UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

TELEPHONE
(312) 858-2660

A. RO Inspection Report No. 050-263/74-01

Transmittal Date : April 19, 1974

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B. RO Inquiry Report No. _____

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C. Incident Notification From: _____
(Licensee & Docket No. (or License No.)

Transmittal Date : _____

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APR 19 1974

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 on February 27--March 1, 1974, by Mr. Hueter of this office of activities authorized by AEC Operating License No. DPR-22 and to the discussion of our findings with Messrs. Clarity and Eliason of your staff at the conclusion of the inspection and subsequently on March 29, 1974 with Mr. Larson.

The enclosed copy of our inspection report identifies 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.

This inspection included a review of Items 2 and 3 of the three items described in our letter dated June 29, 1973.

During this inspection certain of your activities were found to be in apparent violation of AEC requirements, as described under Enforcement Action in the Summary of Findings Section of the enclosed inspection report.

This notice is sent to you pursuant to the provisions of Section 2.201 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office within twenty days of your receipt of this notice a written statement or explanation in reply, including for Violation A: (1) correctiive action taken and the results achieved; (2) corrective action to be taken to avoid further violations; and (3) the date when full compliance will be achieved. Regarding Violation B, the inspector determined that corrective action had been taken and that measures had been taken to prevent recurrences. Consequently, no reply is required for Violation B and we have no further questions regarding that matter at this time.

In accordance with Section 2.790 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this notice, the enclosed inspection report, and your response to this notice will be placed in the AEC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this notice, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

We will gladly discuss any questions you have concerning this inspection.

Sincerely yours,

James G. Keppler
Regional Director

Enclosure:
RO Inspection Rpt
No. 050-263/74-01

bcc: RO Chief, FS&EB
RO:HQ (4)
Licensing (4)
DR Central Files
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U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

Report of Operational Radwaste

RO Inspection Report No. 050-263/74-01

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: February 27 — March 1, 1974

Dates of Previous Inspection: December 26 - 28, 1973 (Environmental)

Principal Inspector: L. Hueter — 4-17-74 (Date)

Accompanying Inspector: None

Other Accompanying Personnel: None

Reviewed By: W. L. Fisher, Senior Health Physicist
Facilities Radiological Protection Section — 4/17/74 (Date)

SUMMARY OF FINDINGS

Enforcement Action

The following violations are considered to be Category II severity:

A. Technical Specification Section 4.8.A.2 of Surveillance Requirements states "Station records of release of iodines shall be maintained on the basis of all stack and vent filter cartridges counted. The filter cartridges shall be counted weekly when the measured release rate of gross beta-gamma activity is less than 25% of average annual release rate of specification 3.8.A.1; otherwise the cartridges shall be counted daily."

Contrary to the above, when the measured release rate of gross beta-gamma activity was 25% or greater of the average release rate of specification 3.8.A.1, during portions of the period November 1973 through January 1974, only the stack filter cartridges were counted daily. The vent filter cartridges were still counted weekly. (Paragraph 2.d)

B. License Conditon 2.C of Amendment No. 1, Provisional Operating License No. DPR-22, authorizes, in part, possession of 0.5405 millicuries of cobalt 60 (in solution form) and 27 microcuries of cobalt 60 (without restriction as to chemical or physical form).1/

Contrary to the above, inventory records show that the licensee possessed approximately 3.4 millicuries of cobalt 60 (in solution form) on June 6, 1973.

It is noted that the overpossession was discovered by the licensee and reported timely to the Commission, and that the corrective actions stated in the report have been implemented by the licensee. These include application for a license amendment (pending) to authorize the possession of all liquid cobalt 60 on inventory and procedural changes to ensure that possession limits are not exceeded in the future. (Paragraph 10)

Licensee Action on Previously Identified Enforcement Matters

None reported.

Unusual Occurrences: None.

1/ Letter, NSP to DL, dated 7/6/73.

Other Significant Findings

A. Current Findings

The licensee has been operating at somewhat reduced power level for about the past two months. During this time, noble gas and iodine 131 release rates have been running about 25-45% of their annual average release rate limits. A refueling outage is scheduled for mid March.

B. Unresolved Items: None.

C. Status of Previously Reported Unresolved Items

1. The licensee has reviewed the off-gas monitor calibration items pertaining to timely quarterly calibrations and adequacy of linear extrapolation of calibration data.[2/] A technical specification change was requested and granted to resolve the question of timely calibration. An error in calibration procedure was detected and corrected pertaining to the other item. It did not significantly affect linear extrapolation of calibration data. (Paragraph 6.b-e)

2. The inspector reviewed the licensee's use of a continuous air monitor to measure the reactor building vent release rate.[3/] The licensee stated that this continuous air monitor was installed at the 1027-foot level of the reactor building in July or August 1970, before issuance of the operating license. This matter is considered resolved.

Management Interview

The management interview was conducted with Messrs. Clarity, Superintendent, Plant Engineering and Radiation Protection, and Eliason, Radiation Protection Engineer, at the conclusion of the inspection on March 1, 1974, and subsequently on March 29 with Mr. Larson, Plant Manager. The following was discussed:

A. The licensee was informed of an apparent violation involving failure to count reactor building vent filter cartridges at specified frequencies. (Paragraph 2.d)

B. The inspector discussed the unresolved items pertaining to the off-gas monitor calibration noted during a previous inspection.[4/] The licensee's actions on the matter were reviewed and the licensee was informed that the matter is considered resolved. (Paragraph 6.b-e)

2/ RO Inspection Rpt No. 050-263/73-06.
3/ Ibid.
4/ Ibid.

C. The inspector discussed the unresolved item pertaining to the use of a continuous air monitor in lieu of the reactor building vent monitor to measure reactor building effluent.5/ The licensee stated that the continuous air monitor was installed at the 1027 foot level of the reactor building in July or August 1970, before issuance of the operating license. The licensee was informed that the matter is considered resolved. (Paragraph 7.b).

D. The need for the licensee to use known concentrations of noble gases to calibrate the continuous air monitor used to measure noble gas release rates from the reactor building vent was discussed. The licensee agreed to expedite this calibration. (Paragraph 7.c)

E. The licensee was informed of apparent violation of License Condition 2.C. involving the possession of liquid cobalt 60 in excess of that authorized.6/ (Paragraph 10)

5/ Ibid.
6/ Letter, NSP to DL, dated 7/6/73.

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

2. Gaseous Radwaste

a. Continuous chart recording is used to fulfill the specification requirement for recording the gross stack release rate of gaseous activity on an hourly basis.

b. Records reviewed from May through December 1973 showed that off-gas was sampled, gross ratio of long-lived to short-lived activity determined, and isotopic analysis performed at frequencies exceeding the specifications.

c. Records reviewed from May 1973 through January 1974 show that gaseous release of tritium from the stack and reactor building vent has been calculated monthly from measured data as required. Cold trapping sampling techniques are used once monthly and the measured concentration is assumed to be the average for the month. The monthly release rate ranged from 0.8 to 3.2 curies, the highest being in October.

d. Records of releases of iodine and particulates with half lives greater than 8 days is maintained on the basis of all stack and vent filter cartridges counted. Technical Specification 4.8.A.2 states, in part, "The filter cartridges shall be counted weekly when the measured release rate of gross beta-gamma activity is less than 25 percent of the average annual release rate of specification 3.8.A.1; otherwise the cartridges shall be counted daily." "Stack/Vent Filter Activity" surveillance records show release rates and the percent of technical specification release rate limits for noble gases as well as both iodine 131 and particulates with greater than 8 day half life. A review of these records from September 5, 1973 through January 28, 1974, showed that the filters have been counted and calculations made throughout this period. The records also show that noble gas release rates were above 25 percent of specification 3.8.A.1 for a short period in the first half of November and ranged from 24 to 42 percent from November 22, 1973 through January 28, 1974. The "Stack/Vent Filter Activity" record was completed daily during this latter period as well as during the earlier period in November. However only the

stack filters were counted daily during these periods. Counting of the vent filters was continued on a weekly basis and the release rate used in the daily calculation of the "Stack/Vent Filter Activity" record was based on the latest weekly analysis of vent filters. The licensee appears to be in noncompliance with Technical Specification 4.8.A.2 which requires filter cartridges to be counted daily when the noble gas release rate is 25 percent or greater of its annual average release rate limit. The specification makes no provision for excluding from the daily counting requirement any of the stack or vent filter cartridges.

e. The significance of vent iodine 131 in relation to the stack iodine 131 (as pertains to the release rate limit for iodine 131 and particulates with greater than 8 day half lives) may be seen by review of the data from a typical "Stack/Vent Filter Activity" record. The one chosen at random represented a 24 hour period ending on December 12, 1973. This record showed the noble gas release rate was 35.4 percent of the specification limit with the stack accouting for 35.0 percent of this and the reactor building vent acounting for only 0.4 percent. This record also showed the release rate of iodine 131 and particulates with greater than 8 day half lives was at 41.5 percent of the specification release rate limit. The stack accounted for only 3.5 percent while the vent accounted for 38 percent. The particulates were an insignificant component of both percentages. The actual iodine 131 release rates were as follows:

Iodine 131 Release Rates (12-12-73)

Stack	0.083 microcuries per second
Reactor Building Vent	0.037 microcuries per second

f. Although the release rate from the vent was less than half that from the stack, the vent accounted for a much greater percentage of the specification limit.

g. The inspector reviewed the licensee's records of release of gaseous waste for the month of December 1973. These records were in agreement with that reported by the licensee in the semiannual report. Further, the review indicated 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. The gaseous effluent data is reported to the Commission in the format specified in Technical Specification 6.7.f.(1).

h. At the time of the May 1973 inspection, it was noted that strontium 89 and 90 airborne releases for the year 1972 were based only on analysis of a stack filter in April and estimated to be the average of that released throughout the year.[7] During this inspection, it was found that the licensee is now evaluating strontium 89 and 90 airborne releases on a quarterly frequency. The licensee was in the process of analyzing a February stack filter and had evaluated a December stack filter. As in the past, the strontium 89 and 90 activity has accounted for a maximum of 1-2 percent of the particulate activity with half life longer than 8 days. Further, particulates with greater than 8 day half life from the stack and the vent are routinely less than 1 percent of the technical specification limit and averaged only 0.27 percent for 1973. The licensee has been unable to detect strontium 89 and 90 in the reactor water. The revised technical specifications (relating to airborne releases) which are to be effective upon placing into operation the augmented gaseous radwaste treatment system, requires quarterly analysis of strontium 89 and 90. The licensee stated that it was recognized that this analysis was to include both the stack and vent effluents. If schedules are met, the augmented gaseous radwaste system should be in operation within 3 months:

i. At the time of a previous radwaste inspection, a 1972 semi-annual effluent report error had been discovered.[8] The licensee agreed to correct the error upon receipt from RO:HQ of the draft report intended for public dissemination. The inspector noted that this correction was made.

3. Gaseous Radwaste Treatment

The licensee uses available means of reducing gaseous effluents and is still in the process of installing additional systems to further reduce gaseous effluents.

4. Recent Iodine and Noble Gas Release Rates

a. Failure in the integrity of fuel cladding has been evident since early November 1973. The licensee has reduced power level to maintain noble gas release rates near their administratively established limits of 100,000 microcuries per second. Since early November, noble gas release rates have ranged between 90,000 and 130,000 microcuries per second. This is well below the technical specification annual average limit of 270,000 microcuries per second.

7/ RO Inspection Rpt No. 050-263/73-06.
8/ Ibid.

b. Also of note, during July through October, stack and reactor building vent iodine 131 release rates ranged from 2.7×10^{-3} to 4.1×10^{-2} microcuries per second and 8.8×10^{-4} to 8.9×10^{-3} microcuries per second, respectively. During this same period, the percent of technical specification limit for total iodine 131 released ranged from 2.6 to 9.7 percent.

c. During November, the stack and reactor building vent iodine 131 weekly release rates reached peaks of 1.5×10^{-1} and 6.3×10^{-2}, respectively and the percent of technical specification limit for total iodine 131 released was 45.7 for November and 29.9 for December. The vent contributed most to this percentage (although its contribution is less than half of the total amount of iodine 131 released) due to the more restrictive factor applied to releases from the vent. Of particular note is the observation that iodine release rates from the reactor building vent (since fuel cladding problems were experienced in early November) have been near or above the revised iodine 131 release rate limits for any calendar quarter. These revised, more restrictive, limits are to be effective when the augmented gaseous radwaste treatment system is put into operation which is anticipated to be immediately following the spring refueling outage. However, the augmented system will have no effect on reducing iodine 131 or other airborne radioactivity from the reactor building vent effluent. The licensee believes the major portion of iodine 131 in the vent effluent during periods of reactor operation is attributable to the venting of tanks and equipment in the Radwaste Facility. These tanks and equipment are used for processing filter media, spent resins and other waste in preparation for shipment and disposal.

5. Stack Gas Monitor

Surveillance records show that stack gas monitor sensor checks, monthly functional tests, and quarterly calibrations have been performed adequately and at required frequencies. Alarm setpoints currently correspond to release rates of about 1.3×10^5 microcuries per second (high) and 2.0×10^5 microcuries per second (High-high).

6. Off-Gas Monitor

a. "Operations Daily Log" surveillance records show that sensor checks have been performed adequately. "Off-Gas Monitor Test and Calibration Procedure" surveillance records show that functional tests have been performed adequately.

b. The adequacy of the calibration of the monitors was considered an unresolved item at the time of a previous inspection as the

responsible person was unavailable for discussion during the inspection.9/ Two problems were apparent: one involved proper calibration throughout the range of the monitors and its involvement with the proper setpoint of the off-gas isolation trip level; the other involved a question of whether the external source calibration had been performed quarterly as appeared to be required by technical specifications.

c. As noted in the referenced inspection report, twice weekly an off-gas sample was analyzed isotopically for comparison with actual off-gas monitor readings. These one point calibrations were then extrapolated linearly although another measurement described in the report suggested a nonlinear response to an external source when the reactor was not operating. Measurements indicated a relative decrease in instrument response at higher radiation levels. As a results, one such measurement made on March 22, 1973, suggested that the isolation trip level could be low by a factor of four if it were based on a one point calibration at the low end of the scale, using a gas sample analysis and then extrapolating linearly. The apparent non-linearity had not been considered in locating the isolation trip level. The licensee reviewed the matter and found the problem to be in the procedure used in calibrating with the external source. Distances had been measured from the surface of the detector rather than from the center of the detector. This introduced an error which became of much greater magnitude for the measurements involving higher radiation levels, and in particular, the highest, made near the surface of the detector. The procedure was altered and subsequent external source calibrations have shown response to be reasonably linear. A review of a calibration performed on November 16, 1973, showed calibration at six points ranging from 100 to 7,000 milliroentgens per hour on the off-gas monitor with linearity demonstrated throughout the range. The isolation setpoint is at 5,000 milliroentgens per hour and corresponds to a release rate at the stack of 270,000 microcuries per second. The latter is the average annual release rate limit but is conservative by a factor of 10 for the specified isolation trip point.

d. It is concluded that the isolation trip level was not low as the off-gas monitor has a linear response and the isolation trip point has been based on a one point calibration in the lower range of the instrument by using an actual gas sample.

e. The second problem involved the frequency of calibration of the of the off-gas monitor with an external source. The technical specification appeared to require this calibration to be performed

9/ Ibid.

quarterly. This could not be done during reactor operation. As a solution to this problem, the licensee requested and was granted a change in the technical specifications. The issuance on November 15, 1973, of Change No. 12 to the technical specifications included a revision of Table 4.2.1 on page 62 of the specifications, involving the calibration of the off-gas monitors. As revised, the instruments are to be calibrated every three months by means of a built-in source, and each refueling outage with a known radioactive source."

f. The licensee continues the isotopic analysis of an off-gas sample about twice weekly for use in the one point calibration described in Paragraph c, above. In addition, quarterly calibrations have been performed by means of a built-in current source. The latest calibration of the off-gas monitors with an external source was performed on November 16, 1973. Another is planned for the refueling outage scheduled to start about mid March.

7. Reactor Building Ventilation Plenum Monitor

a. "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.

b. As indicated during a previous inspection, use of a continuous air monitor (CAM) in lieu of the reactor building vent monitor to measure the reactor building effluent did not appear to have been reviewed in accordance with 10 CFR 50.59(b).[10/] The licensee stated that the continuous air monitor was installed on the 1027 foot level of the reactor building in July or August 1970, before issuance of the operating license.

c. The licensee's calibration of the continuous air monitor referenced above is based on response curves supplied by the vendor, relating counts per minute to concentration, for various groups of isotopes. The vendor used one isotope to make actual calibrations, (which indicated linear response) and the rest of the data were based on a literature review providing information on decay schemes, energies, etc. Quarterly response and linearity checks have been conducted using an external source. Response is also compared with that of a 1972 check to verify no change in instrument characteristics. A General Electric supplied beta scintillator calibrated at GE's Valecitos facility has been placed

10/ Ibid.

in series with the CAM. Data from both the CAM and the scintillator are being supplied to GE who will provide the licensee with the results. The licensee stated that verbal conversation to date indicates the "calibration" currently being used for the CAM is conservative. Further, the licensee indicated their plans to modify the sample air stream piping to provide isolation and recirculation capabilities which will facilitate calibration of the CAM with known concentrations of noble gases from the steam jet air ejector or the off-gas system holdup tanks.

8. Standby Gas Treatment System Filter Efficiency Tests

The standby gas treatment system has two identical branches. Each branch has an upstream high efficiency (HEPA) filter bank followed by a charcoal filter bank and then a dowstream (HEPA) filter bank. Records show that all filter banks of both branches were tested for efficiency three times in 1973, January 16-18, July 2-5, and December 19-21. HEPA filters were tested for 0.3 micron size particles based on a dioctylphthalate (DOP) test and charcoal filters were tested with freon. All tests showed that each filter bank had an efficiency, based on its respective test, greater than the 99 percent required by technical specifications.

9. Radioactive Liquid Storage

"Liquid Radwaste Storage Activity" surveillance records show that from July 1 through December 31, 1973, a sample from the Waste Sample, Floor Drain Sample, Waste Surge, and Condensate Storage Tanks have been taken, analyzed, and recorded as required by technical specifications. The highest total activity in these tanks was a little above one curie (excluding tritium and dissolved noble gases) at any one time the 72 hour analysis was made. This is below the specification limit of 2 curies.

10. Possession of Liquid Cobalt 60 Source in Excess of License Limits

a. The licensee reported by letter to the Commission their determination that the quantity of liquid cobalt 60, being stored onsite for the purpose of preparing standard sources, was in excess of their licensed limit.11/ The determination was made while performing a source inventory on June 6, 1973. The authorized limit for liquid cobalt 60 as specified in License Condition 2.C. of Provisional Operating License DPR-22 is 0.5405 millicuries (in solution form) and 27 microcuries (without restriction as to chemical or physical

11/ Letter, NSP to DL, dated 7/6/73.

form). The actual inventory was found to be about 3.4 millicuries. Investigation showed that the licensee had not ordered the source size which was received. It was included as part of a larger order for the licensee. When it arrived it was picked up on the source inventory but not recognized at the time as being in excess of the license limit. The licensee was informed that the possession of liquid cobalt 60 in an amount greater than 0.568 millicuries is in apparent noncompliance with License Condition 2.C.

b. In the report to the Commission, the licensee stated that corrective action would be taken. The report stated that corrective action would be taken to modify the operating license to include the additional cobalt 60. The licensee on August 31, 1973, submitted to DL a request for an increase in the possession limit of cobalt 60 in liquid form to include that currently in excess of limit. As of the inspection date, this requested amendment was still pending. Further the report stated that procedures for receiving radioactive sources would be changed so that the licensed limit would not be exceeded in the future. The licensee has established and put into use a procedure covering receipt, transfer, and disposal records. A computer program has been prepared for providing a monthly inventory. Any time a new source is received, this information has to be put into the computer program. Part of this procedure requires that a check be made to assure that the new source by itself or when combined with material already on hand will not exceed any licensed possession limit. It was in setting up the computer program initially that the over possession was noted by the licensee.