

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-412/89-10

Docket No. 50-412

License No. NPF-73 Priority - Category C

Licensee: Duquesne Light Company
Post Office Box 4
Shippingport, Pennsylvania 15077

Facility Name: Beaver Valley Power Station, Unit 2

Inspection At: Shippingport, Pennsylvania

Inspection Conducted: May 15-19, 1989

Inspectors: *S. K. Chaudhary* 6/9/89
for R. A. McBearty, Reactor Engineer date

Approved by: *S. K. Chaudhary* 6/9/89
S. K. Chaudhary, Chief, Materials and Processes Section, EB, DRS date

Inspection Summary: Inspection on May 15-19, 1989 (Report No. 50-412/89-10)

Areas Inspected: A routine, unannounced inspection was conducted of inservice inspection activities including observations of NDE in progress, implementing NDE procedures, and review of ISI data. Additionally, the inspection included steam generator tube eddy current examination results and secondary water chemistry.

Results: The inspector concluded that the licensee had established controls to manage its ISI program in compliance with applicable code and regulatory requirements, and that ongoing activities complied with requirements.

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Details

1.0 Persons Contacted

Duquesne Light Company

- * J. D. Crockett, General Manager - Corporate Nuclear Services
- * R. L. Hansen, Director of General Engineering
- T. Heime1, NDE Specialist - Inservice Inspection
- * C. Kirshner, Quality Assurance Supervisor
- * F. Lipchick, Senior Licensing Supervisor
- * A. F. Mosso, Quality Assurance NDE Coordinator
- * T. P. Noonan, General Manager - Nuclear Operations
- R. A. Perry, Supervisor - NDE Services
- * B. Sepelak, Licensing Engineer
- W. H. Sikorski, Director - Inservice Inspection
- * K. A. Troxler, Supervisor Inservice Inspection Services

U. S. Nuclear Regulatory Commission

- * J. Beall, Senior Resident Inspector
- * P. Wilson, Resident Inspector

* Denotes those present at the exit meeting.

2.0 Scope of the Inspection

Section XI, Rules for the Inservice Inspection of Nuclear Power Plant Components, of the ASME Boiler and Pressure Vessel Code provides rules for the examination, testing, and inspection of components and systems in a nuclear power plant. Section XI mandates that the plant owner develop a program which will demonstrate conformance to code requirements, and that the licensee perform inservice inspections (ISI) to comply with those requirements and program. Examination of the steam generators is a special case of ISI and is governed by the Technical Specifications.

The following areas were selected for inspection:

- Inservice inspection program
- Implementing nondestructive examination (NDE) procedures
- Personnel qualification/certification records
- Steam generator eddy current inspection
- Review of secondary water chemistry
- Engineering Support to ISI
- Quality assurance involvement with ISI
- Erosion/Corrosion program
- ISI data

3.0 Review of NDE Implementing Procedures (7305)

Inservice inspection at Beaver Valley Unit 2 is performed in accordance with the licensee's procedures. Vendor NDE technicians are provided training on each procedure which they will be required to implement. The licensee is developing a program to require that its ISI vendor personnel successfully pass a practical examination in the method which they will perform. A mockup has been fabricated for that purpose, and contains samples for visual, penetrant, magnetic particle, and ultrasonic examination.

The inspector reviewed selected procedures to ascertain compliance with ASME code and regulatory requirements and for technical adequacy. The following procedures were selected for inspection:

- Procedure No. UT-303, Revision 7, "Ultrasonic Examination of Piping Systems and Components Less Than or Equal to Two Inches Wall Thickness"
- Procedure No. LP-101, Revision 7, "Solvent Removable Visible Dye"

The inspector determined that the aforementioned procedures complied with applicable code and regulatory requirements. Liquid penetrant procedure LP-101, Rev. 7 identifies that the useful temperature range is 40°F to 125°F. The procedure qualification record confirms that the procedure was qualified within the specified temperature range using materials supplied by the three suppliers identified by the procedure. Each procedure was found to be technically adequate for its intended use.

No violations were identified.

4.0 Inservice Inspection Data (73755, 73753)

Inservice inspection NDE data were selected for inspection to ascertain that ASME Code and regulatory requirements were complied with. Additionally, data were inspected to ascertain that the 10-year program, outage schedule and procedural requirements were complied with. Data representing the following were selected for inspection:

- 2 RHS-001-5C, 12" diameter RHR system weld
- 2 CHS-PSR001, support on the Chemical Handling and Volume Control system.
- 2 CHS-PSR675X, support on the Chemical Handling and Volume Control system.
- 2 SIS-067-F04, 1" diameter Safety Injection system weld

- 2 RCS-025-8A, 2" diameter Hydrogenated Drain system weld
- 2 RCS-025-F17A, 2" diameter Hydrogenated Drain system weld
- 2 DGS-001-1A, 2" diameter Hydrogenated Drain system weld

The data verified that the examination methods, including visual, liquid penetrant and ultrasonic examination, which were specified by the 10 year program plan and the outage schedule, were performed on each component as applicable.

Qualification/certification records of the NDE technicians who performed the examinations were reviewed to ascertain that the technicians were properly qualified. The records confirmed that those personnel were certified to the proper level of qualification to perform their assigned task.

No violations were identified.

5.0 Steam Generator Inspection (73753)

Steam Generator tube examinations using the eddy current examination method are mandated by the facility's technical specification. The examinations which were performed at Beaver Valley Unit 2 are the first inservice examinations since the facility commenced commercial operation in November 17, 1987.

Tubes in steam generators 2RCS-SG-21A (S/G A) and 2RCS-SG-21C (S/G C) were examined during the 1989 refueling outage. The number of tubes which were examined and the extent of the examinations follows.

	<u>S/G "A"</u>	<u>S/G "C"</u>
Bobbin coil, full length	627	646
Bobbin coil, tube end to the top of the 8th cold leg support	134	189
Rotating pancake coil, Row 1&2 U-Bends	187	188
Rotating pancake coil, hot leg tubesheet	150	-
8 X 1, hot leg tubesheet region	149	-

One indication, 31% through wall, was identified in S/G "A." That indication, which was originally identified by the preservice eddy current examination, was located in the free span of tube R40 C27 between the 7th and 8th hot leg support plates.

No tubes were plugged as a result of the examinations. Tubes at row 11, column 4 and row 9, column 33 in S/G C were each preventively plugged with a solid plug in the hot leg tube end, and a leak limiting plug in the cold leg tube end. These tubes were replugged using the plug-in-plug technique as a result of the reported failure of certain Westinghouse mechanical plugs, which were the type of plug installed during the PSI of the Beaver Valley Unit 2 steam generators.

The examinations were performed by Babcock and Wilcox Company (B&W), eddy current examiners. The primary data analysis was performed by B&W and a secondary analysis was performed by ECHORAM, a subsidiary of Westinghouse. The data analysis was governed by licensee document ISI-GL-004, Revision 3 entitled Guideline for the analysis of Steam Generator Eddy Current Data. The guideline was developed to establish consistency in the analytical process, and to ensure that the analyses were in compliance with licensee requirements. The guideline is applicable to all contractor analysts.

Certification records of the B&W personnel who were responsible for performing eddy current examinations and for analyzing the results were selected for inspection to ascertain that the personnel were properly qualified to perform those duties.

Four of the personnel were determined to be certified to Level II A, and a fifth individual was certified to Level III in the eddy current method. Additionally, the records confirmed that each examiner had been currently examined for visual acuity.

Secondary water chemistry guidelines at Beaver Valley Unit 2 are based on all volatile treatment. The monitoring program identifies three action levels to take remedial action when monitored parameters are observed and confirmed to be outside normal values, and to restore them to normal values in a timely manner.

No violations were identified.

6.0 Engineering Support to Inservice Inspection (73051)

The licensee's engineering department at Beaver Valley provides engineering support when an Engineering Memorandum (EM) is issued by the inservice inspection department.

The ISI Level III issues an EM when examination results are found to be rejectable per applicable acceptance criteria. The EM is distributed by QC, after the assignment of a unique number, to engineering where it is given to the proper group within the department. The rejectable condition is evaluated and a disposition is provided. During the outage a Rapid Response Team was established to expedite the processing of EMs. The inspector noted that dispositions were documented, in some cases, within one day of the issuance of the EM. The engineering evaluation disposition and corrective action provided was, in each instance, appropriate to the reported condition, and was technically adequate to return the component to an acceptable condition.

The ISI department is responsible for tracking all engineering memoranda issued by the department. An ISI engineer was made responsible for maintaining an EM log which showed the status of all memoranda issued by the department. The licensee advised the inspector that the system was being revised to include EMs on a computer tracking system which was expected to improve the tracking and reporting capability of the ISI department with regard to nonconforming items.

No violations were identified.

7.0 Quality Assurance Involvement in Inservice Inspection Activities (73051)

Surveillance of Westinghouse and EBASCO ISI activities was performed by the licensee's QA NDE Coordinator during the course of the 1R refueling outage. The NDE coordinator also is certified to Level III.

Ultrasonic equipment calibration was observed at the Westinghouse Waltz Mills facility in addition to the onsite activities of the two vendors. The surveillances were performed to determine that NDE procedures were complied with, examination personnel were qualified to perform their assigned duties, and that examination results were properly documented.

In addition to the QA surveillance of onsite ISI activities, the licensee used QA Audit No. OUTC 88-01 to place EBASCO Services, Inc. on its qualified vendors list. The EBASCO Quality Assurance Program was audited on May 2-13, 1988 by Public Service Company of Colorado QA Operations Department at Fort St. Vrain, Unit 1. The Public Service Company of Colorado audit was used by Duquesne Light Company in lieu of performing its own audit of EBASCO.

No violations were identified.

8.0 Secondary Side Erosion/Corrosion Program

Concern regarding erosion and corrosion in balance of plant piping systems has been heightened as a result of the December 9, 1986 feedwater line rupture that occurred at Surry Unit 2. This event was the subject of NRC Information Notice 86-106 issued on December 6, 1986, and a supplement issued on February 13, 1987.

The inspector reviewed the licensee's actions with regard to the detection of erosion/corrosion in plant components. The inspection was conducted to determine the scope of the licensee's program and the results to date.

The licensee's erosion/corrosion program consists of selected portions of single and two-phase high energy systems. The following plant systems are included in the program:

- Condensate System
- Feedwater System
- Feedwater Heater Vents and Drains
- Extraction Steam
- Steam Generator Blowdown System
- Turbine and Condenser System
- Miscellaneous Drains

Components in the program are ranked according to susceptibility to attack by Erosion/Corrosion with the aid of the EPRI CHEC computer program, manual calculations based on accepted equations and relationships, industry and plant specific experience and engineering judgement in combination with one or more of the aforementioned techniques.

Inspection guidelines are provided by document ES-M-009, Revision 0, entitled "Erosion/Corrosion Program for the Beaver Valley Power Stations Units 1 and 2," including grid marking used in the inspection of the identified component or fitting. The specified grid size is based on the component diameter and ranges from a 1" grid for components up to 6" diameter, and a 3" grid for components greater than 12" diameter.

The evaluation of results includes a calculation of the design minimum wall thickness using an equation from Section 104.1.2 of ANSI B 31.1.0 1967.

The program defines acceptance criteria based on the calculated time remaining for a component to reach the design minimum wall thickness. Sample expansion guidelines are provided for cases when a component is judged to be unacceptable because of excessive wall loss due to erosion/corrosion.

The current refueling outage, 1R, is the first time the program has been implemented at Unit 2, and the results are considered to be a baseline for future measurements.

Two elbows were replaced during the outage due to measured wall thickness less than the allowable minimum. The licensee plans to send the samples to an independent laboratory for analysis to determine the cause of the thinning. Additionally, mechanical measurements will be made to assess the accuracy of the ultrasonic thickness measurements which were made at the site.

No violations were identified.

9.0 Conclusions

The licensee's control of its ISI program is enhanced by the use of its own implementing procedures. The training provided by the licensee to vendor personnel allows the licensee to judge individual capability and to assure that the examination personnel are competent to perform their

assigned duties. An added advantage is that the system allows the licensee to expeditiously revise a procedure when that is necessary.

Inservice inspection data were complete and clearly documented. The licensee's Level III reviews vendor data and signs each data sheet which is subsequently submitted to the ANI for his review and approval. The In-Service Inspection Control system (ISIC), a computerized ISI data management system, is used for tracking program status and is evidence of the licensee's commitment to maintaining a quality program.

The Engineering Memorandum system for requesting engineering support for ISI in use at Beaver Valley was found to be working, although it appeared that improvement was needed in the area of tracking and reporting. The licensee agreed with the inspector's assessment and initiated a revision of the system to accommodate computer tracking to permit enhanced reporting capability.

Eddy current examination of steam generator tubes which was performed during the 1R refueling outage complied with Technical Specification requirements regarding sample size and content. Examination personnel were qualified to perform the examinations and to analyze the results. The system established by the licensee to control the data analysis process provided controls to minimize errors and missed calls by the analysts.

Quality assurance coverage of inservice inspection activities is further evidence of the licensee's control of its vendor's activities. That was exhibited by the surveillance performed at a vendor's facility at Waltz Mills of activities which would affect onsite activities, and by the use of a certified Level III individual to perform the vendor surveillance.

10.0 Exit Meeting

The inspector met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on May 19, 1989. The inspector summarized the scope and findings of the inspection.

At no time during the inspection was written material provided by the inspector to the licensee. The licensee did not indicate that proprietary information was involved within the scope of this inspection.