

U. S. ATOMIC ENERGY COMMISSION
REGION III
DIVISION OF COMPLIANCE

Report of Inspection

CO Report No. 263/70-6

Licensee: Northern States Power Company
Monticello Nuclear Generating Plant
Construction Permit No. CPPR-31
Category B

Dates of Inspection: March 27-31 and April 5-6, 1970

Dates of Previous Inspection: March 2-3 and 12-13, 1970

Inspected By: *C. D. Feierabend* C. D. Feierabend Reactor Inspector 4-21-70

Reviewed By: *H. D. Thornburg* H. D. Thornburg Senior Reactor Inspector 5-4-70

Proprietary Information: None

SUMMARY

The initial leak rate test was continued beyond the original schedule because of problems with temperature measurements. Computation of leak rate at the site from raw data yielded a leak rate value of 0.89%/day without allowance for error and uncertainty. The maximum allowable leak rate specified for the test is 0.9%/day which is also the technical specification limit for startup. The test was rerun following the location and repair of several leaks. The leak rate computed from raw data at the site without error allowance was 0.86%/day.

Discussions with the applicant included the environmental monitoring program planned during plant operation. (Section II.B.)

The applicant's current estimate of earliest fuel loading date is May 9, 1970. Review of the construction schedule indicates that completion dates for some construction and test activities extend beyond May 9. (Section II.C.)

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DETAILS

I. Scope of Inspection

The principal purpose of the inspections on March 27-30 and April 5-6 was to observe the primary containment leak rate test. Results of our consultant's evaluation of the environmental monitoring program^{1/} were discussed with the applicant in the Northern States Power corporate offices on March 31. Mr. B. Grier, Regional Director, accompanied the inspector on April 6 to observe the status of construction with respect to licensing actions.

Several problems arose during the initial test mainly associated with the temperature measurements. For the second test, conducted on April 4-6, all thermocouple leads were replaced with shielded cables, permanently installed in cable trays and connected to the plant computer. This provided fast recorded readout of all temperatures every five minutes.

Personnel contacted during the course of the inspection were:

Northern States Power Company (NSP)

J. Sullivan, Site QA Supervisor
P. Krumpal, Metallurgical Engineer
C. Larson, Plant Superintendent (Operations)
G. Jackson, Plant Results Engineer
B. Clark, Environmental Chemist

General Electric Company (GE)

J. Violette, Project Manager
J. Helton, Site Manager
J. Sherman, Site QA Representative
R. Goettge, Test Supervisor
R. Pratt, Project Engineer
J. Staley, Shift Test Engineer

Bechtel Corporation

D. Vanderpool, Lead Test Engineer
A. Moody, Test Engineer

^{1/} Addendum to CO Report No. 263/70-2.

II. Results of Inspection

A. Containment Leak Rate Test

The inspector reviewed the final test procedure. Discussion with NSP test personnel indicated that all of the areas which were identified as lacking in detail in a previous inspection report^{2/} were discussed (by NSP) with the test engineers. The details will be included in the final test report. During the review of the test procedure, observation of the test in progress and in reviewing the test results, the inspector verified that all of the items discussed in the previous inspection report^{3/} had been considered. The final test procedure and data sheets did include the details for penetration testing and the weighting factors for the temperature sensors. A Bechtel test engineer verified that each penetration bellows was complete with restraint installed. The inspector was assured by NSP that the final test report will include information concerning the induced leak and an error analysis of the results.

Prior to start of the test, the inspector reviewed the references and P&ID drawings together with the valve lineup checklist and discussed the lineup with NSP and GE test personnel. The ANS proposed standard^{4/} and the AEC Technical Safety Guide^{5/} were used as references, in addition to the approved test procedure. In general, all systems were lined up to simulate the "accident condition," i.e., the lines normally containing water were filled with water, valves which remain open were left open, and valves which close as a result of an isolation signal were closed.

Preliminary testing of electrical penetrations, double gasketed seals, and isolation valves was completed prior to the integrated leak rate test. Review of the test reports indicated that all preliminary test results were well within the established test criteria. The method of local leak rate testing of isolation valves measured the leakage of both valves in each line as it measured the leakage from pressure applied between the two isolation valves. The criteria used for each test was the allowable limit for one valve, so the local tests were conservative. Results of the local leak rate tests were as follows:

^{2/} CO Report No. 263/70-5.

^{3/} Ibid.

^{4/} ANS 7.60, Proposed Standard for Leakage-Rate Testing of Containment Structures, Approved by ANS Standards Committee June 14, 1967.

^{5/} AEC Technical Safety Guide, Reactor Containment Leakage Testing and Surveillance Requirements, Revised Draft dated December 15, 1966.

<u>Component</u>	<u>Test Criteria (SCF/HR)</u>	<u>Test Results (SCF/HR)</u>
Double gasketed seals	34.4 @ 41 psig	
Air lock		0.08 @ 10 psig
Others		<u>8.92 @ 41 psig</u>
Total		9.0
Testable penetrations and isolation valves except main steam		
Each	17.2 @ 41 psig	3.83 @ 41 psig (max)
Total	103.2 @ 41 psig	16.94 @ 41 psig
Main Steam Isolation Valves		
Each	11.0 @ 25 psig	4.29 @ 25 psig (max)
Total		8.17 @ 25 psig

Preparation for the integrated leak rate test was essentially complete when the inspector arrived; however, he did observe the location of several thermocouples and dewcells inside the drywell and verified that all pressurized vessels such as welding equipment, fire extinguishers, etc., were removed from the drywell.

The inspector also examined the test instrumentation and preparations for data recording. The mercury manometer for measuring containment pressure was not yet installed as it had been damaged in shipment, however, it was installed prior to start of the leak rate test.

The first air was introduced into the vessel at ~7 p.m. on March 27, with the containment at 6.4 psig by 10:25 p.m. This pressure was held until local "soap check" of all drywell and torus penetrations were complete.

The test pressure was then increased to ~42 psig. All penetrations were again soap checked and the entire reactor building was checked for air leaks using a sensitive portable sonic leak detector. Several leaks in valve packing glands, etc. were located and repaired.

The test was continued, with data recorded and leak rate calculated hourly. Several problems arose, mainly associated with temperature measurements, with result that the hourly leak rates obtained were calculated to be above maximum allowable limits. The inspector left the site Monday afternoon, March 30. The test was continued until about 5 p.m. on April 1. Then, a measured leak was established through a calibrated rotameter, and maintained about three hours for a check on accuracy of measurements. According to NSP test personnel, the calibrated leak data appeared to verify the test measurement data. Test results, as calculated onsite, indicated a leak rate of $\sim 0.89\%$ for 24 hours. This was considered to be within the limits of the test criteria, but too close to be acceptable, by the applicant and his contractors. The test was scheduled to be repeated the following weekend.

For the second test, conducted on April 4-6, all thermocouple leads were replaced with shielded cables installed permanently in cable trays, and connected to the plant computer. A sensitive pressure transmitter was added to provide pressure data for computer printout as additional verification of any pressure changes. Several small leaks at valves, piping plugs, etc., were repaired prior to start of the second test. Search for additional leakage was conducted with the sonic leak detector at intervals throughout the test.

The inspector observed test personnel record data and search for leaks during the swing and midshifts. The procedures used and data obtained appeared to be consistent with previous observations, however, the hourly leak rate calculations indicated approximately the same results as those obtained during the first test. The test was completed at ~ 0900 on April 6 followed by another calibrated leak check. Rate of pressure loss was ~ 22 mm Hg/hour (approximately double the rate during the integrated leak rate test). Final calculations were not complete at the termination of the inspection, however, preliminary calculations indicated that the leak rate for the test would be $\sim 0.8\%$ for 24 hours.

B. Environmental Monitoring

The inspector discussed the applicant's environmental monitoring program with Mr. Clark in his office on March 31. This was primarily to inform him of comments made by our consultant concerning possible improvement or refinement of the environmental program for an operating facility. These recommendations were summarized in the memorandum^{6/} forwarding our addendum to CO Report No. 263/70-2.

^{6/} Memo from Thornburg to O'Reilly, subject, "NSP (Monticello) Docket No. 58-263," dated March 30, 1970.

Mr. Clark stated that several of the items were already in the NSP program, however, they may not have been specifically identified.

1. Background data for air sampling stations is provided from a station remote from the site in Minneapolis, although this is not described in the NSP report^{7/} for 1968 or the revised program.^{8/}
2. TLD's are not shielded in their field installation. They are hung outside the air sampler instrument housing. This is stated in the revised program.^{9/}

Mr. Clark stated that NSP would increase sampling in the event of any detectable plant release, but that this information was not now included in the program description. He stated that sampling of lakes would not be deleted from the program as this was a program addition resulting from recommendations made by a consultant to the Minnesota Pollution Control Commission. He also stated that he would consider all of our consultant's recommendations for monitoring during plant operation.

C. Status of Construction

On April 6, prior to conducting a tour of the construction site to observe the status of construction, Messrs. Violette and Helton briefed Mr. Grier and the inspector on the construction schedule and the current status with regard to plant completion. In general, the discussion included a review of the construction schedule to identify certain areas that cannot be considered "complete" until after some of the hot functional testing is complete. This includes such items as final balancing of ventilation systems, final adjustment of pipe hangers and installation of certain block shielding.

The "earliest fuel loading date" discussed was May 9, two weeks later than previously indicated.

Other items on the construction schedule extending beyond May 9 include work on permanent grating in the drywell, completion of the inerting system, application of special coatings on concrete in some of the rooms and at the 935' elevation and miscellaneous pipe insulation. They stated that the leak rate testing of the secondary

^{7/} NSP Environmental Monitoring Program Annual Report, 1968, for the Monticello Nuclear Generating Plant, dated June 1, 1969.

^{8/} Description of the Environmental Monitoring Program for the Monticello Nuclear Generating Plant, Revised June 1, 1969.

^{9/} Ibid.

containment was scheduled to be complete by May 9, but that GE experience at other facilities indicated that this test could take longer than the current schedule indicates.

D. Exit Interview

An exit interview was held with Messrs. Helton and Sullivan at the conclusion of the inspection. Mr. Helton stated that although the containment leak rate appeared to meet the test criteria (0.86% vs 0.90% maximum allowable) GE was not satisfied, and intended to take actions to reduce the leakage. He stated that at this point he did not know what action would be taken until the test data had been fully evaluated. GE plans to forward all of the test data to APED San Jose for further evaluation. The inspector agreed that the test was not satisfactory.