

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

REGION III

Report of Operational Radiation Protection Inspection

IE Inspection Report No. 050-263/75-10

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-(G.R) 545 Mwe

Type of Inspection: Announced - Radiation Protection

Dates of Inspection: May 20-22, 1975

Principal Inspector: *Loren Hueter*
Loren Hueter

6/17/75
(Date)

Accompanying Inspector: *Robert Greger*
Robert Greger

6/17/75
(Date)

Other Accompanying Personnel: None

Reviewed By: *W. L. Fisher*
W. L. Fisher, Senior Health Physicist
Facilities Radiological Protection Section

6/18/75
(Date)

SUMMARY OF FINDINGS

Inspection Summary

Inspection on May 20-22, 1975: Reviewed radiation protection organization, training, procedures, records, audits, reports, instrumentation and equipment, respiratory protection program, safety evaluations, and byproduct material inventory. Observed plant radiological conditions during inspection of facilities.

Enforcement Action

None.

Licensee Action on Previously Identified Enforcement Matters

None within the scope of this inspection.

Unusual Occurrences

None within the scope of this inspection.

Other Significant Findings

A. Systems and Components

None.

B. Facility Items (Plans and Procedures)

The licensee has not consistently performed routine surveys and updated extended Radiation Work Permits. (Paragraph 8.e and f)

C. Managerial Items

None.

D. Noncompliance Identified and Corrected by Licensee

None.

E. Deviations

None.

F. Status of Previously Reported Unresolved Items

No previously reported unresolved items within the scope of this inspection.

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 May 22, 1975, and subsequently by telecon with Mr. Eliason (Radiation Protection Engineer) on June 2, 1975. The following items were specifically discussed with the licensee personnel:

- A. The inspectors noted that certain office personnel had not received formal radiation protection instruction. The licensee stated that all plant and contract employees working within restricted areas would be required to complete a radiological indoctrination course. (Paragraph 5)
- B. The inspectors questioned the inclusion of certain items in the Radiation Protection Information Memorandum File. The licensee agreed to evaluate the information contained in the Radiation Protection Information Memorandum File for possible inclusion in the controlled plant procedures system. (Paragraph 6)
- C. The licensee stated that the procedures pertaining to radiation protection surveys and radiation work permits would be reviewed in light of the inspection findings. (Paragraph 8.e and 8.f)
- D. The use of certain respiratory protective equipment for which the licensee could provide no evidence of approvals was discussed. Licensee personnel stated that no protection factors would be considered for use of any such devices in the future. (Paragraph 9)

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. Scheinost, Plant Quality Engineer
E. Wright, Radiation Protection Specialist
P. Yurczyk, Radiation Protection Specialist
G. Mathiasen, Radiation Protection Specialist
W. Shinnick, Radiation Protection Specialist
J. Peterson, Radiation Protection Specialist

2. Organization

The only change in the radiation protection organization since the last radiation protection inspection, conducted in March 1974, has been the addition of two radiation protection specialists to the staff. These positions were filled in March and July 1974. All normal radiation protection staff positions are presently filled. One of the new staff members had previous radiation protection experience in the Nuclear Navy, while the other had no previous nuclear experience. A Radiation Protection Specialist Trainee Progression Program is used to provide training and periodic evaluation and testing for all radiation protection specialists. Responsibilities are assigned based on this training and demonstrated level of competence.

During major outages the licensee continues to utilize the services of health physicists from another NSP nuclear plant as well as contract health physicists.

3. Licensee Audit

The licensee conducted an annual internal audit of the radiation protection procedures, as required by their Administrative Control Directives, in November 1974. The audit appears to have been limited in scope. Examined during the audit were the review and approval and procedure identification and control requirements; one procedure was examined for adherence. Mr. Ralph Scheinost, who has recently assumed the Plant Quality Engineer's position, is responsible for scheduling, organizing, and ensuring the timely performance of internal audit. Radiological contractor performance is not, according to the licensee personnel, included within the purview of the audit program. The Safety Audit Committee performs additional scheduled audits of radiation protection activities. These audits were not examined during this inspection.

4. Initial Discussions With Management

During initial discussion with radiation protection management, it was stated that there had been no unreported exposures or releases since the last radiation protection inspection. There were no previous unresolved items. Also, there were no identified unusual occurrences with radiation protection significance which had not previously been inspected.

5. Training

An initial 4-hour radiological training course (followed by a written exam) is given new employees and contract personnel prior to allowing unescorted entry within the access control areas. A 10-hour course for operators presently under development is expected to be available in videotape form in the near future. Requalification tests are given annually; the last such exam was given in January 1975. Self study is utilized in preparation for the annual requalification exams.

According to licensee personnel, all licensee and contract personnel presently at the plant have either successfully completed or are presently enrolled in a radiological indoctrination course with the exception of two administrative personnel. Selective examination of the test records by the inspectors did not reveal any **discrepancies from the licensee's statements**. The licensee stated that the two administrative personnel would be given the radiological indoctrination training, since their jobs require entry within restricted areas, even though their work does not involve radioactive materials. This matter will be examined further during a subsequent inspection.

6. Radiological Protection Procedures

The inspectors examined changes which had been made to the following procedures since the previous radiation protection inspection:

- E.1.2.VI Exposure received while visiting other sites on company business
- E.1.3.IV Access Control
- E.1.3.V Radiation work permits
- E.1.5.V Protective clothing and equipment
- E.1.6.II Reports

The procedural revisions examined did not alter the overall procedural compatibility with regulatory requirements. The revisions had been reviewed and approved in accordance with the requirements specified in the Technical Specifications and Administrative Control Directives.

In addition to the formal radiation protection procedures contained in Volume E of the Operations Manual, the licensee maintains a compilation of radiation protection information memoranda. These memoranda contain guidance (both short and long term) to the radiation protection technicians for performance of their duties, but additionally appear to contain some radiation protection procedures which should be more rigidly controlled (in accordance with policy stipulated in the licensee's Administrative Control Directives). The licensee agreed to examine these memoranda for conformance with the documentation requirements contained in the Administrative Control Directives. This matter will be examined further during a subsequent inspection.

7. Instrumentation and Equipment

The inspectors examined selected radiation protection survey equipment utilized by the licensee in the conduct of radiation, contamination, and airborne surveys. The instruments examined were operable and had been calibrated within the time periods specified in the radiation protection procedures. It was noted that the licensee does not routinely perform neutron surveys. An annual historical neutron survey is conducted. The examination did not reveal any discrepancies in the adequacy of survey instruments nor the interpretation of survey results. The licensee has commenced sending survey instruments to an outside laboratory for calibration instead of performing these calibrations onsite.

8. Records-Radiation Safety Evaluation

a. In Plant Air Sampling Program

The licensee utilizes eight continuous air monitors (CAM) for monitoring airborne particulate activities within the plant buildings. Only the CAM monitoring the drywell is equipped with a charcoal adsorber. A revised calibration procedure for the continuous air monitor, in the process of finalization at the time of this inspection, will be examined during a subsequent inspection. In addition to the continuous air monitors, the licensee conducts grab sample surveys for airborne particulate and halogen activities. These surveys are conducted in accordance with the Radiation Protection

Survey Procedure (E.1.4.II). Areas with airborne activities greater than 0.25 MPC are required to be posted. An unidentified isotope MPC of $3E-10$ microcuries per milliliter is utilized. The licensee does not routinely perform gamma isotopic analyses of the airborne samples.

The licensee controls entries into airborne radiation areas and maintains a log of individual MPC-hours. An administrative limit of 20 MPC-hours (seven consecutive days) is utilized for routine exposure control. Credit is taken for use of respiratory protection equipment only if nasal smears indicate less than 500 disintegrations per minute.

b. Unusual Occurrences

There were no unusual occurrences with identified radiation protection significance which had not previously been evaluated by RO.

c. Personal Dosimetry

The licensee utilizes the services of Eberline Instrument Corporation to provide TLD badges for personal monitoring. Additionally, direct or indirect reading dosimeters are required to be worn. Extremity monitoring is stipulated **for expected exposures in excess of 300 millirems per week**. Exposure records equivalent to AEC Form 5 are maintained on the contractor's printout sheets. The inspectors examined the licensee's personal dosimetry records for 1974 and the first quarter of 1975; no discrepancies were noted. AEC Form 4's were required to be completed for approximately 12 to 14 individuals during the period reviewed. A selective review of the AEC Form 4's did not reveal any discrepancies.

The licensee maintains a tabulation of dosimeter readings and comparisons with TLD badge results. When required, the contractor's cumulative TLD exposure records are corrected to reflect significant additional exposures recorded by the dosimeters. The licensee expects to acquire a dosimeter calibrator in the near future and to begin an internal dosimeter calibration program.

d. Bioassays and In Vivo Counting

The licensee continues to contract the performance of annual whole body counts at the end of or during the latter stages of a refueling outage. In conjunction with the January 9 through February 7, 1975, refueling outage, whole body counts were performed for 186 people by Helgeson Nuclear Services on January 27-29, 1975. The largest burdens reported, all well below permissible limits, were as follows:

<u>Radionuclide</u>	<u>Body Burden</u>	<u>Percent of Limit*</u>
Cesium 134	44 nanocuries (nCi)	< 0.5 TB
Cesium 137	73 nCi	< 0.5 TB
Iodine 131	40 nCi	5.7 Thy
Zirconium-Niobium 95	51 nCi	3.2 L
Ruthenium 106	60 nCi	10.0 L
Cobalt 58	61 nCi	2.1 L
Cobalt 60	122 nCi	11.1 L

*The designations TB, Thy and L stand for total body, thyroid and lung, respectively, representing the organ of reference on which the limit is based. The permissible burdens for total body and thyroid are taken directly from ICRP Report of Committee II. As that report does not list a permissible limit for the lung, Helgeson Nuclear Service has calculated the value for the referenced isotopes using a lung model.

Indication of minor external contamination on several individuals resulted in a recount for these individuals after showering. The recount showed successful removal of the external contamination.

The bioassay program consists primarily of occasional urine samples collected by the licensee and submitted to Eberline for analysis. Nasal swabs are counted for individuals who have been in airborne areas whether or not respiratory equipment was worn. When a nasal swab has an activity greater than 500 disintegrations per minute (dpm), a urine sample is collected and counted. A resample is taken at a level of 100 dpm per milliliter (dpm/ml) in urine. At a level of 200 dpm/ml in urine, a gamma scan is made for isotopic identification and whole body counting is considered.

A review of bioassay records showed that several urine samples had been collected since the last radiation protection inspection as a result of activity on nasal swabs. Although none of these urine samples had concentrations of 100 dpm/ml, in some cases a resample was taken, followed by a whole body count and an evaluation made of the body burden and the exposure received. The analyses did not indicate any overexposures to airborne concentrations.

e. Radiation Surveys and Exposure Control

The licensee's procedures specify the conduct of routine daily and weekly radiation, contamination, and airborne radioactivity surveys. In-house limits of 2.5 millirems per hour, 100

disintegrations per minute per 100 square centimeters, and 0.25 MPC are utilized in defining radiation, contamination, and airborne radiation areas, respectively. The inspectors conducted a selected review of the licensee's survey results. It was noted that on several occasions portions of the specified surveys were not conducted. Licensee personnel stated that the demands of higher priority items occasionally prevented completion of routine surveys. The licensee stated that the matter would be investigated and appropriate corrective action implemented. This matter will be examined further during a subsequent inspection. No other discrepancies were noted.

The licensee is in the process of setting up a surveillance program for calibrations not required by technical specifications. Calibration procedures and schedules will be examined during a subsequent inspection.

An evaluation of radiation levels due to nitrogen 16 was made for the licensee in March 1972 by Catalytic, Inc. of Philadelphia, Pa. An ion chamber consisting of a stainless steel sphere filled with argon gas to a pressure of several atmospheres was used in conjunction with a gamma spectrometer used to quantify nitrogen 16 and other components in the measured field. The survey, conducted while operating near full power, showed the maximum radiation level at the perimeter fence (1720 feet from the turbine) to be less than 5 mR/year due to nitrogen 16. At 120 feet and at about 75 feet from the turbine the radiation levels due to nitrogen 16 were measured at 800 mR/year and 6,000 mR/year, respectively, the latter being about 0.7 mR/hr. When operating, the only routine entries to the turbine area are quick walk-throughs by operators.

f. Work Authorization Records

A selected review of Radiation Work Permits for the first four months of 1975 revealed no problems concerning the preplanning of work. It was noted, however, that the licensee had not, in all cases, complied with the internally specified weekly review and updating of extended Radiation Work Permits. The licensee stated that the matter would be investigated and that appropriate corrective action would be taken. This matter will be examined further during a subsequent inspection.

9. Respiratory Protection

A review was made of the licensee's respiratory protection program which consists of training, face piece fitting and testing, cleaning, inspection and repairs, and storage. Equipment on hand includes self contained units, air purifying respirators (full and half mask face pieces), and airline respirators (full face masks and suits). For use with the air purifying respirators, the licensee has on hand filter cartridges and canisters, the latter containing both a particulate filter and a charcoal sorbent. The licensee could provide no evidence that either the airline supplied suit or the canister containing both a particulate filter and a charcoal sorbent were approved by Bureau of Mines (BOM) or National Institute for Occupational Safety and Health (NIOSH). A licensee representative stated that it was thought by them that the devices in question were approved.

As previously noted in paragraph 8.a the licensee controls entries into airborne radiation areas and maintains a log of individual MPC-hour exposures. Associated with this log is a record of the measured airborne concentration of iodine and/or particulates, the MPC used, and the length of exposure. In calculating MPC-hours of exposure, the licensee typically used for particulate activity the gross beta count, rather than isotopic identification, and uses the restrictive MPC value of $3E-10$ microcuries per milliliter ($\mu\text{Ci/ml}$) based on the absence of alpha emitters, lead-210, actinium-227, radium-228, and plutonium-241. This MPC value is more restrictive than the applicable MPC value for strontium 90 of $1E-9$ $\mu\text{Ci/ml}$.

Review of the log of individual MPC-hour exposures from January 1, 1975 up to the inspection dates revealed no indication of applying a protection factor for use of the airline supplied suit. Several instances were found where a protection factor had been applied with respect to particulates when the canister containing both a particulate filter and a sorbent were used. However, in only one instance were measured air concentrations high enough that use of a protection factor would have been required to maintain exposure to 40 MPC-hours in any period of seven consecutive days. The protection factor needed in this one instance was 1.25. The routine nasal swab taken at the completion of the job showed no significant activity. Further, if one assumed all of the measured particulate activity were strontium-90, the exposure during the seven consecutive days in question would have been only about 15 MPC-hours without considering any protection factor.

10. Materials Inventory

The licensee's radioactive material inventory and leak test records were reviewed. Inventories and leak tests are conducted semiannually as required by Radiation Protection Procedure E.1.8.II. Examination of the licensee's records and inspection of the source storage area did not reveal any discrepancies from the authorized possession limits. The last leak test and inventory was conducted in January 1975. A nominal 2 microcurie Th-228 source was determined to be leaking at that time. The source was sealed in a plastic bag while awaiting disposal.

11. Receipt and Transfer of Material

Since the last radiation protection inspection, the licensee has had no irradiated fuel shipments. Transfer of radioactive material, including radwaste, were reviewed during a recent radwaste inspection.^{1/} The procedures for transfer require a determination that the receiver is authorized to receive the material. The licensee also has procedures for package inspection and for receiving and opening packages. The current procedure for receipt and unpackaging of radioactive materials to fulfill requirements of 10 CFR 20.205 is contained in Radiation Protection Information Memorandum No. 9 dated November 21, 1974. No problems were noted in review of these procedures and records maintained of receipts of four packages of radioactive material thus far in 1975.

12. Shipping Accidents

According to licensee personnel there have been no accidents involving shipments since the last radiation protection inspection. Review of radioactive material transfer records during a recent radwaste inspection^{2/} did not reveal any discrepancies from the licensee's statement.

13. Facilities and Equipment

Since the last radiation protection inspection there have been several changes in facilities and/or equipment completed as well as some currently in various stages of planning. Most of these changes having radiation protection significance involve the radwaste system. Records reviewed show that the licensee performed the safety evaluation required by 10 CFR 50.59 for such changes and also obtained appropriate management approvals for such changes.

1/ IE Inspection Rpt No. 050-263/75-04.
2/ Ibid.

The paper work involving Design Change 74-50 to provide for radwaste solidification by a vendor was reviewed in detail with no problems noted by the inspector. This change was reported in the licensee's second half 1974 semiannual operating report.

About a two-hour tour was made of the controlled access area in the reactor building and radwaste building. No actual radiation work was observed. Areas specifically observed include the following:

- a. Radiochemistry laboratories
- b. Counting rooms
- c. Change rooms
- d. Personal decontamination areas
- e. Equipment and laundry decontamination areas
- f. Radioactive material storage areas

Particular attention was given to posting, access points to restricted and radiation areas, and high radiation area control devices. No problems were noted other than the observation that certain of the extended Radiation Work Permits had not been updated on a weekly basis as noted elsewhere in this report.

14. Notifications and Reports

A licensee representative stated that the licensee has experienced no theft or loss of licensed material, incidents, overexposures, excessive levels, or concentrations since the last radiation protection inspection which would require reporting under applicable sections of 10 CFR Part 20. No information to the contrary was identified during the inspection. A review of the licensee's personal exposure records along with the annual report submitted to the Commission indicates that the reporting requirements of 10 CFR 20.407 have been properly met.

Copies of personal exposure reports submitted to both the individual and the Commission upon termination of employment were observed for several randomly selected individuals who had terminated in 1974 and early 1975. No discrepancies were noted. Further, licensee personnel stated that an annual exposure report is provided to each individual, whether requested or not. The above shows compliance with report requirements of 10 CFR 20.408, 20.409 and 19.13.

15. Posting of Notices to Workers

The applicable documents specified in 10 CFR 19.11 were observed to be either posted as required or instructions posted as to the location where the documents could be inspected. Four bulletin boards are used for this required posting. These are located at (1) access control (2) third floor level, (3) control room and (4) main entrance. The first two were specifically observed; both had the required items posted.