U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-334/89-15

Docket No. 50-334

License No. DPR-66

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

Facility Name: Beaver Valley Power Station, Unit 1

Inspection At: Shippingport, Pennsylvania

Inspection Conducted: September 5-8, 1989

Inspectors: Robert A. McBrearty — 9/22/89
R.A. McBrearty, Reactor Engineer — date

Approved by: Jack Strosnider — 9/22/89
J.R. Strosnider, Chief, MPS, EB, DRSS — date

Inspection Summary: Inspection on September 5-8, 1989 (Report No. 50-334/89-15)

Areas Inspected: A routine, unannounced inspection was conducted of the licensee's inspection activities regarding the use of the H.A.F.A. International developed Instrumented Inspection Technique (IIT) as an alternative to the hydrostatic test requirements of ASME Section XI. The areas inspected included observation of a test in progress, the H.A.F.A. Level I, II and III qualification/certification procedure, and the adequacy of the IIT test procedure.

Results: The observed test was performed in accordance with the applicable procedure. Two unresolved items were identified regarding the adequacy of the test procedure to control significant test parameters and the validity of the H.A.F.A. Level I, II and III personnel qualification/certification.

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Details

1.0 Persons Contacted

Duquesne Light Company

* S. Fenner, Manager, Quality Assurance
* D. Grabski, Engineer
* F. Lipchick, Senior Licensing Supervisor
* T. P. Noonan, General Manager, Nuclear Operations
* W. H. Sikorski, Director, Inservice Inspection
* K. A. Troxler, Supervisor of Inservice Inspection Services

H.A.F.A. International, Incorporated

* D. F. Abbuehl, Senior Test Specialist
* T. M. DeBortoli, Project Manager/Senior Test Engineer
* R. P. Milke, Project Leader, Level III

U.S. Nuclear Regulatory Commission

* J. E. Beall, Senior Resident Inspector
* P. R. Wilson, Resident Inspector
  M. R. Hum, NRR

2.0 Observations of Work in Progress

Section XI of the ASME Boiler and Pressure Vessel Code, 1980 Edition requires system pressure tests to be conducted in accordance with the requirements of Article IWA-5000. System leakage tests and system hydrostatic tests shall be conducted at the test conditions of pressure and temperature specified in IWB-5000, IWC-5000, and IWD-5000.

By letter dated April 22, 1986, the licensee requested NRC approval to use an alternative inspection technique at the Beaver Valley Nuclear Power Station, Units 1 and 2, to satisfy the inservice pressure testing requirements of ASME Code, Section XI, IWA, IWB, IWC, and IWD. The alternative technique proposed for use by the licensee is the Instrumented Inspection Technique (IIT) developed by H.A.F.A. International, Incorporated, and the subject of H.A.F.A. Topical Report HAFA 135(N), dated April 1985, entitled "Instrumented Inspection Technique As An Alternative To Hydrostatic Testing Requirements for ASME Class 1,2, and 3 Systems and Components". Based on review of the HAFA Topical Report the NRC concluded that the Instrumented Inspection Technique is a suitable alternative to Section XI requirements for hydrostatic tests.

During the current refueling outage, the licensee plans to use the Instrumented Inspection Technique on portions of the safety injection system and the chemical and volume control system. The safety injection-boron injection subsystem test, governed by test procedure IIT 11.11,

Revision 1, entitled "Safety Injection System Pressure Testing (Unit 1) - Boron Injection Tank", was scheduled to be completed in two phases. Two different test pressures were required, phase I at 10 $^{+10}_{-0}$ psig, and phase II at 2500 $^{+50}_{-0}$ psig, each with a two hour hold time at test pressure.

The inspector observed the phase I portion of the test to ascertain whether procedural and regulatory requirements were complied with. The inspector determined that, after allowing the system pressure to stabilize within the required test limits, it was maintained at the required pressure for two hours prior to commencing the VT-2 visual examination of the system. The visual examination was performed by two licensee visual inspectors. The required IIT equipment was identified by the procedure and included a leak measuring device (LMD) model T5-1-1, a 30 psig full scale calibrated pressure gauge, a test manifold with a pressure relief valve and a bypass valve, and acoustic leak sensing equipment. Additionally, an AE International model LD-180 device for monitoring the output of acoustic sensors was used.

Acoustic sensors were placed on the valves identified by step 7.3.1 of procedure IIT 11.11, Revision 1, and during the course of the test the model LD-180 was attached to each sensor in sequence to obtain background noise levels and test data. The VT-2 visual inspection was considered the acceptance test, and the acoustic data were treated as supplemental information.

During the two hour hold time three background noise level readings for each acoustic sensor were recorded at approximately 1 minute intervals. While the visual examination was in progress three additional readings were recorded from each acoustic sensor and compared to the background noise level readings previously recorded. Those readings, like the background readings, were recorded at approximately 1 minute intervals.

The inspector interviewed licensee personnel regarding the level of licensee involvement in the IIT and acoustic tests performed on plant systems. The IIT test acceptance is based on VT-2 visual examinations which are performed by qualified licensee visual inspectors. The acoustic tests are conducted by H.A.F.A. personnel and the results are evaluated by a H.A.F.A. Level II technician. A report is provided to the licensee for review and acceptance. In response to the inspector's question the licensee stated that no licensee personnel are qualified to independently evaluate the acoustic test data. The licensee agreed with the inspector that improvement in this area is needed.

The phase I portion of procedure IIT 11.11 was conducted in accordance with the procedure, the sequential steps were verified by signature as they were completed and licensee operations and health physics personnel were at the test location to support the test effort.

The inspector expressed concern that the procedure did not adequately control the portion of the test dealing with acoustic parameters. Examples include the number of acoustic background noise level checks that must be made, selection of the acoustic sensor frequency, and the method of attaching the acoustic sensor to the various system components. The H.A.F.A. Level III indicated that three different methods are used to attach the sensors. No method is specified by the procedure. The Level III stated that three background noise level checks are made prior to performing the test. A H.A.F.A. Level II test technician stated that three checks are usually made, but sometimes two checks are made and the number is left to the discretion of the technician. The Level II also stated that sensor frequency determines, to a great extent, the test sensitivity and that this is left to the technician's discretion. The adequacy of the procedure to control significant test parameters is considered unresolved pending licensee evaluation and action, and subsequent NRC review (334/89-15-01).

3.0 Personnel Qualification/Certification

The inspector interviewed the H.A.F.A. Level III examiner and Level II technicians regarding personnel certification procedures applicable to H.A.F.A. test personnel.

The inspector was advised that personnel certification is accomplished in accordance with Topical Report HAFA 135, as approved by the NRC, and HAFA Quality Assurance Procedure 9.2 which is included in the Topical Report. The Level III examiner, in response to the inspector's questions, stated that Level I and II technicians were originally certified for a period of three years by examination. He further stated that, prior to the expiration of the three year period, the program was "streamlined" and the technicians were re-certified by virtue of continued acceptable performance for a three year period commencing with the date of re-certification. The Level III also stated that he was appointed to the Level III position by an officer of the company.

Procedure 9.2 references ANSI N45.2.6 although the applicable edition is not identified. The ANSI document is applicable to the qualification of personnel for methods not included in SNT-TC-1A and permits certification by appointment and re-certification by virtue of continued acceptable performance. SNT-TC-1A also permits recertification by virtue of continued acceptable performance, but ASME Section XI requires, for nuclear work, certification and recertification of Level I, II and III personnel by examination only.

It appears that SNT-TC-1A and Section XI should govern because leak testing and acoustic emission testing methods are included in SNT-TC-1A. This item is considered unresolved pending clarification as to whether ANSI N45.2.6 or SNT-TC-1A and Section XI govern the qualification and certification of H.A.F.A. Test personnel (334/89-15-02).

4.0 Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable, violations or deviations. Unresolved items are discussed in paragraph 2 and paragraph 3 of this report.

5.0 Exit Meeting

The inspector met with licensee representatives, denoted in paragraph 1, at the conclusion of the inspection on September 8, 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.