

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

*Reactor Facilities  
Branch*

JAN 30 1976

Northern States Power Company  
ATTN: Mr. Leo Wachter  
Vice President  
Power Production and  
System Operation  
414 Nicollet Mall  
Minneapolis, Minnesota 55401

Docket No. 50-263

Gentlemen:

This refers to the inspection conducted by Mr. L. R. Greger of this office on January 5-9, 1976, of activities at the Monticello Nuclear Generating Plant authorized by NRC Operating License No. DPR-22 and to the discussion of our findings with Mr. Larson and other members of the plant staff at the conclusion of the inspection.

A copy of our report of this inspection is enclosed and identifies the areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, interviews with plant personnel, and observations by the inspector.

No items of noncompliance with NRC requirements were identified within the scope of this inspection.

Based on discussions with your representatives at the plant, we understand that you implemented the gaseous effluent requirements contained in Amendment No. 11 to the Technical Specifications on October 1, 1975 and that although the Augmented Off-Gas System is not yet considered fully operational, you will continue to operate in accordance with those Technical Specifications.

*JM*

Northern States Power  
Company

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JAN 30 1976

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you or your contractors believe to be proprietary, it is necessary that you make a written application to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. Any such application must include a full statement of the reasons for which it is claimed that the information is proprietary, and should be prepared so the proprietary information identified in the application is contained in a separate part of the document. Unless we receive an application to withhold information or are otherwise contacted within the specified time period, the written material identified in this paragraph will be placed in the Public Document Room.

No reply to this letter is necessary; however, should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely yours,

Gaston Fiorelli, Chief  
Reactor Operations and  
Nuclear Support Branch

Enclosure:  
IE Inspection Rpt No.  
050-263/76-02

cc w/encl:  
C. E. Larson, Plant Manager

bcc w/encl:  
PDR  
Local PDR  
NSIC  
TIC  
Anthony Roisman, Esq., Attorney

U. S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report of Operational Radwaste Inspection

IE Inspection No. 050-263/76-02

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

License No. DPR-22  
Category: C

Monticello Nuclear Generating Plant  
Monticello, Minnesota

Type of Licensee: BWR 1670 Mwt

Type of Inspection: Routine, Unannounced

Dates of Inspection: January 5-9, 1976

Principle Inspector: *L. R. Greger*  
L. R. Greger

1/29/76  
(Date)

Accompanying Inspectors: None

Other Accompanying Personnel: None

Reviewed By: *W. L. Fisher*  
W. L. Fisher, Section Leader  
Fuel Facility Projects and  
Radiation Support

1/29/76  
(Date)

SUMMARY OF FINDINGS

Inspection Summary

Inspection on January 5-9, (76-02): Review of radwaste records and procedures, process monitor calibrations, and reactor coolant chemistry.

Enforcement Items

No items of noncompliance with NRC requirements were identified during this inspection.

Licensee Action on Previously Identified Enforcement Items

Not Applicable.

Other Significant Items

A. Systems and Components

The augmented off-gas system was considered operational for the purpose of implementation of the revised technical specifications commencing with the fourth quarter of 1975. (Paragraph 3.a, Report Details)

B. Facility Items (Plans and Procedures)

Unresolved Item - The licensee's process monitor calibration procedures utilize solid sources in the performance of quarterly calibrations. Review of cross calibrations between the solid sources and fluid standards is required to determine the adequacy of the quarterly calibrations. (Paragraph 7, Report Details)

C. Managerial Items

None identified during this inspection.

D. Noncompliance Identified and Corrected by Licensee

None identified during this inspection.

E. Deviations

None identified during this inspection.

F. Status of Previously Reported Unresolved Items

Not applicable.

### Management Interview

A management interview was conducted with Mr. Larson and other members of the licensee's staff at the conclusion of the inspection on January 9, 1976. The following items were discussed with the licensee representatives:

- A. The inspector noted that the licensee had implemented the technical specification revision (Amendment No. 11) pertaining to operation of the augmented off-gas system as of October 1, 1975. The inspector asked for clarification of the licensee's intent with respect to continued implementation of the revised technical specifications. The licensee stated that although some operational problems had not been fully resolved, the augmented off-gas system would continue to be operated in accordance with the revised technical specifications. (Paragraph 3.a, Report Details)
- B. The inspector noted that the gaseous effluent limits changed from annual to quarterly with implementation of Amendment No. 11 to the technical specifications. The inspector requested the licensee to clarify the derivations of the "Percent of Technical Specifications Limit" entries in the semiannual report covering the last half of 1975. The licensee stated that explanatory information would be included in the semiannual report. (Paragraph 3.b, Report Details)
- C. The licensee stated that the procedures utilized to control discharge of radwaste from the licensee's solidification system to the contractor's mobile solidification trailer would be revised to specifically address controls to prevent inadvertent discharge of radwaste. (Paragraph 5, Report Details)
- D. The licensee stated that the off-gas stack monitor conversion factor calculation would be reviewed to ensure that gas decay tank release calculations utilize the correct isotopic analyses. (Paragraph 7.a, Report Details)
- E. The inspector stated that due to time restrictions and the limited availability of a member of the licensee's staff, cross calibrations between the discrete solid sources used in several process monitor calibration procedures and fluid standards had not been examined. The inspector further stated that until the cross calibrations were reviewed the adequacy of the calibrations would be carried as an unresolved item. The licensee stated that the cross calibrations would be available for the inspector's review during a subsequent inspection. The licensee further stated that certain cross calibration procedures were to be revised to include a requirement for multipoint calibrations and more explicit description of calibration sources. (Paragraph 7, Report Details)

## REPORT DETAILS

### 1. Persons Contacted

C. Larson, Plant Manager  
M. Clarity, Plant Engineering and Radiation Protection Superintendent  
L. Eliason, Radiation Protection Engineer  
F. Fey, Assistant Radiation Protection Engineer  
R. Jacobson, Chemist  
L. Nolan, Engineer  
J. Peterson, Radiation Specialist

### 2. General

This inspection was conducted to examine the licensee's radwaste (gaseous, liquid, and solid) operations for compliance with NRC regulations. The licensee's derivations and records of radioactive effluents were reviewed and compared with the radioactive releases reported in the licensee's semiannual reports. Liquid and gaseous effluent process monitor calibrations and reactor coolant chemistry measurements were also reviewed. No deviations from regulatory requirements nor prudent health physics practices were identified during the inspection.

### 3. Gaseous Radwaste

#### a. Augmented Off-Gas System

The licensee's augmented off-gas system, consisting of two recombiners and five pressurized hold up tanks added to the existing 30-minute holdup system, has operated most of 1975. Several problems, including off-gas detonations, leakage associated with the hydrogen analyzers, and pressure oscillations causing flow control difficulties, prevented continuous operation during the year. The problem of off-gas detonations has apparently been resolved through modification of the catalyst support bed and thorough cleaning of the off-gas piping. Although minor operational problems remain, the licensee considered the augmented off-gas system operational for technical specification purposes as of October 1, 1975. The more restrictive gaseous effluent technical specification limits therefore become applicable commencing with the fourth quarter of 1975.

Based upon statements by licensee personnel and review of licensee records, the recombiner downstream hydrogen monitors have been operable (at least one per train) during power operation, hydrogen concentrations downstream of the recombiners

have not reached the 4% trip point, and the gas decay storage tanks have not experienced problems associated with valve leakage. Storage times in the gas decay tanks have averaged between 10 and 20 days, dependent upon condenser air inleakage rates and operating history. No instances of less than 12 hours holdup were noted. Condenser air inleakage, determined weekly as required by the technical specifications, has normally been in the range of 5 to 10 cfm. Gas decay tank gross radioactivity is determined in conjunction with the weekly air inleakage surveillance. Review of the licensee's surveillance records revealed the maximum gross radioactivity contained in any one gas decay tank during 1975 to have been less than 25% of the technical specification limit. Subsequent to the last refueling outage, gas decay tank gross radioactivity has routinely been less than 1% of the technical specification limit. According to the licensee's surveillance records, functional test and calibration frequencies for the modified off-gas hydrogen analyzers complied with the technical specification requirements during 1975.

b. Gross Gaseous Radioactivity Releases

Continuous monitors on the off-gas stack and reactor building vents perform alarm, isolation, and quantification functions to prevent exceeding the technical specification release rate limit. The gross radioactivity release limit was reduced by a factor of approximately 10 by the modified off-gas technical specification revision which became effective October 1, 1975. According to the licensee's monitoring records, the maximum release rate experienced during the first three quarters of 1975 was less than 25% of the technical specification limit (annual average), and the average release rate was approximately 5% of the technical specification limit during that period. The maximum release rate noted under the revised technical specifications (fourth quarter) was less than 3% of the technical specification limit (quarterly average) and the average release rate was less than 1.5% of the technical specification limit. No release rates in excess of the instantaneous technical specification limits were identified during the records review.

According to the licensee's surveillance records, air ejector off-gas isotopic analyses were performed weekly during the entire year. The long-lived to short-lived activity ratio was determined weekly during the first three quarters of the year, as required by the former technical specifications. Average beta and gamma energies per disintegration were determined weekly in conjunction with the isotopic analyses.

c. Radioiodine Releases

Charcoal samplers on the off-gas stack and reactor building vents provide continuous sampling and periodic quantification of airborne radioiodine effluents. The radioiodine release limit was changed during the year (commencing in October) due to the modified off-gas technical specification revision and a change in the location of the nearest dairy cow. According to the licensee's monitoring records, the average radioiodine release rate was less than the annual technical specification limit for 1975. Subsequent to the last refueling (October 1975), radioiodine releases have routinely been less than 1% of the technical specification limit. The modified off-gas system utilizes an in-line charcoal bed for iodine removal, whereas the former off-gas system did not utilize charcoal. Daily sampling has not been required during 1975. I-133 and I-135 analyses have been performed at least monthly.

d. Radioactive Particulate Releases

Particulate samplers on the off-gas stack and reactor building vents provide continuous sampling and periodic quantification of airborne particulate effluents. The radioactive particulate release limit was changed during the year (commencing in October), due to the modified off-gas technical specification revision. According to the licensee's monitoring records, the average particulate release rate was less than the annual technical specification limit during 1975. Subsequent to the last refueling (October 1975), particulate releases have routinely been less than 1% of the technical specification limit. Daily sampling has not been required during 1975. Gamma isotopic analyses were performed weekly; MPC values are determined for each isotopic analysis. Sr-89, Sr-90, and gross alpha analyses were conducted at least quarterly.

e. Tritium Releases

During 1975, the licensee has used both cold trapping and silica gel to collect vaporous tritium samples. According to the licensee's surveillance records, the off-gas stack and the reactor building vents were sampled monthly during 1975. Gaseous tritium releases were calculated from condensate concentrations monthly. The licensee's sampling records were in agreement with the tritium releases reported for the first half of 1975.

4. Liquid Radwaste

a. Effluents

No liquid radwaste releases were made during calendar year 1975. Waste liquids continue to be recycled for reuse in the reactor coolant system or used in processing of solid wastes. In order to achieve this maximum recycle philosophy, the licensee minimizes the generation of high conductivity wastes, such as laundry, chemical cleaning, and demineralizer regeneration water. The licensee has not experienced significant ground water or condenser inleakage. Makeup water is required to compensate for losses via evaporation and solid radwaste usage. The makeup requirements have been significantly reduced by operation of the recombiners in the modified off-gas system. Approximately 4500 gallons of high conductivity (low radioactivity - approximately 56 mCi total) chemical waste water was shipped offsite for disposal during 1975.

The licensee's monthly discharge canal surveillance records were reviewed. No discrepancies from the technical specification requirements were noted.

b. Liquid Storage

The licensee's "Liquid Radwaste Storage Activity" surveillance records for 1975, were selectively reviewed. No discrepancies from the required surveillance frequencies were noted. The maximum total activity recorded for the Waste Sample, Floor Drain Sample, Waste Surge, and Condensate Storage Tanks was less than 20% of the technical specification limit of 30 curies.

5. Solid Radwaste

The licensee's radwaste solidification system remains out of operation, due to cement hardening problems in the "mixer-feeder." Excessive personal exposures associated with maintenance resulted in the decision to modify the "mixer-feeder" by improving the flushing arrangement. Further modifications to the solidification system, including TV level monitoring instrumentation and a drum fill splatter shield, are also underway. Until the radwaste solidification modifications are completed, mobile solidification services have been contracted from Chem Nuclear Systems, Inc. Mobile solidification operations were conducted on four occasions during 1975, totaling approximately three months onsite time. According to the licensee's records, approximately 5000 curies of waste was transferred to Chem Nuclear for solidification

and disposal during 1975. The licensee completed construction of a permanent enclosure which surrounds the mobile solidification trailer. The enclosure provides weather protection and enhances contamination control, should accidental leakage occur. Licensee procedures control the solidification operations, including shipment of the solidified radwaste. It was noted that these procedures did not specify precautions to prevent inadvertent discharge of radwaste material via the temporary hose connection to the mobile solidification trailer.

Review of the licensee's waste disposal records did not reveal any discrepancies from the waste disposal data reported in the licensee's Ninth Semiannual Operating Report. No discrepancies from packaging or labeling requirements were noted.

6. Radioactive Effluent Reports

The licensee's semiannual operating reports covering the periods July 1, 1974 through December 31, 1974 and January 1, 1975 through June 30, 1975 were reviewed. The reporting format complies with the technical specification requirements. No anomalous results were noted. It was noted that noble gas releases had decreased more than a factor of 10 over the reporting periods, apparently due to replacement of leaking fuel in January 1975 and increased usage of the modified off-gas system during the first six months of 1975. The licensee's release records subsequent to the October 1975 refueling indicate that the noble gas releases have been reduced by more than a factor of 100 over those experienced during the last half of 1974.

7. Process Monitors

a. Off-Gas Stack Monitor

Continuous off-gas stack monitoring is provided by two scintillation detector monitors located on an isokinetic sample line. The monitors' outputs are averaged and printed out hourly by the process computer. According to the licensee's records, the conversion factor for the monitor is determined at least weekly from an isotopic analysis performed on a sample of the air ejector off-gas. Review of the licensee's conversion calculations revealed that a relatively minor error apparently exists in the method used to calculate the conversion factor. The nonsystematic error evolves from an inaccurate selection of gas decay storage tank isotopic analyses. The stack monitor alarm and isolation trip points are determined quarterly in conjunction with the monitor calibration. The setpoints were found to be consistent with the technical specification release rate limits.

According to the licensee's surveillance records, functional test and calibration frequencies during 1975 complied with the technical specification requirements. The adequacy of the calibration technique was not ascertained and is considered unresolved pending examination of cross calibrations between the discrete solid sources utilized in the calibration procedures and gaseous standards. Performance of the functional test was adequate.

b. Air Ejector Monitor

Continuous air ejector off-gas monitoring is provided by two off-line ionization chamber monitors. According to licensee personnel, both air ejector monitors were operable throughout 1975. A selective review of the licensee's records did not reveal any instances of monitor inoperability. It was further noted that operation with the off-gas holdup system recombiners bypassed was not necessary during 1975. The air ejector monitor isolation trip points are determined in conjunction with the monitor calibration. The trip setpoints were found to be consistent with the technical specification limit for the maximum stack gross radioactivity release rate (assuming 120 minutes decay). The licensee's records indicated that the air ejector monitor conversion factor (mR/hr to  $\mu$ Ci/sec) is determined at least weekly, based upon an isotopic analysis performed on a sample of the air ejector off-gas. No discrepancies were noted in the conversion calculations.

According to the licensee's surveillance records, functional test and calibration frequencies during 1975 complied with the technical specification requirements. Cross calibrations between the discrete solid sources utilized in the calibration procedure and gaseous standards were not examined. This item will be examined further during a subsequent inspection. Performance of the functional test was adequate.

c. Reactor Building Vent Monitors

Continuous release monitoring of the reactor building ventilation exhaust is provided by an off line continuous air monitor. The monitor output is averaged and printed out on an hourly basis by the process computer. According to the licensee's surveillance records, functional test and calibration frequencies

during 1975 complied with the technical specification requirements. Cross calibrations between the discrete solid sources utilized in the calibration procedure and gaseous standards were not examined. This item will be examined further during a subsequent inspection. Performance of the functional test was adequate.

Two GM monitors in the reactor building ventilation plenum and two GM monitors on the refueling floor serve alarm and ventilation isolation functions. According to licensee personnel, the monitors were operable throughout 1975. A selective review of the licensee's records did not reveal any instances of monitor inoperability. According to the licensee's surveillance records, functional test and calibration frequencies during 1975 complied with the technical specification requirements. The monitor trip points are determined quarterly in conjunction with the monitor calibrations. The setpoints were found to be consistent with the technical specification requirements.

d. Liquid Effluent Monitor and Discharge Canal Monitor

Liquid radwaste effluent and discharge canal monitoring is provided by separate, in line, scintillation detector monitors. According to licensee personnel, both liquid monitors were operable throughout 1975. A selective review of the licensee's records did not reveal any instances of monitor inoperability. According to the licensee's surveillance records, functional test and calibration frequencies during 1975 complied with the technical specification requirements. Cross calibrations between the discrete solid sources utilized in the calibration procedures and liquid standards were not examined. These cross calibrations will be examined during a subsequent inspection. Performance of the functional tests were adequate.

8. Procedures

The following Operations Manual changes were reviewed:

- B.5.11 Process Radiation Monitoring (9/6/75)
- B.7.1 Liquid Radwaste (2/11/75)
- B.7.2 Gaseous Radwaste (11/25/75)
- B.7.3 Solid Radwaste (6/25/75)

The above listed procedural changes were noted to have been reviewed by the Operations Committee. The changes do not appear to degrade the licensee's radiological effluent control capabilities.

9. Reactor Coolant Chemistry

The licensee's reactor coolant radiochemistry results for calendar year 1975 were examined. No discrepancies from the technical specification surveillance requirements for radioiodine sampling or monthly gamma isotopic analyses were noted. According to the licensee's records, radioiodine sampling was conducted: (1) at least every 96 hours during power operation, (2) within 24 hours subsequent to reactor startup when the I-131 dose equivalent concentration prior to shutdown had been between 1% and 10% of the 5  $\mu\text{Ci/gm}$  technical specification limit, and (3) prior to reactor startup when the I-131 dose equivalent concentration prior to shutdown had been greater than 10% of the 5  $\mu\text{Ci/gm}$  limit. The reactor coolant radioiodine concentration (I-131 dose equivalent) averaged less than 10% of the technical specification limit; the maximum radioiodine concentration was less than 20% of the technical specification limit. Radiiodine surveillance during 1975 was not dependent upon air ejector monitor increases.