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

REGION III

Report of Operational Radwaste Inspection

IE Inspection Report No. 050-263/75-04

Licensee: Northern States Power Company
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: Unannounced, Waste Management Systems

Dates of Inspection: February 18-21, 1975

Date of Previous Inspection: February 7, 1975 (Operations)

Principal Inspector: Loren Hueter — 3-31-75 (Date)

Accompanying Inspector: Don Miller — 3-31-75 (Date)

Other Accompanying Personnel: None

Reviewed By: W. L. Fisher, Senior Health Physicist
Facilities Radiological Protection Section — 3-31-75 (Date)

SUMMARY OF FINDINGS

Enforcement Action

None

Licensee Action on Previously Identified Enforcement Matters

A. During a previous inspection the licensee was found in apparent violation regarding adequate calibration of the liquid effluent monitor.[1/] Licensee action since that inspection along with a commitment received during the current inspection results in our having no further questions at this time regarding the matter. (Paragraph 3)

B. The licensee has completed corrective action related to an apparent violation noted during a previous inspection[2/] involving frequency of counting vent filter cartridges when specific gross beta-gamma activitiy release rates were exceeded. (Paragraph 8)

Unusual Occurrences

None

Other Significant Findings

A. **Current Findings**

The licensee was at power during the inspection having ended an outage about 2 weeks prior to the inspection.

B. Unresolved Items

None

C. Status of Previously Reported Unresolved Items

None reported

Management Interview

The inspectors conducted an interview with Messrs. Larson (Plant Manager), Clarity (Superintendent-Plant Engineering and Radiation Protection) and Fey (Assistant Radiation Protection Engineer) at the conclusion of the inspection on February 21, 1975. The following matters were discussed.

1/ RO Inspection Rpt No. 050-263/74-04.
2/ RO Inspection Rpt No. 050-263/74-01.

A. The inspectors stated that corrective action related to an apparent violation noted during a previous inspection[3/] along with a commitment received during this inspection results in our having no further questions at this time regarding calibration of the liquid effluent monitor. (Paragraph 3)

B. The inspectors acknowledged the corrective action taken regarding an apparent violation noted during a previous inspection[4/] involving the frequency of changing and counting vent filter cartridges when specific gross beta-gamma activity release rates were exceeded, and that we have no further questions at this time regarding the matter. (Paragraph 8)

C. Potential problems with the mobile waste solidification system were discussed. The inspectors gave favorable comment on the licensee's comprehensive radwaste records system. (Paragraph 7)

3/ RO Inspection Rpt No. 050-263/74-04.
4/ RO Inspection Rpt No. 050-263/74-01.

REPORT DETAILS

1. Persons Contacted

C. Larson, Plant Manager
M. Clarity, Superintendent, Plant Engineering and Radiation Protection
L. Eliason, Radiation Protection Engineer
F. Fey, Assistant Radiation Protection Engineer
R. Jacobson Chemist
D. Anthony, Plant Engineer, Operations

2. Liquid Radwaste System

The licensee continues to operate the facility without release of liquid radwaste. The last liquid radwaste release was in January 1972. Waste liquids are processed and reused with the exception of chemical wastes. The high conductivity of chemical wastes is the major factor affecting feasibility of the reclamation of these wastes. The liquid chemical wastes are used in processing solid wastes (refer to paragraph 7 for further details). All contaminated laundry is sent to an out-of-state licensed laundry facility, minimizing the licensee's handling of liquid wastes having high conductivity.

The valve for releasing to the discharge canal was observed to be chained and locked to prevent inadvertent releases.

3. Calibration of Liquid System Radiation Monitors

During a previous inspection[5/] the licensee was cited against Technical Specification 4.8.C.1 in that functional tests and pulse generator tests performed on the liquid radwaste effluent monitor did not constitute a calibration as defined in Technical Specification 1.F. As noted above, this monitor has not been used to monitor actual radwaste releases for over three years in that the last release of this type was made in January 1972. The licensee established a revised quarterly procedure approved by management on July 22, 1974 and first used on August 30, 1974. This procedure involves an electronic "calibration" (including trip functions) of the entire unit exclusive of the detector. Linearity of the detector's response using an acceptance criteria of $\mp$ 20% is then determined using three similar cobalt 60 sources of differing activities. Further, the licensee agreed to correlate monitor response to the actual radwaste prior to subsequent release by using an actual analyzed sample of the sparged liquid radwaste in a limited length of the piping.

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Functional tests continue to be performed monthly on the liquid radwaste effluent monitor.

Records were reviewed of routine electronic tests (monthly) and response to a solid source of given activity (quarterly) performed for both the service water effluent monitor and the discharge canal monitor.

4. Radioactive Liquid Storage

"Liquid Radwaste Storage Activity" surveillance records were reviewed for December 1974 and January 1975. These records show that samples were taken from the Waste Sample, Floor Drain Sample, Waste Surge and Condensate Storage Tanks every 72 hours during the period. These samples were analysed for gross beta-gamma activity and recorded as required. The maximum total activity (excluding tritium and dissolved noble gases) during this period was 1.84 curies. Technical Specifications surveillance requirements stipulate actions to be taken to reduce the radioactivity when the total in the tanks exceeds 30 curies.

5. Reactor Coolant Quality

Records show that required monthly isotopic analysis of reactor coolant water have been performed throughout 1974. A detailed review of December 1974 records shows that reactor coolant was sampled at least every 96 hours and analyzed for gross beta activity and also for total iodine concentration. The gross beta concentration did not exceed 6.6 microcuries per milliliter and total iodine concentration did not exceed 4.6 microcuries per milliliter. The later is well within the Limiting Condition of Operation of 20 microcuries per milliliter of total iodine in Technical Specification 3.6.C.1.

The December records also shows that every 96 hours a sample of reactor coolant was analyzed for conductivity and chloride ion content. The conductivity did not exceed 0.19 micromho per centimeter (applicable Technical Specification limit of 10) and the chloride ion content did not exceed 0.01 parts per million (applicable Technical Specification limit of 1.0). A cursory review of records for November 1974 and January 1975 showed that four hour testing frequency requirements had been met during reactor startup, shutdown, or testing.

6. Review for Potential Unmonitored Liquid Release Path

There are no cold (nonradioactive) sumps in the reactor building or Radwaste Building. The turbine building has a cold sump having two sump pumps (one as backup to the other) which operate automatically based on water level in the sump. The cold sump collects only from floor drains in the turbine building. However, most of the floor drains in the Turbine Building are sealed closed. Other sumps are also located

on the lower level of the Turbine Building which drain to radwaste systems. These sumps are located on a sub level of the lower level of the Turbine Building which is about 4½ feet lower than the level of the clean sump. The area of the sub-level is quite large such that to overflow it would take a very large volume of water. Therefore, entry of potentially contaminated water into this cold sump from the hot sumps is highly improbable. Samples of liquid from this cold sump have been taken and analyzed periodically for evidence of radioactivity with negative results.

7. Solid Radwaste

The licensee's basic solid radwaste system and procedures are as described in a previous inspection report.[6/] However, the licensee has had increasing maintenance difficulties with the cement handling components of the solidification system. This maintenance has resulted in significant personal exposure. Cement has hardened in one of the augers rendering the final stages of the solidification system inoperable. As a result, the licensee has obtained the services of a licensed firm, Chem Nuclear, to perform solidification onsite using a patented process housed in a tractor trailer parked at the solid radwaste loading dock. Wastes containing about 80% liquid are transferred by a positive displacement pump through a high pressure hose to the trailer where it is mixed in a given ratio with a chemical compound in a shielded container. A catalyst is added just prior to entering the steel liners which are placed in shipping casks.

Although no activity is expected, the displaced air when the liner is being filled is vented by tubing back to the Radwaste Building. A closed circuit TV system provides viewing of the filling operation. Shipments were made in the fall of 1974 through Chem Nuclear and more shipments were in progress at the time of the inspection. Use of the system has resulted in large reduction in exposure of plant personnel per shipment. Further, Operating personnel of Chem Nuclear are reportedly not receiving significant personnel exposures.

The licensee's solid waste shipment records were reviewed in detail for the first six months of 1974, with respect to disposition, approximate volume, activity and labeling. No discrepancies were noted between the licensee's records and that reported by the licensee in the semiannual report pertaining to disposition, volume and activity. The licensee has established and is utilizing a comprehensive set of procedures for controlling shipments of radioactive material. These procedures cover the stages from original request through stages of approval, analysis, surveys, etc. and a follow-up to assure that each shipment arrives at its planned destination.

6/ RO Inspection Rpt No. 050-263/73-06.

8. Gaseous Radwaste System

The technical specification requirement for recording the gross stack release rate on an hourly basis is fulfilled by a continuous recording chart.

Records reviewed for the three month period from October through December, 1974 show that off-gas was sampled, gross ratio of long-lived to short-lived activity determined and isotopic analysis performed at frequencies meeting the technical specifications.

The inspectors reviewed the licensee's records of releases of gaseous waste for the month of June, 1974. These records were in agreement with that reported by the licensee in the semiannual report. Further, it was concluded from the review that the licensee used proper data reduction techniques to obtain identity, quantity, release rate and percent of technical specification limits of noble gases, halogens and particulates.

At the time of a previous inspection[7/] the licensee was cited against the surveillance requirements of Technical Specification 4.8.A.2 in that some filter cartridges were not counted daily as required when gross beta-gamma activity exceeded 25% of the annual average release rate of specification 3.8.A.1. A review of records during this inspection showed that since the referenced inspection the licensee has counted both stack filter cartridges and vent filter cartridges daily when required due to measured gross beta-gamma activity.

Since the last radwaste management inspection, the licensee has in the interest or reducing gaseous radwaste releases to "as low as practicable" installed a demister and charcoal filter in the exhaust line which vents tanks and processing equipment in the Radwaste Facility to the reactor building vent. For the short time this filter system has been in operation, the licensee judges that it has been effective in reducing the iodine 131 releases from the reactor building vent by a factor of 2-3.

9. Off-Gas Monitor

Records show that at least twice weekly during reactor operations one point calibrations are performed by comparing the off-gas monitor reading with isotopic analyis of an actual off-gas sample. Proper functional tests have been performed every three months using a built in current source and each refueling outage with a known external source to assure reasonably linear response. An acceptance criteria has been established for the tolerance of measured response by the monitor compared to the known activity with instructions to notify the Rad Protection Engineer if response falls outside the established tolerance.

7/ RO Inspection Rpt No. 050-263/74-01.

10. Stack Gas Monitor

Sensor checks, monthly functional checks and quarterly calibrations have been performed adequately and at required frequencies for the stack gas monitor as evidenced by surveillance records.

11. Reactor Building Ventilation Plenum Monitor

"Reactor Building Ventilation Plenum Monitor Test and Calibration Procedure" surveillance records show that the plenum monitors have been functionally tested and calibrated (in terms of exposure rate in milliroentgen per hour) as required by specification for reactor building isolation purposes.

As noted during previous inspections a continuous air monitor (CAM) is utilized in lieu of the reactor building vent monitor to measure the reactor building vent effluent for use is demonstrating compliance with specification release rates. At the time of a previous inspection[8/] the licensee agreed to expedite calibration of this CAM with known concentrations of noble gases. The licensee has established and implemented test and calibration procedures involving: (1) an annual calibration with a known mixture of noble gases of plant origin (air ejector off-gas); (2) a semiannual calibration check (within ± 15% of annual calibration response) utilizing a krypton 85 standard and xenon 133 of plant origin; and (3) a quarterly three point linearity check (within ± 20%) using an external source and the inverse square relationship to distance with the detector removed from its shield. The annual calibration is performed concurrently with a quarterly linearity check. The CAM calibration factor determined during the November 1974 calibration while using known concentrations of a mixture of xenon 133, xenon 135 and krypton 85 from the air ejector off-gas was 3.1×10^{-8} microcuries per milliliter per count per minute. It is noted that this factor is somewhat more conservative than the factor previously used which was based on response curves supplied by the instrument vendor. However, if one were to assume this same calibration factor should have applied in the past the percent of specification limits for total gaseous releases in the past would not have been altered even when considering the more restrictive limits placed on the vent as compared to the stack as insignificant quantities of noble gases are released by the reactor building vent.

12. Standby Gas Treatment System Filter Efficiency Tests

Records show that required tests of charcoal filters by using freon and tests of high efficiency particulate air filters using dioctylphthalate

8/ RO Inspection Rpt No. 050-263/74-01.

were performed at required frequencies in 1974 and early 1975. All filters tested in the standby gas treatment system met the acceptance criteria. The latest tests were performed on January 8, 1975.

The inlet heater output and pressure drop across the combined high-efficiency and charcoal filters were tested in March 1974 and found to meet specifications. The pressure drop across the filters was again tested in mid May 1974 due to a charcoal filter change.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION III
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A. IE Inspection Report No. 050-263/75-04

Transmittal Date : April 2, 1975

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