U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Report No. 50-412/85-03

Docket No. 50-412

License No. DPPR-105 Priority -- Category B

Licensee: Duquesne Light Company
Robinson Plaza Building No. 2
Suite #210, PA Route 60
Pittsburgh, Pennsylvania

Facility Name: Beaver Valley Power Station, Unit 2

Inspection At: Shippingport, Pennsylvania

Inspection Conducted: January 2 - February 1, 1985

Inspectors: G. A. Walton — Feb. 8, 1985
G. A. Walton, Senior Resident Inspector — date

L. J. Prividy — Feb. 8, 1985
L. J. Prividy, Resident Inspector — date

Approved by: L. E. Tripp — 2/15/85
L. E. Tripp, Chief, Reactor Projects Section 3A — date

Inspection Summary: Inspection on January 2 - February 1, 1985 (Report No. 50-412/85-03)

Areas Inspected: Routine, unannounced inspection by two resident inspectors (227 hours) of activities pertaining to previously identified unresolved items, in-place storage of components, installation of pipe supports, containment polar crane maintenance, weld material control, weld material certification, review of welding and inspection procedures, inspection of structural steel bolting and daily site tours.

Findings: The areas inspected during this inspection period were found acceptable. Good controls were found in the weld electrode control program and the welding area. No violations were identified.

DETAILS

1. Persons Attending Exit Interview

Duquesne Light Company

L. Arch, Senior Project Engineer
R. Coupland, Director, Quality Control
C. Davis, Director, Quality Assurance
D. Denning, Assistant Director, Quality Control
E. Horvath, Project Engineer (Electrical)
J. Konkus, Project Engineer
C. Majumdar, Assistant Director, Quality Control
M. Pavlick, Director, Milestone Management
D. Rohm, Assistant Director, Quality Control
J. Stabb, Compliance Engineer
J. Waslousky, Senior Quality Assurance Engineer

Stone and Webster Engineering

H. A. Dasenbrock, Senior Construction Manager
D. F. Esielionis, Assistant Superintendent, Engineering
D. R. Lessard, Assistant Superintendent, Engineering
A. C. McIntyre, Superintendent, Engineering
J. G. Novak, Superintendent, Construction
R. C. Wittschen, Licensing Engineer

2. Construction Site Walk-Through Inspections

Daily tours of the construction site were made to observe work activities in progress, completed work, and plant status of the construction site. The presence of quality control inspectors and quality records were observed. All areas observed were found acceptable.

3. Licensee Action on Previous Inspection Findings

(Open) Unresolved Item 82-11-02, HVAC Support Installation

Previous NRC Inspection Report 50-412/82-11 had identified several questions and concerns with regard to the installation of HVAC supports. These concerns covered the entire area from engineering specifications of these supports to how construction was actually installing the supports.

Subsequent to this NRC inspection, the licensee instituted a reinspection of HVAC supports to address these questions and concerns.

During this inspection period, the inspector met with the licensee to review the current status of the reinspection efforts of the HVAC supports. From this meeting, it was apparent that this unresolved item was not ready to be closed. Nonconformance and Disposition reports will be issued to document the various HVAC support inspections and to determine their acceptability.

(Open) Noncompliance 82-02-01, Failure to Provide Quantitative Criteria To Assure Adequate Weld Sizes on Support.

Inspection Report 82-02 identified that the Stone and Webster's standard procedure STD-PS-2A-2 specified the standard weld configurations and sizes on support, and as shown, the weld could be fabricated meeting all the specified requirements but fail to have adequate throat sizes necessary for structural integrity. The inspector further observed that once a weld was completed, the effective throat thickness could not easily be determined.

In a letter to the NRC dated May 26, 1982, Duquesne Light responded with the following:

"Standard BZ Drawing No. PS-2A is used to describe the weld joint details for connecting trunnions to run pipe. The original issue, PS-2A-1 dated January 9, 1979, contained both an angular range requirement of 60 to 100 degrees between the pipe and trunnion surfaces to be welded and a weld leg length requirement that, "the size of the weld shall equal or exceed the specified size, w, at all points in the connection." Typical cross-sectional views were provided showing the weld joint angle, chamfer width, weld leg length, and weld surface profile.

Noncompliance 82-02-01 cites BZ Drawing No. PS-2A-2, dated January 11, 1980. In response to 82-02-01, Drawing No. PS-2A-2 will be voided, work performed to its requirements reviewed, and new instructions provided for future fabrications. The potential consequences of work performed to PS-2A-2 include the use of joint angles in excess of 100 deg. and undersized weld leg lengths on the run pipe side of the joint. This latter concern is based on a misunderstanding that this side of the weld is controlled by achieving a flush weld. However, the use of a flush weld criterion is only appropriate when the groove angle is nominally equal to 90 deg. To provide clarification for future work drawing Note 2 will be revised to limit the maximum angle of chamfer to 100 deg. (i.e, $60^{o} \geq A \geq 100^{o}$ and a reference to Note 3, describing the weld leg length, will be shown on both sides of the joint in each typical cross-section provided in PS-2A. The potential use of excessive joint angles and inadequate weld leg lengths will be prevented in the future by these changes to the PS-2A standard."

The licensee then initiated a program to determine if existing supports welded in accordance with Drawing PS-2A contained adequate weld sizes.

The investigation included the application of ultrasonics to determine weld thickness. The ultrasonic test revealed that several welds contained inadequate weld sizes. Exploratory grinding was then done on three welds to confirm the validity of the ultrasonic test. After the validity was proven positive, Stone and Webster Engineering commenced establishing corrective actions. A summary of proposed corrective actions are as follows:

- Sixty-nine ASME welds were evaluated.

  35 welds were redesigned and additional trunnion plates were added to two sides.

  17 welds required a drawing change to reflect the as-built requirements.

  9 welds are to be corrected by the addition of fillet welds.

  1 weld requires a riser clamp and lug.

  4 welds require spool pieces to be added.

  1 weld is corrected by a new design.

  2 welds which were not inspected will be addressed during the stress reconcilation program.

- Twenty-nine non-ASME welds were evaluated.

  1 weld was redesigned and additional trunnion plates were added to two sides.

  3 welds require the addition of a fillet weld.

  2 welds required a drawing change.

  2 welds are corrected by a new design.

  21 welds are still under review.

In addition to the above, fifteen welds are located in the reactor dome which were welded in accordance with PS-2A. Engineering has established the following rework program on these supports.

5 welds will be corrected by adding trunnion plates to two sides of each weld.

9 welds will be corrected by adding a pad buildup.

1 weld still requires disposition.

The inspector reviewed the licensee's activities on this program including a review of the revised standard drawing PS-2A. In addition, the inspector visually audited the installed trunnion plates on pipe support 2CCP-PSA-014 for compliance with Drawing Number BZ-72A-18-6A. The inspector found the areas inspected acceptable.

This item will remain open pending further reviews by the inspector to assure disposition and rework are accomplished in accordance with the commitments.

(Closed) Noncompliance 84-03-01, Wiring In Exciter Control Panels

The licensee submitted a supplemental response dated January 30, 1985, to the NRC which describes the completions of the corrective actions taken on this item. The licensee has advised that the current guidance provided in 2BVM-25 correctly reflects the proper handling of design changes made by Nonconformance and Disposition Reports (N&D). The documents were revised to allow a "one time only" design change be incorporated by referencing the N&D in the text of the specification in the final revision of the specification. In addition, since June 1983, training on the above requirements has been conducted at Stone and Webster headquarters and on site engineering.

The inspector verified that the above changes were implemented. This item is closed.

(Open) Unresolved Item 84-16-02, Construction of Spent Fuel Storage Pool and Refueling Cavity Liners

Previous NRC Inspection Report 50-412/84-16 had identified an unresolved item concerning the construction of the spent fuel storage pool and refueling cavity liners. It was noted that Section C.1.1 of Regulatory Guide 1.29, Revision 3, requires that the spent fuel storage pool be designed and designated as Seismic Category I. Table 1.8-1, Volume 1 of the FSAR endorses Regulatory Guide 1.29, Revision 3, with no apparent exceptions. However, in reviewing the ordering specification 2BVS-25 for these liners, the inspector noted that they were classified as Category II, which was confirmed verbally with Stone and Webster Engineering.

The licensee has responded to this discrepancy with the following information supporting resolution of this issue. Regulatory Guide 1.29 requires that the spent fuel storage pool structure and the spent fuel racks be designated as Seismic Category I and designed to withstand the effects of an SSE and remain functional. As indicated in BVPS-2 FSAR Section 3.8.4 and Table T3.2-1, the spent fuel pool storage structure and the spent fuel racks are designated and designed as Seismic Category I. Aside from these two items, Regulatory Guide 1.29 does not explicitly require any other portions of the spent fuel storage pool to be designated and designed as Seismic Category I.

Under Regulatory Position C.2, however, Regulatory Guide 1.29 allows portions of structures, systems, or components whose continued functioning is not required following an SSE but whose failure could reduce the functioning of other Seismic Category I plant features, to be designed and constructed such that an SSE could not cause such a failure. BVPS-2 has implemented this guidance in the FSAR Table T1.8-1 where it stipulated that such plant features be classified as Seismic Category II and that such features be designed and constructed to withstand SSE loads. In this regard, it must be noted that Seismic Category II is a classification specific to BVPS-2.

The BVPS-2 spent fuel pool liner, which does not need to function during or after an SSE, but must maintain its structural integrity, has been designated, designed and constructed as Seismic Category II. Thus, although the liner is not classified as Seismic Category I, the spent fuel pool liner is designed and constructed to withstand SSE loads.

To support the Seismic Category II classification of the liners, the licensee substantiates the design and construction per the following discussion. Design calculations performed by Stone and Webster Engineering support the design of the liners as Seismic Category II; these design considerations are reflected in the shop fabrication and field erection specification (2BVS-25) for the liners. In FSAR Section 3.2.1.2, Seismic Category II components, structures and systems at BVPS-2 are designed to QA Category II requirements; FSAR Section 3.2.2.3 defines QA Category II as a classification that ensures that the design, manufacture, procurement, storage, and handling of such items will be of a high quality so that design requirements are met. These statements are reflected in 2BVS-25, which is a QA Category II, non-safety-related specification for the spent fuel pool liner and refueling cavity liner.

The inspector surveyed documentation for the liners required by the Test, Inspection and Documentation requirements of 2BVS-25. Survey of this documentation indicates that the liners were fabricated and installed in a quality manner commensurate with licensee commitments.

For example, certified mill test reports were required for liner materials and licensee inspectors were required to witness and accept important events such as leak tests of liner seam welds. Thus, the inspector was satisfied that the construction of the liners was performed satisfactorily.

One item that requires correction is Section 9.1.2.3 of the FSAR. Currently, a statement in the FSAR is made, "The spent fuel pool, spent fuel pool liner, and all supporting structures are designed for the SSE seismic loads described in Section 3.8.4." This statement tends to lead the reader to conclude that all listed items are classified as Seismic Category I when, in fact, the spent fuel pool liner is Seismic Category II. To clarify this issue, the licensee has committed to modify FSAR Section 9.1.2.3 by adding the following statement after the current potentially misleading statement: "The BVPS-2 spent fuel pool structure and the spent fuel racks are designated, designed and constructed as Seismic Category I items; the spent fuel pool liner and refueling cavity liner, and various supporting structures are designated, designed and constructed as Seismic Category II items." Also, it was noted that NRR has requested additional information from the licensee concerning why the spent fuel pool liner is not included in Table 3.2-1 of the FSAR.

The inspector had no further questions on this item at this time. This items remains open pending NRR review of the design and construction criteria for the spent fuel pool liner.

(Open) Unresolved Item 84-16-04, Repair of Main Steam Isolation Valve

The main steam isolation valves are being repaired onsite by Schneider Power Corporation. This is fully described in Inspection Reports 84-16 and 84-18. In conjunction with this repair, Schneider Power Corporation has qualified an automatic tungsten inert gas (TIG) welding process.

The inspector performed a technical review of this Procedure SPBV-448, Revision 1, titled General Weld Procedure for Overlay Modification to MSS Isolation Valves and corresponding weld procedure qualification tests.

To eliminate post weld heat treatment (PWHT) of the completed repairs, the contractor has adopted Code Case N-217-1 which is approved by the NRC by its inclusion in Regulatory Guide 1.84. In lieu of performing a PWHT, the code case requires the overlaid portion of the valve body to be raised to 300 degrees fahrenheit and held for two hours after welding is completed. Preheat must be maintained until the 300 degrees fahrenheit hold is accomplished. The inspector verified the welding procedure has provided this requirement.

The inspector found all areas reviewed acceptable. No violations were identified.

The inspector will continue to monitor and report this item in future inspections.

4. Reactor Containment Polar Crane Maintenance

As an associated part of recent activities where the polar crane was used to lift reactor pressure vessel upper and lower internals, the inspector reviewed recent maintenance records of the polar crane.

Field Construction Procedure (FCP) 705.3 titled Preventive Maintenance of the Reactor Containment Building Crane 2CRN-201 is the controlling document used for maintaining the polar crane during construction. FCP 705.3 contains detailed checklists which define preventative maintenance requirements to be performed daily, weekly, monthly and semi-annually. The inspector reviewed the following checklists:

1. Daily Operating Shift Checklist - October 29, 1984 thru December 28, 1984.

2. Weekly Checklist - November 9, November 19, November 23, December 3, December 7, December 14, 1984.

3. Monthly Checklist - November 19, 1984, December 14, 1984, thru December 18, 1984.

4. Semi-annual Checklist - December 14, 1984 thru December 18, 1984.

The inspector found that the maintenance items checked were consistent with the items listed in Section 9.1.5.6.1, Polar Crane, in the FSAR. During the semi-annual check, inspection of the bridge drive gear boxes revealed misalignment in the gear mesh. Nonconformance and Disposition Report 18,629 was issued on December 17, 1984, and dispositioned several days later by Stone and Webster Engineering. Close inspection of this gearing will be performed weekly and the polar crane vendor representative will be on site in the next three months for a complete inspection and permanent corrective action. The inspector found the areas reviewed acceptable.

5. Welding Material Control

The inspector audited the weld material issue station in the Auxiliary Building to ascertain compliance with Field Construction Procedure (FCP) 601.5 in the following areas:

- Welding materials were being properly stored.

- Holding ovens were serialized for identification and thermostatically controlled for constant temperature controls.

- Each holding oven was equipped with a calibrated thermometer.

- Storage ovens were monitored by Issue Station Attendant to assure proper temperature control and operating conditions.

- After opening, low hydrogen electrodes were being stored in holding ovens at 300 F ± 50 F.

- After issue, where required, low hydrogen electrodes were being kept in portable rod warmers. In addition, maximum allowable exposure times are specified and adhered to.

- Issue stations are restricted to authorized personnel. The list of approved personnel is posted at each issue station.

- A suitable container is provided at the issue station for disposal of scrapped welding materials. The container is kept in the issue room to prevent the removal of scrapped welding material by unauthorized personnel.

- The issue station was clean, dry and maintained at temperatures between 40 F and 140 F.

- Welding material was maintained traceable to its appropriate material certification. The inspector verified the certification for Lot Number 2L411AD02, and 2L413AD01 and Weldstar Heat Number 065900.

- Welding material was segregated according to classification, type, size, heat and/or lot.

- Electrodes which are issued and exposed to ambient temperatures in excess of allowable specified times are scrapped. Re-baking is not permitted.

- Low hydrogen and stainless electrodes are placed in holding ovens and maintained at specified temperatures for a minimum of one hour prior to issuance.

- All issued electrodes are controlled by Form WMR-1. The form identifies the welder, weld procedure, weld number to be worked on, lot/heat number of issued electrodes, date and time of electrode issuance, number or pounds of electrodes issued, and issue station attendants name. Also, the date and time are entered when any electrodes are returned.

The inspector audited four issue slips, identified as issuance to welder F-482, F-AEK, F-696 and F-510. The inspector verified adequate controls were being implemented in accordance with the listed requirements.

The inspector found all areas reviewed acceptable. Good controls were being implemented for all electrodes stored and issued from this station. No violations were identified.

6. Weld Material Certification

The inspector audited the weld material certifications for 11,850 Lbs. of E7018 - Lot Number 2L413AD01, 17,150 Lbs. of E7018 - Lot Number 2L411AD02, and 485 Lbs. of E70S-2 - Heat Number 065900 for compliance with Section II Part C of the ASME - B&PV Code. The inspector verified the chemistry, yield strengths, tensile, elongation and charpy impact test were within acceptable ranges. The inspector also verified the certifications were certified and legible. The review found all areas acceptable.

7. In-Process Welding On Supports

The inspector audited the welding activities in progress on pipe support 2-CCP-PSR-074, elevation 710, Auxiliary Building, to verify compliance with applicable requirements. The inspector verified the following items were being properly accomplished:

- Weld and welder were properly identified on the documentation and the part being welded.

- Weld procedure was identified, available at the weld location, and was being followed.

- Welder and weld procedure were qualified for conditions being welded.

- Weld material was properly withdrawn, and was being heated in a portable rod warmer. The electrodes were identified for traceability, were of the proper material and size as required by the weld procedure.

- Preheat and interpass temperatures were being maintained.

- Visual observation of the weld surface appeared adequate.

The inspector found all areas reviewed acceptable.

8. Inspection of Structural Steel Bolting

The inspector performed inspection in the Safeguards Building of structural steel bolting to verify that high strength bolts and nuts were used. The specification specifies A325 bolts and nuts be used for structural steel connections.

The ASTM Standard requires A325 high strength bolts and nuts be uniquely identified. The bolts must be stamped A325 on the bolt head. The nuts must be marked on one face with three equally spaced circumferential lines. Another acceptable marking is the stamping of 2P on one surface. Markings may be raised or depressed at the option of the manufacturer.

The inspector visually inspected approximately 50 bolts and nuts. All bolts were easily identificable as A325 by the stamping apparent on the head. Only about 50 percent of the nuts were identifiable. Heavy paint prevented the symbol 2P or the 3 lines from being discernible on the nuts.

To verify the adequacy of the nut material, the inspector requested that six bolts, selected by the inspector, be disassembled. The six selected had no apparent markings on the nuts.

After disassembly, the outer face was marked so that exposed ends could be established. In addition, all paint was removed. A visual inspection of the six nuts was made and the following conditions were noted:

- Three nuts were clearly identified on the exterior face as high strength nuts.

- One nut was clearly identified on the interior face as a high strength nut. It was identified with three depressed lines and the identification was legible. It had been put on reversed of what it should be to be readily identifiable.

- Two nuts had no apparent identification on either surface. One nut had faint identification which could be symbol "2P", but it was installed with the markings on the interior (sealing surface) and the tightening process had obliterated the marking. The other nut had no apparent markings on either surface.

To determine if the nuts were high strength, the licensee performed "Brinell" hardness tests on the six nuts plus eight additional other nuts selected at random. The "Brinell" numbers were then converted to approximate tensile strength. The tensile strengths of the two nuts were 98,000 psi and 81,000 psi. The tensile strengths of the identifiable high strength nuts ranged from 72,000 psi to 127,000 psi. A test performed on a 307 G.B. mild steel nut gave tensile readings of 55,000 psi. The hardness tests adequately demonstrated the nuts were high strength material. Identification for the one nut was probably lost by putting the nut on backward and stripping the identification off when tightened.

Based on this data, the inspector found this item acceptable. No violations were identified.

9. Inspection of Completed Pipe Supports

The inspector performed a detailed inspection of piping supports 2CCP-PSR016 and 2CCP-PSA014. This review included a visual examination with the aid of weld gauges and other measuring devices, to verify the supports were installed and inspected in accordance with applicable drawings. The inspector verified support location, clearances, weld type and size, and material sizes. The inspector also verified the drawings were clear and concise. Both drawings had received constructability reviews by Engineering.

Inspection Procedure IP 7.3.1 titled "Fabrication and Installation of Pipe Supports" was reviewed for technical adequacy as well as the inspection reports generated from the Quality Control inspection of these supports.

The inspector found the supports were installed in accordance with the drawings and specification. The QC inspection attributes were adequately documented.

All areas reviewed were found acceptable.

10. Work Controls on Cable for Rosemont Transmitter

During a daily site tour, the inspector noticed that Rosemont transmitter, 2-CCP-DT-100-2-AR, located at the 735' elevation in the Auxiliary Building was disassembled as evidenced by the disconnected electrical connections between the conduit end and the transmitter. Since the associated CCP system had been turned over to the DLC Startup Test Group, and there was no immediate evidence of equipment removal tags at the disconnected transmitter, the inspector was concerned that there might be a lack of

control of this work. Upon further inspection of this matter, it was determined that work in this area was being properly controlled. Specifically, the DLC Startup Test Group had authorized the electrical contractor via a post turnover work authorization request to rework the cable (2CCPARX007) associated with this transmitter. Accordingly, this item was turned back to construction and under their cognizance. Upon completion of the work, it will be inspected by Site Quality Control and then presented to the DLC Startup Test Group for concurrence.

The inspector found this item acceptable.

11. Installation of Supports Installed after Piping is Installed

Inspection Report 83-02 discussed an unresolved item (83-02-03) regarding the allowable clearances at the contact point of horizontal run piping supports. The item was unresolved because an engineering disposition required 1/16 inch minimum clearance between the pipe and the support. If this clearance was maintained, the support would be ineffective.

The licensee resolved the issue at that time by revising the governing document (2BVS-920) to require contact between the pipe and the support on horizontal run piping.

In a recent inspection, the inspector noted 2BVS-920 has since been revised to state "Clearance shall be 0 inches at the resting point of horizontal pipe runs at the first support outboard of an equipment nozzle or penetration. The acceptable total clearance between top and bottom (top + botton) lies between maximum and minimum values as specified in Tables 1 or 2. Table 1 and 2 specifies a minimum clearance of 1/16 inches, up to 1/4 inch maximum clearance.

The inspector raised concerns regarding this change. They are:

- Component cooling water line 2-CCP-018-031-3 comes into the containment building by a penetration, through a valve, thru to the first support, followed by an extensive length of piping (approximately 60 feet) with several supports equally spaced. The piping then enters a tee and branches off to other valves. As described in the specification, only the first support is required to contact the pipe and provide support. The inspector believes this clearance is only acceptable if the piping is put on location and kept there while the supports are installed. However, during piping installation, the only specified requirements to maintain the piping on location is ± 1 inch. During support installation, construction is not required to verify that piping is on location. Therefore, it is not clear that excessive loads are not being applied on the first support or on the piping penetration.

Based on a meeting held with Stone and Webster Engineering and Duquesne Light Company, the following actions are planned to determine if excessive loads exist at the areas of concern; Engineering will provide instructions to construction management and the piping will be lifted until the weight of the piping is achieved or until the piping load is taken off the support. The applied loads necessary to achieve the above will be monitored and recorded. From this, engineering will determine if excessive forces are applied to the support or penetration.

The inspector advised this item would remain unresolved pending the outcome of this test. (85-04-01).

12. Exit Interview

A meeting was held with the licensee's representatives indicated in Paragraph 1 on February 1, 1985, to discuss the inspection scope and findings.