

U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

RO Inspection Report No. 050-263/73-06

Licensee: Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401

Monticello Nuclear Generating Plant
Monticello, Minnesota

License No. DPR-22
Category: C

Type of Licensee: BWR (GE) 545 Mwe
Type of Inspection: Routine, Unannounced

Dates of Inspection: May 29 - 31, 1973

Dates of Previous Inspection: May 23 - 25, 1973

Principal Inspector: W. L. Fisher

W. L. Fisher

6/28/73
(Date)

Accompanying Inspector: L. J. Hueter

W. L. Fisher for

6/28/73
(Date)

Other Accompanying Personnel: None

Reviewed By: J. M. Allan, Chief
Radiological and Environmental Protection Branch

J. M. Allan

6-28-73
(Date)

SUMMARY OF FINDINGS

Enforcement Action: None

Licensee Action on Previously Identified Enforcement Matters

The licensee has completed corrective action related to noncompliance item 9(f) noted during the May 1972 management inspection.^{1/} (Paragraph 7)

Unusual Occurrences: None

Other Significant Findings

A. Current Findings: None

B. Unresolved Items

1. Available records did not confirm quarterly calibrations of the liquid radwaste monitor as required by Technical Specifications. (Paragraph 6)
2. Available records did not confirm that the use of a continuous air monitor to measure the reactor building vent release rate had been properly reviewed. (Paragraph 11)
3. Available records did not confirm quarterly calibration of the off-gas monitor. Also, linear extrapolation of calibration data might have been improper. (Paragraph 12)

C. Status of Previously Reported Unresolved Items^{2/}

Not determined due to absence of concerned licensee representative.

Management Interview

A management interview was conducted at the conclusion of the inspection with Messrs. Anderson, Fey, G. Jacobson and R. Jacobson. The following matters were discussed:

^{1/} Letter, RO:HQ to NSP dated 10-19-72.

^{2/} Letter, RO:III to NSP dated 4-16-73.

- A. The inspector stated that the radwaste management program appeared to be generally satisfactory, and that three areas of possible noncompliance (C, D, and E, below) would be considered unresolved pending review by the cognizant licensee representative, who was away from the plant during this inspection.
- B. The inspector stated that corrective action related to noncompliance item 9(f) noted during the May 1972 management inspection had been reviewed and that the item was considered to be resolved. (Paragraph 7)
- C. The inspector described a potential noncompliance item related to quarterly calibration of the liquid radwaste monitor. (Paragraph 6)
- D. The inspector described a potential noncompliance item related to use of a continuous air monitor to measure the reactor building vent release rate. (Paragraph 11)
- F. The inspector described a potential noncompliance item related to quarterly calibration of the off-gas monitor. (Paragraph 12)
- F. The inspector stated that the licensee's analytical results for a spiked filter paper provided by the AEC compared well with the spike levels. (Paragraph 15)
- G. The inspector noted that the licensee had been provided a copy of the report of an aerial survey performed in 1970.
- H. The inspector noted that a 1972 semiannual effluent report error had been discovered. The licensee agreed to correct the error upon receipt from RO:HQ of the draft of the effluent report intended for public dissemination. (Paragraph 8)

REPORT DETAILS

1. Persons Contacted

C. Larson, Plant Manager
W. Anderson, Superintendent - Operations and Maintenance
G. Jacobson, Plant Engineer, Technical
F. Fey, Assistant Radiation Protection Engineer
R. Jacobson, Chemist

2. Solid Wastes

The licensee's solid wastes are packaged on site in the Radwaste Building and shipped at periodic intervals in sole use vehicles to a licensed land burial facility. In 1972, all waste was shipped to Nuclear Engineering Company at Sheffield, Illinois. The licensee also maintains records of transfer of samples and other contaminated items.

In general, the licensee has two types of solid waste, that which is compacted and that which is mixed with cement. Both types are packaged in DOT Specification 17H, 55-gallon metal drums. Compressible, low radioactivity wastes, such as paper and rags collected in plastic bags, are compacted. The compactor has a vented air system such that air flows into the compactor unit and passes through high efficiency particulate filters before being exhausted from the reactor building activation stack.

Solidified waste generally consists of centrifuged sludge from the radwaste cleanup system. The solids include flocculent and resin filter media and the contained fission and activation products. Solid wastes from the primary water cleanup system are processed, packaged, and shipped separately from solids obtained from other sources, due to the significantly higher radioactivity in the solids from the primary water system. However, the same equipment and facilities are used for processing and packaging.

The recent completion of a remotely operated concreting system has resulted in significantly reduced radiation exposure to persons working in the Radwaste Building. The remote operations include selection of ingredients, mixing, drum filling, drum capping, measurement of radiation levels at contact and at 3 feet from the drum, drum spray washing, and placement of drums in storage location.

Contact exposure rates from barrels containing solid waste from the reactor primary water cleanup system have ranged up to 30 R/hr. About

five barrels of this waste are generated monthly during routine reactor operation. Fourteen barrels of this waste are shipped at one time in a shielded cask.

Contact exposure rates from barrels containing solid waste from other sources have ranged up to 1 R/hr recently. The increase in activity is attributed to cleanup of water from the Fuel Storage Pool which has recently been put into use. Approximately 45 barrels per month of this lower level waste are generated during routine reactor operation.

Approximately 5 barrels of low level compacted waste are generated monthly during routine reactor operation. The volume of low level waste can increase somewhat during outages.

Each drum is assigned a number when filled and its plant history is maintained on a record form entitled, "Radioactive Materials Storage Inventory."

The licensee's solid waste shipment records were reviewed in detail for the first six months of 1972, with respect to disposition and approximate volume and activity. All shipments went to the Nuclear Engineering Company land burial facility at Sheffield, Illinois. No solid wastes are buried on site. The recorded volume and activity of the drums agreed with values reported by the licensee in the semiannual report. Shipments were made on seven dates during the period. Records indicate that all barrels were labeled with either a "Radioactive III" label or a "Radioactive-Low Specific Activity" label, as appropriate. The records also included data indicating that the packages did not contain fissile or large quantities of licensed materials and therefore were not subject to the requirements of 10 CFR 71, Packaging of Radioactive Material for Transport.

A shipment was being loaded during the inspection. The inspector observed application of appropriate labeling to individual drums. Also, a number of barrels were spot checked to see if the assigned radioactivity content corresponded to the recorded exposure rate at 3 feet in accordance with the graph. No discrepancies were noted.

3. Liquid Radwaste Records and Reports

The inspector reviewed the Monticello liquid effluent records for calendar year 1972. Batch transfer logs for the waste sample tank floor drain sample tank, chemical waste tank, and laundry drain tank showed that only one batch of radwaste was released during the year. Transfers were made from the waste sample tank to the condensate storage tank and occasionally back to the waste collector tank or waste surge tank for recycle through the liquid waste cleanup system. The only transfer from the floor drain

sample tank was to the waste collector tank on January 23, 1972. From the chemical waste tank there were only five transfers, all to the floor drain collector tank. Records show that all laundry drain tank liquids were transferred to the chemical waste tank in 1972, except batch number 1150, a 1000-gallon batch released to the discharge canal on January 4, 1972. That was the only liquid release in 1972 and the last made by the licensee as of this inspection date. Since that date, all liquid wastes have been reclaimed or used in waste solidification. The valve on the liquid radwaste discharge line leading to the discharge canal was observed by the inspector to be chained and padlocked in the closed position to prevent inadvertent releases.

4. Liquid Radwaste Treatment

The most recent release of radwaste to the Mississippi River was made on January 4, 1972. Nearly all liquid radwaste is reclaimed. A small amount is used in the solidification of resins and filter media.

5. Liquid Radwaste Storage

"Liquid Radwaste Storage Activity" surveillance records show that from January 1972 to May 1973, the Waste Sample tanks, Floor Drain Sample Tank, Condensate Storage Tanks, and Waste Surge Tank have been sampled as required by the technical specifications. The highest total activity in these tanks appears to have been about 0.4 Ci on December 21, 1972.

6. Liquid Radwaste Effluent Monitor Calibration

"Radwaste Effluent Monitor Quarterly Calibration" surveillance records show that a one-point calibration with a liquid standard (Cs-137) was performed in August 1970. At that time, the instrument's response to external check sources was also measured, as follows:

<u>Date</u>	<u>Response</u>	<u>To</u>
8-26-70	2.5×10^{-6} μ Ci/ml/c/s	Cs-137 solution
8-31-70	9×10^3 c/s	2.59×10^6 d/m of Co-60
8-31-70	7×10^4 c/s	2.59×10^7 d/m of Co-60

Since that time, check sources of various strengths and unidentified type have been used to check the response quarterly. The "Radwaste Effluent Monitor Quarterly Calibration" surveillance records do not indicate that these checks, which occur in the "Functional Test" portion of the surveillance record, constitute a calibration. No

other records available during this inspection showed that the Radwaste Monitor has been calibrated as required by Technical Specification 4.8.C.1. The matter is being considered unresolved pending discussion with the responsible person, who was unavailable during the inspection.

7. Liquid Radwaste System Operating Procedures

During the management inspection of May 1972, the licensee was cited for having not revised radwaste operating procedures to reflect changes made to the radwaste system.^{3/} In replying to the citation, the licensee stated that Section B.7 of the Operations Manual was being revised to include all Volume F procedures. During the current inspection, the inspector reviewed and found adequate the revision to Section B.7.1, which specifically concerns liquid radwaste.

8. Gaseous Radwaste Records and Reports

The inspector reviewed quarterly "Off-Gas Calibration Log," "Chemistry Weekly Report," and "Off-Gas Isotopic Analysis" records, weekly "Off-Gas Gross Activity Measurement" records, and weekly stack and reactor building vent particulate filter analytical results (obtained by the Minnesota Department of Health) for calendar year 1972. Records for September 1972 were reviewed and compared with the semiannual effluent report. No discrepancies were noted between the recorded and reported noble gas, halogen, and particulate effluent data.

Gaseous effluents have two primary release paths, the stack and the reactor building vent. The stack handles only a small portion (4000 cfm) of the gaseous effluent volume, but handles most of the effluent activity, primarily noble gases and their daughter products from the air ejector. The reactor building vent, through which the main volume of gaseous effluent flows, is divided into three separate parts. In determining release rates from the vent, samples are collected from and the release rate determined for each part. The sum of the three then represents the vent release rate.

Effluent records indicate that the noble gas release rate usually ranged from 30,000 to 60,000 $\mu\text{Ci}/\text{sec}$ from the stack and was less than 300 $\mu\text{Ci}/\text{sec}$ from the reactor building vent. During September 1972, the I-131 release rate averaged about 0.04 $\mu\text{Ci}/\text{sec}$ for the stack and 0.01 $\mu\text{Ci}/\text{sec}$ for the reactor building vent. For the same month, the particulate release rate averaged about 0.0005 $\mu\text{Ci}/\text{sec}$ for the stack and 0.0004 $\mu\text{Ci}/\text{sec}$ for the vent.

^{3/} Letter, RO:HQ to NSP dated 10-19-72.

The inspector's review of records revealed that samples of the air ejector off-gas are obtained two and sometimes three times a week. An isotopic analysis is performed and a ratio of long-lived to short-lived activity is determined for each sample. This ratio is based on gross beta-gamma counts taken twenty minutes after sample collection and two hours after sample collection. The isotopic data and air ejector off-gas flow rate are used in calibration of the off-gas monitor and the stack monitor.

Records showed that charcoal cartridges and particulate filters are removed weekly from samplers in the stack and the three parts of the reactor building vent. The licensee analyzes the charcoal cartridges for halogens and analyzes the particulate filters for gross beta-gamma activity prior to sending the particulate filters to the Minnesota Department of Health for analysis of isotopes with half-lives greater than 8 days (excluding Sr-89 and 90). In April 1972, the licensee analyzed a stack filter for Sr-89 and 90. This analysis was used in estimating Sr-89 and 90 releases for all months of the calendar year 1972. In reviewing the data with the inspector, the licensee detected an error in the Sr-89 and 90 analysis. This error affected records of Sr-89 and 90 activity released and the semiannual effluent reports. The monthly activity recorded and reported as being released was $\leq 1 \times 10^{-8}$ curies per month for Sr-89 and for Sr-90. The corrected value should be 3.9×10^{-6} Ci per month for Sr-89 and 3.6×10^{-6} Ci per month for Sr-90 for each month except January 1972 when the reactor was shut down. The licensee indicated that records and the semiannual report information would be corrected.

No errors were apparent in analytical methods or data aside from the error mentioned above.

9. Gaseous Radwaste Treatment

The licensee presently uses available means of reducing gaseous effluents and is installing additional systems to further reduce gaseous effluents.

10. Iodine Release Rates During Recent Outage

During the recent outage, stack and reactor building vent I-131 releases rates ranged from 4.4×10^{-6} to 3.1×10^{-2} $\mu\text{Ci}/\text{sec}$ and 1.0×10^{-4} to 5.9×10^{-2} $\mu\text{Ci}/\text{sec}$, respectively. During the three months before the outage, the stack and vent I-131 release rates ranged from 1.7×10^{-2} to 3.1×10^{-2} $\mu\text{Ci}/\text{sec}$ and 0.5×10^{-3} to 8.7×10^{-3} $\mu\text{Ci}/\text{sec}$, respectively.

11. Reactor Building Ventilation Plenum Monitor

"Reactor Building Exhaust Plenum Test and Calibration Procedure" surveillance records show that the plenum monitors have been functionally tested and calibrated (in terms of exposure rates in mR/hr) as required for reactor building isolation purposes. However, the inspector was unable to find that the monitors have ever been calibrated to measure radioactive effluent concentrations in the plenum. The licensee has installed a continuous air monitor to sample and measure the plenum concentration, but the inspector was unable to find that this change had been reviewed by the licensee in accordance with 10 CFR 50.59. The matter is being considered unresolved pending discussion with the responsible person, who was unavailable during the inspection.

12. Off-Gas Monitor Calibration

"Off-Gas Monitor Test and Calibration Procedure" surveillance records show that functional tests have been performed adequately. However, the monitors do not appear to have been calibrated properly throughout their range. Twice weekly, an off-gas sample is analyzed isotopically for comparison with actual off-gas monitor readings. These one-point calibrations are then extrapolated linearly, although another measurement (described below) suggests a nonlinear response.

As part of the "Off-Gas Monitor Test and Calibration Procedure," response to an external source is measured whenever the reactor is not operating. One such measurement, made on March 22, 1973, suggests that the off-gas isolation trip level might be low by a factor of four. This apparent nonlinearity seems never to have been considered in conjunction with the off-gas calibrations. In addition, this external source calibration, which appears to be required quarterly by the technical specifications, may have been missed from time to time, as evidenced by the lack of such calibration records between February 8, 1972, and March 22, 1973.

This matter is being considered unresolved pending discussion with the responsible person, who was unavailable during the inspection.

13. Stack Gas Monitor

Surveillance records show that stack gas monitor functional tests and calibrations have been performed adequately. Alarm setpoints presently correspond to release rates of about 1×10^5 $\mu\text{Ci/sec}$ (high) and 2×10^5 $\mu\text{Ci/sec}$ (High-high).

14. Administrative Off-Gas Limit

The licensee has initiated an administrative limit of 100,000 $\mu\text{Ci}/\text{sec}$. The procedure, documented as Volume F Temporary Memo No. 301, requires that operation above 100,000 and 270,000 $\mu\text{Ci}/\text{sec}$ be approved by Power Production Department Management and by the Vice President - Power Production and System Operation, respectively.

15. Analysis of Spiked Filter

In November 1972, the licensee was provided a particulate filter which had been spiked with four radionuclides by the AEC Health Services Laboratory in Idaho. The inspector discussed the licensee's analytical results, which compared very well with the spike values.

16. Branching Ratios

The licensee was given what are considered by RO to be the most accurate gamma branching ratios for the major off-gas radionuclides.



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A. RO Inspection Report No. 050-263/73-06

Transmittal Date : June 29, 1973

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B. RO Inquiry Report No. _____

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C. Incident Notification From: _____
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