

August 4, 2000

Mr. L. W. Myers
Senior Vice President
Beaver Valley Power Station
Post Office Box 4
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION UNIT NO. 2 - ISSUANCE OF AMENDMENT
RE: EXTENSION OF STEAM GENERATOR TUBE INSPECTION INTERVAL (TAC
NO. MA7248)

Dear Mr. Myers:

The Commission has issued the enclosed Amendment No. 112 to Facility Operating License No. NPF-73 for the Beaver Valley Power Station, Unit No. 2. This amendment consists of changes to the license in response to your application dated November 29, 1999, as supplemented December 20, 1999.

The amendment adds a license condition authorizing a one-time extension of the steam generator inspection frequency specified in Technical Specification 4.4.5.3.a. The extension permits the next steam generator (SG) inspection to be performed during the next refueling outage or at the end of 650 effective full power days of operation, whichever is first for fuel cycle 8. This extension will permit the next SG inspection to coincide with the next scheduled refueling outage.

A copy of the related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

/RA/

Daniel S. Collins, Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-412

Enclosures: 1. Amendment No. 112 to NPF-73
2. Safety Evaluation

cc w/encls: See next page

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PENNSYLVANIA POWER COMPANY
OHIO EDISON COMPANY
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
THE TOLEDO EDISON COMPANY
FIRSTENERGY NUCLEAR OPERATING COMPANY
DOCKET NO. 50-412
BEAVER VALLEY POWER STATION, UNIT 2
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 112
License No. NPF-73

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by FirstEnergy Nuclear Operating Company, et al. (the licensee) dated November 29, 1999, as supplemented December 20, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the Facility Operating License is amended as indicated in the attachment to this license amendment.
3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Marsha Gamberoni, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility
Operating License

Date of Issuance: August 4, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 112

FACILITY OPERATING LICENSE NO. NPF-73

DOCKET NO. 50-412

Replace the following page of the Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove

5

Insert

5

(8) Detailed Control Room Design Review (DCRDR)

Deleted

(9) Safety Parameter Display System (SPDS)

Deleted

(10) Fire Protection Modifications (Section 9.5.1 of SER Supplement 6)

Deleted

(11) Additional Conditions

The Additional Conditions contained in Appendix D, as revised through Amendment No. 102, are hereby incorporated into this license. FENOC shall operate the facility in accordance with the Additional Conditions.

(12) Steam Generator Surveillance Interval Extension

The performance interval for the steam generator surveillance requirement identified in the licensee's request for surveillance interval extension dated November 29, 1999, shall be extended to coincide with the Cycle 8 refueling outage (prior to first entry into Mode 4 after the outage) or the end of 650 effective full power days, whichever is sooner. This surveillance will not extend beyond November 30, 2000.

D. Exemptions

The following exemptions are authorized by law and will not endanger life or property or the common defense and security, and certain special circumstances are present. With the granting of these exemptions, the facility will operate, to the extent authorized herein, in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission.

- (1) The facility requires an exemption from the requirements of General Design Criterion (GDC) 4, Appendix A to 10 CFR 50. The staff has described in detail in Supplement 4 and Supplement 5 to the Safety Evaluation Report the technical basis and "special circumstances" associated with this exemption. The staff's environmental assessment was published on March 27, 1987 (52 FR 9979). Therefore, pursuant to 10 CFR 50.12(a)(1), 10 CFR 50.12(a)(2)(ii) and (iv), Beaver Valley Power Station, Unit 2 is exempt from the requirements of GDC 4, Appendix A to 10 CFR 50 with respect to the dynamic loading effects associated with the postulated pipe breaks described in detail in Section 3.6.3 of Supplement 4 to the Safety Evaluation Report. These dynamic loading effects include pipe whip, jet impingement, and break-associated dynamic transients. Specifically, this eliminates the need to install jet impingement barriers and pipe whip restraints associated with postulated pipe breaks in the pressurizer surge line, reactor coolant bypass system,

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 112 TO FACILITY OPERATING LICENSE NO. NPF-73
PENNSYLVANIA POWER COMPANY
OHIO EDISON COMPANY
THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
THE TOLEDO EDISON COMPANY
FIRSTENERGY NUCLEAR OPERATING COMPANY
BEAVER VALLEY POWER STATION, UNIT 2
DOCKET NO. 50-412

1.0 INTRODUCTION

By letter dated November 29, 1999, as supplemented December 20, 1999, the FirstEnergy Nuclear Operating Company (FENOC, the licensee) submitted a request for changes to the Beaver Valley Power Station, Unit No. 2, facility operating license. The requested change would add a license condition to authorize a one-time change to Technical Specification (TS) surveillance requirement (SR) 4.4.5.3.a to require that the next steam generator inspection be performed during the next refueling outage or at the end of 650 effective full power days (EFPDs) of operation, whichever is first for fuel cycle 8. The December 20, 1999, letter provided additional information and did not change the initial proposed no significant hazards consideration determination or expand the amendment beyond the scope of the initial Federal Register notice.

2.0 EVALUATION

2.1 Background

An inservice inspection of the Beaver Valley Unit 2 steam generator tubes was completed in May 1996 during refueling outage 2R6. During the subsequent Beaver Valley Unit 2 operating cycle (cycle 7), the licensee entered an extended forced outage for both Beaver Valley units. The extended (286-day) forced outage for Unit 2 began on December 16, 1997, and ended on September 23, 1998. In March 1999, the licensee completed refueling outage 2R7. Because of the extended outage, Beaver Valley 2 refueling outage 2R8 that was initially scheduled for the spring of 2000 was rescheduled to the fall (September) of 2000.

TS SR 4.4.5.3, "Inspection Frequencies," in part, provides the periodicity for conducting inservice inspections of steam generator tubing. Based on the current condition category from TS Table 4.4-2, the licensee must perform inservice inspections at intervals of not less than 12 nor more than 24 calendar months after the previous inspection. In order to comply with this requirement, the licensee completed the Beaver Valley 2 steam generator inspections on September 2, 1998, during the extended forced outage. Since refueling outage 2R7 occurred about 6 months after this inspection, the licensee did not conduct the inspection again during 2R7 because the minimum SR interval of 12 months was not met. Thus, without an extension of the current surveillance interval, the Beaver Valley 2 steam generators would need to be inspected by September 2, 2000, requiring a mid-cycle outage solely to perform the tube inspections prior to the scheduled refueling outage, 2R8.

In its letter of November 29, 1999, the licensee requested a one-time extension of the interval for SR 4.4.5.3.a that would enable the completion of cycle 8 power operation without interruption for the steam generator tube inspections. Specifically, the licensee has requested that a license condition be added as follows:

(12) Steam Generator Surveillance Interval Extension

The performance interval for the steam generator surveillance requirement identified in the licensee's request for surveillance interval extension dated November 29, 1999, shall be extended to coincide with the Cycle 8 refueling outage (prior to first entry into Mode 4 after the outage) or the end of 650 effective full power days, whichever is sooner. This surveillance will not extend beyond November 30, 2000.

As stated in TS Bases 3/4.4.5, the inspection of the steam generator tubes ensures that the structural integrity of this portion of the reactor coolant system (RCS) will be maintained. The inservice inspection is essential to maintain surveillance of conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. The inservice inspection also provides a means of characterizing the nature and cause of any tube degradation so that conservative measures can be taken. The inspection and subsequent corrective measures help to ensure that the assumptions used in the accident analysis are satisfied.

2.2 Evaluation

Beaver Valley 2 has three Westinghouse Series 51M steam generators, which use mill-annealed alloy 600 tubing that has been full-depth hardrolled into the tubesheet. The tubing has a nominal outside diameter of 0.875 (7/8) inch and wall thickness of 0.050 inch. The steam generators also utilize carbon steel drilled-hole tube support plates and have flow distribution baffle plates.

The licensee stated that an extensive eddy current inspection of steam generator tubes was conducted in August to September 1998 during the mid-cycle forced outage. This inspection comprised: (1) full-length examination of 100 percent of the in-service tubes in rows 3 to 46 using bobbin coil probes, (2) examination of hot and cold leg tubes in rows 1 and 2 with bobbin coil probes to the uppermost tube support plate, (3) examination of the U-bend region of rows 1 and 2 using a single-coil Plus Point probe, (4) a 20 percent random sample of the U-bend

region of row 3 tubes using a single-coil Plus Point probe, and (5) examination of the roll transition expansion and sludge pile regions of all hot leg tubes using a three-coil Plus Point probe. A three-coil rotating pancake probe was used to reexamine distorted tube support plate indications that could not be resolved through the bobbin coil testing. The licensee also stated that (1) 100 percent of dents and free-span dings identified with a bobbin coil voltage of ≥ 2.00 volts, located between the top of the hot leg tubesheet and the third hot leg support plate, were reexamined with the three-coil Plus Point probe and (2) 100 percent of dents ≥ 5.00 volts, located at the other hot leg tube support plate intersections were examined with the three-coil Plus Point probe.

In a letter dated May 28, 1999, the licensee submitted the 1998 steam generator inspection report for Beaver Valley Unit 2 to document the results of the eddy current examinations and provide tube-specific inspection data. The licensee also noted that no tubes have been repaired to date by sleeving. By a letter dated December 20, 1999, the licensee provided a copy of a Framatome Technologies report titled "Beaver Valley-2 Condition Monitoring and Operational Assessment: 08/98 Forced Outage," Revision 1, dated December 9, 1999. In addition to assessing the as-found condition of the steam generators, the report projected the condition of the tubes at the end of Cycle 8. As stated in the report, the main damage mechanism encountered was attributed to circumferential outside diameter stress corrosion cracking (ODSCC) near the top of the hot leg tubesheet. Other less frequently encountered degradation included axial ODSCC in the sludge pile, pitting above the hot leg tubesheet, and pitting between the sixth and seventh tube support plates. While 3 other indications in the freespan were identified by bobbin coil probes in steam generator B about 4.2 to 4.8 inches above the 6th hot leg tube support plate, the licensee could not confirm the indications as flaws using Plus Point probe examination. Of the 13 tubes repaired by plugging, eight were repaired due to tubesheet related indications. The three tubes in steam generator B with freespan indications that were not confirmed were conservatively removed from service. However, none of the tubes that was plugged had exceeded its corresponding structural limits.

In its condition monitoring, the licensee concluded that none of the indications detected in August/September 1998 exceeded or threatened structural limits for any of the damage mechanisms. Thus, tube integrity had been maintained throughout the previous operating cycle. In its operational assessment of the steam generator condition through the end of Cycle 8, the licensee completed a deterministic assessment using the largest flaw projected to be left in service based on the detection threshold for each degradation mechanism. The licensee concluded that structural and leakage integrity, considering the projected degradation, would be maintained after 750 EFPDs of operation at the end of Cycle 8. The NRC staff finds that the results from the 1998 examination compare adequately with the licensee's predicted condition of the tubes at the end of the cycle and that adequate tube integrity was maintained. The NRC staff also finds that, based on the assumptions and methodologies applied, the licensee's conclusions in its operational assessment of Cycle 8 appear to be reasonable.

From the unit shutdown in December 1997 until early March 1998, the licensee maintained the secondary side of the steam generators in continuous recirculation using the condensate and feedwater system and the steam generator blowdown system. This allowed the steam generator chemistry conditions to be maintained to minimize corrosion potential. Subsequently, the licensee placed the steam generators in wet lay-up in accordance with industry guidelines prescribed for that purpose. During the lay-up, the steam generators were maintained at reduced temperatures and with water chemistry conditions that should prevent further

degradation of steam generator tubes. Following the restart of the unit in March 1999, the licensee observed minor main condenser inleakage that was corrected in October 1999. Since the licensee's actions to control the effect of the inleakage maintained the levels of sodium and sulfates below Electric Power Research Institute Action Level 1 guidelines, the NRC staff finds that the inleakage should have minimal impact on the conclusions reached in the operational assessment.

As part of Amendment No. 101, dated August 18, 1999, regarding alternate plugging criteria for steam generator tubing and the reduction of reactor coolant specific activity limits, the RCS operational leakage for primary-to-secondary leakage through any one steam generator was limited to 150 gallons-per-day (gpd). The licensee employs radiation monitors in the condenser air ejector and the steam generator blowdown lines that can be used to measure this leakage in addition to periodic RCS water inventory balance measurement. There has been no measurable steam generator leakage since the plant restart in March 1999.

2.3 Summary

Steam generator tube examinations are normally conducted during refueling outages such that compliance with the SR interval frequency is maintained. In the case of Beaver Valley Unit 2, an unplanned, long duration forced outage occurred during operating cycle 7 that created the need to conduct SR 4.4.5.3.a prior to refueling outage 2R7. At the time of the 2R7 outage, an insufficient operating period had transpired to meet the minimum duration between examinations required by SR 4.4.5.3.a. and the examination was not conducted.

Since appropriate wet lay-up conditions were maintained prior to the unit's return to operation in March 1999, tube degradation is not expected to have occurred in this time-frame. On the basis of the results of comprehensive eddy current examinations and the structural and leakage integrity assessment, the Beaver Valley Unit 2 steam generators should be expected to operate satisfactorily for the entire operating cycle 8. Because of the wet lay-up program, the current primary and secondary water chemistry controls, and the current operating cycle leakage history, the steam generators can be expected to retain structural and leakage integrity during the operating cycle. Lastly, if leakage were to occur, the leakage monitoring capability and leakage guidelines would enable operators to take necessary actions within an acceptable time-frame.

SR 4.4.5.3.a specifies that steam generator inspections are to occur no more than 24 months after the last inspection. On the basis of this requirement, the next Beaver Valley Unit 2 inspection would be due by September 2, 2000. Since the licensee has proposed that the interval not extend beyond November 30, 2000, the licensee will complete the inspection no more than 27 months after the last inspection with the approval of the requested action. Additionally, the licensee is currently scheduled to begin refueling outage 2R8 on or about September 30, 2000. Therefore, the licensee will probably only operate the unit online at normal operating pressure and temperature for about 1 month into the period of the proposed extension.

2.4 Conclusion

On the basis of the preceding evaluation, NRC staff concludes that the licensee's proposed one-time extension to the steam generator tube inspection interval for Beaver Valley Unit 2 is acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (65 FR 17915). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: P. Milano

Date: August 4, 2000