U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-412-82-02

Docket No. 50-412

License No. CPPR-105 Priority -- Category A

Licensee: Duquesne Light Company

Robinson Plaza Building No. 2

Suite #210, PA Route 60

Pittsburgh, PA 15205

Facility Name: Beaver Valley Power Station, Unit 2

Inspection at: Shippingport, Pennsylvania

Inspection Conducted: March 1-31, April 1-7, 1982

Inspectors: G. Walton, Senior Resident Inspector — April 13, 1982 (date signed)

T. Varela, Reactor Inspector — 4/20/82 (date signed)

S. Chaudhary, Reactor Inspector — 4/19/82 (date signed)

Approved by: L. Tripp, Chief, Reactor Projects Section No. 2A, Projects Branch No. 2 — 4/16/82 (date signed)

Inspection Summary: Inspection on March 1 - April 7, 1982 (Report No. 50-412/82-02). Areas Inspected: Routine, unannounced inspection by two region based inspectors and one resident inspector of piping and hangers, structural steel and supports, welder and procedure qualifications, tool controls, weld issuance and postweld heat treatment requirements. The inspector also performed numerous site tours of construction activities. The inspection involved 177 hours onsite by three inspectors. Results: Of the eight areas inspected, two items of noncompliance were identified in two areas:(1) Failure to provide quantitative criteria to assure adequate weld size; (2) Failure to perform fit-up inspection to an acceptable inspection program.

DETAILS

1. Persons Contacted

Duquesne Light Company (DLC)

*I. E. Arch, Senior QA Engineer
+*R. Coupland, Director, Quality Control
+*H. N. Crooks, Jr., Assistant Director, Quality Control
F. G. Curl, Construction
+*C. R. Davis, Director, QA
*C. E. Ewing, QA Manager
+*W. H. Glidden, Senior QA Engineer
D. C. Morgan, QC Senior Structural Engineer
G. Wargo, Supervisor Site Test Laboratory
R. Hill, Batch Plant QC Inspector
+*J. Proven, Construction Engineer
+*F. L. Schwartz, Licensing Engineer
*C. J. Raabe, Construction Engineer
L. Williamson, Quality Control Inspector

Stone and Webster (S&W)

*S. T. Adams, Superintendent of Construction
+*C. R. Bishop, Resident Manager
G. Bingham, Concrete Superintendent
S. Boss, Site Structural Engineer
*R. J. Faust, Site Structural Engineer
*A. C. McIntyre, Site Engineering Office Head
+*J. Purcell, Site Engineering Office
+*R. Harris, Site Engineering Office

Pittsburgh DesMoines Steel Company (PDM)

J. Madden, QC Supervisor
D. Rhodes, Construction Superintendent

Schneider, Inc.

+ J. Sekely, Welding Engineer

*Present at exit meeting March 5, 1982
+Present at exit meeting April 2, 1982

2. Construction Site Walk-Through Inspection

Numerous 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, quality control records and equipment preservation was observed. The inspector examined work items for any obvious defects or noncompliances and for evidence of quality control of the work. Specifically the inspector observed the following: diesel generator building concrete construction, containment building - pipe rack installation and steam generator elevation 707', slab construction, auxiliary building - ventilation duct supports, containment building dome - preparations for concrete wall placement, main steam building - pipe rupture restraints installation.

No item of noncompliance was identified.

3. Licensee Actions On Previous Inspection Findings

a. 79-88-01 - Part 21 (Closed). Power Piping - Welder Qualification.

Pipe spools supplied by Power Piping Company for use in Beaver Valley, Unit 2, were fabricated by personnel whose welding qualifications did not comply with the interpretation of the ASME B&PV Code, Section IX. The problem was related to qualifications to attach bosses 2 inch and smaller pipe to larger diameter pipe, butt welding of small diameter pipe, welder machine operator qualification. As a result of the failure to comply, welders performed production welding on 202 items without proper qualification.

The corrective actions were divided into two parts due to the physical location of the affected piping. Forty-six items were onsite at Duquesne Light when the problem was dis ered. They are reported to the NRC under 10CFR50.55e, CDR 79-00-02 and will remain open until all repairs are completed. The other 156 items were repaired at Power Piping Company. The corrective actions were to remove the weld and reweld using qualified welders. To prevent reoccurrence all welders were requalified to discipline described above. It was determined that Power Piping had only welded nuclear work for Beaver Valley, Unit 2 and no other site was involved. This item is considered resolved.

b. 81-00-03 (50-55e) (Closed). Potential Deficiency Welded Beam Attachment.

Analysis by Power Piping has determined that the HS-142 beam attachment load rating at various angles is less than the full rated loads indicated by the original calculations. Using the reduced load rating, an analysis of all HS-142 beam attachments has found the actual loads are less than the reduced load ratings and

all attachments are acceptable without any additional work. The inspector had no further questions on this matter.

c. 80-08-01 (Closed). Interim Storage of Equipment.

The inspector reviewed the changes made to SQC-5.2 and SQC-IP-5.2.1 for controls of inplant storage. In addition, the inspector performed numerous site inspections of temporary and permanant plant storage conditions. All areas inspected were found acceptable. This item is considered resolved.

d. 81-03-01 (Closed). SAR Definition of Code Applicability on Neutron Shield Tank.

The inspector reviewed a preliminary copy of Section 5.4.14.1 of the BV-2 FSAR which reflects the fabrication practices applied to the neutron shield tank. As stated in the FSAR, the ASME B&PV Code Section VIII, Division 1 was used as guidance for fabrication of the tank. Certain sections of the code were followed, for example, all welding was in accordance with UW-2, heat treatment was in accordance with UCS-56. The nondestructive testing techniques are in accordance with UW-51. The areas which deviate are defined in the final specification for the reactor vessel support structure. The actual construction of this item is adequately described in the FSAR and this item is considered resolved.

e. 81-00-05 (Closed). Welder Qualification.

This item was determined to be "not reportable" by the licensee. The inspector verified that the item was very minor and had no safety significance. This item is resolved.

f. 80-00-07 (Closed). Seismic Calculations for Category 1 Structures.

The inspector reviewed the final report which concluded, after a detailed review, that no structural deficiencies existed in the following Category 1 structures:

(1) Auxiliary building

(2) Control Room

(3) Valve pit

(4) Service building

(5) Main steam and cable vault area

(6) Fuel and decontamination building

(7) Safeguards building

(8) Diesel generator building

This item is considered resolved.

4. Safety Related Structural Steel Support

By direct observation, discussions with cognizant personnel and review of documentation, the inspector verified the acceptability of and conformance to the design/erection requirements of structural steel supports. The inspector visually examined the following supports:

-- SIS-PSA-027;

-- CHS-PSA-078

The above supports were part of the Safety Injection System (SIS) and Chemical and Volume Control System (CHS) respectively. The inspector reviewed the following documents:

-- S&W Drawings: BZ-83A-163-2A;

BZ-83A-64-2; Sheets 1 & 2

BZ-19C-41-4C; Sheets 1 & 2

-- Schneider Isometric Drawings: 108310-0E; Sheets 1 & 2

108326-0D; Sheets 1 & 2

101919-2C; Sheets 1 & 2

The inspector also performed dimensional checks on the above supports to determine their conformance to the specified fabrication and installation requirements; reviewed certain CMTRs for the materials used in the fabrication;ascertained that NDE was performed; and specified processes were used in fabrication and installation.

Based on the above personal observations, discussions with cognizant personnel, and review of documentation, the inspector determined the following:

(1) Specified materials and processes were used.

(2) Required NDE was performed.

* (3) Fabrication and installation was per drawing requirements.

* (4) Adequate inspection was performed.

* (5) Sufficient inspection records were maintained.

* Except as discussed in the following paragraphs.

The inspector observed that the S&W standard procedure STD-PS-2A-2 specified the weld configurations and sizes. The weld dimensions as described in the standard are such that a weld could be made meeting all the requirements without having an adequate throat or weld metal deposit for structural integrity. The inspector further observed that once a weld was made the effective throat or weld metal deposit could not easily be determined. The failure of the standard to specify quantitative criteria to preclude inadequate weld size is a violation of 10CFR50, Appendix B, Criterion V. (82-02-01).

5. Weld Fit-Up Inspection

The inspector expressed concern that the inspection of welding preparation and fit-up were not performed on all safety-related welds. In response to the inspector's concern the licensee stated that the inspections for fit-ups and welding-prep were carried out on a random sampling basis, and was considered adequate by the licensee to assure the integrity of welds. The inspector, however, observed that the random inspections performed for weld-preps and fit-ups were not based on any established sampling plan, recognized standard practice, and/or a predetermined frequency; also, the licensee could not provide adequate justification for the sample size or selection process.

The inspector further observed that the weld #2-SIS-87-F500 in Safety Injection System was inspected but had not been accepted because the final weld size was not verifiable by QC due to the lack of weld-prep and fit-up data, and the dimension of land area in the joint.

The method used by the licensee to perform the fit-up inspections does not meet the intent of 10CFR50, Appendix B, Criterion X for the following reasons:

a. The items selected for fit-up inspection are highlighted with an asterisk on the weld data sheet. This provides the construction personnel advance notice of those that will be inspected and those that will not. This could result in such welds being a non-representative sample. Added attention to quality would be possible for those welds so identified for inspection including assignment of the best fitter(s) to work on such welds.

b. The method used by Quality Control personnel to select the fit-ups that will be inspected is not based on any approved sampling program. It appears to be based on the decision of that particular person marking the weld data sheet. This method could vary from person to person and does not provide adequate justification for the different variables involved such as different crafts and welding processes involved.

The failure to perform fit-up inspections by recognized standard practices is a violation of 10CFR50, Appendix B, Criterion X. (82-02-02).

6. Unresolved Items

During this inspection period, two unresolved items were found. Listed below are the items and basis for being unresolved.

a. The inspector audited the requirements contained in ANSI-N-45.2.8 against the installation and inspection practices used when installing Category 1 piping. Paragraph 4.4 of the above document states that inspections of the work areas and the work in progress shall be performed to verify that mechanical items are being located, installed, assembled or connected in compliance with the latest approved drawings. It further states that the inspections performed shall include as appropriate: leveling and alignment, and clearances and tolerances.

Discussions with QC revealed that provisions are not included in the inspection procedures (IPs) for normal piping installations to assure that all drawing tolerances are met.

The licensee is investigating to determine the actions necessary to assure and demonstrate that they are achieving compliance in this area.

This item remains open pending further discussions and review. (82-02-03).

b. The inspector reviewed the requirements and practices used to control stainless steel contamination when in contact with carbon steel racks. 2BVS-920 contains requirements for control of iron contamination on stainless steel during fabrication and erection of piping. This specification requires that racks and shelving must be covered with wood, heavy plastic sheets or stainless steel to prevent iron contamination. During the normal site tours the inspector observed that the above policy was not always complied with and although considered minor, stainless steel piping was found in contact with carbon steel racks. The inspector questioned the licensee regarding these practices and was advised of the following:

(1) Technically, there is nothing wrong with stainless steel contacting carbon steel if iron contaminants are subsequently removed from the stainless material.

(2) The contractor has determined that it is better to control iron contaminants now than remove it later.

(3) A revision will be made by the licensee to FCP 208 (field construction procedure) imposing the requirements stated in 2BVS-920.

(4) Site Quality Control has included requirements in IP-7.35 for QC surveillance to verify that adequate precautions are taken to minimize contamination of stainless steel items.

This item remains unresolved pending review of FCP-208. (82-02-04).

7. Containment Building Personnel Access Hatch (PAL).

a. Status of Construction

The inspector observed and discussed with PDM and reviewed records on the incomplete status of the personnel access hatch. This shop fabricated vessel was approved to be cut in half at mid-barrel cross section to accommodate installation in containment wall reinforcing steel at the wall penetration. The liner plate/PAL donut welds, girth weld to reunite the barrel and the containment concrete wall surrounding the inner half of the barrel have been completed. However, PDM's additional work notices and quality controls must be accomplished prior to the final pressure test. This is necessary to provide conformance to drawings, specifications and referenced code. The inspector was informed that completion of the PAL is scheduled for June 1982.

b. Quality Assurance/Control Record Review

These records were reviewed, evaluated and discussed with responsible PDM, Licensee and S&W personnel:

-- Field Receiving Report, manufacturer's data reports and vendor inspection shipping release;

-- Installation, Liner Penetration and Girth welds, release for contruction, weld prep, fit-up, seam weld, QA on NDE for field welds (Vt, Mt, Vb and Rt);

-- Authorized Nuclear Inspector certification data reports;

-- Licensee Site QC Surveillance reports of weld prep, welding and NDE;

-- Licensee QA audit of PDM activities;

-- S&W Records Management - review of computer retrieved microfilm records on PAL material, installation, welding and NDE records.

c. Observation of Completed Installation Welds

Welds for PAL attachment of the donut to containment liner plate and girth were observed to be without obvious deficiency and evidenced good workmanship.

No item of noncompliance was identified.

8. Diesel Generator Shop Fabricated Fuel Storage Tanks

Technical Specification No. 2BVS-54 for two-sixty thousand gallon shop fabricated tanks were reviewed by the inspector. ASME III Code requirements were observed imposed on a qualified vendor having ASME Certification. Records in these areas were reviewed on the tanks received at the site:

-- Receiving inspection reports;

-- Nonconformance and disposition reports;

-- Inspection (QC) records.

No item of noncompliance was identified.

9. Storage of Structural Steel and Fabricated Items

The inspector determined the status of structural steel items stored in laydown areas. The inspection was performed to ascertain that the items were properly stored on cribbing or dunnage to prevent deterioration; adequately controlled to preclude unauthorized removal; properly tagged to show the acceptance status; and were properly identified by markings/tags and/or stenciling/etchings for piece mark, item number and systems.

Based on the above observation, the inspector determined that the storage and control of structural steel and fabricated items was acceptable.

No items of noncompliance were identified.

10. Welding Procedure Specification and QA Procedures for Steel Structures and Supports

The inspector reviewed documents and held discussions with cognizant licensee and contractor personnel to ascertain: (1) welding procedures specifications (WPS) and quality assurance procedures for field welding of steel structures and supports were established; (2) WPSs were qualified and controlled; and (3) confirmed to be the applicable code requirements. The inspector selected the following two WPSs for review:

-- WPS-SPBV-100; General Procedure;

-- WPS-SPBV-300E, GTAW, Specific procedure for ASME classes 1, 2, and 3; and Attachment welds for material thickness 0.062 inches to 0.750 inches;

-- PQT-760532 for SPBV-300E;

-- Certain weld data sheets for rod issue.

Based on the above documentation review, discussions with personnel, and personal observations, the inspector determined that the contractor responsible for structural steel welding had established procedures for preparation, qualification, distribution, and revision of welding procedure specifications.

For the two WPSs selected, the inspector determined that:

a. They were in conformance with the above procedure;

b. They defined all essential variables in accordance with the applicable editions of Section IX of ASME B&PV Code;

c. Each of the selected procedures were qualified in accordance with ASME, Section IX and the supporting PQR (PQT-760532) was adequate and available;

d. The PQR listed the essential variables for the specific welding process (GTAW), and the variables were consistent with the applicable code;

e. The mechanical tests required by the code were performed and were properly documented on PQR (tensile and bend tests on reduced sections per ASME, Section IX and RG 1.31);

f. The PQR was certified by the contractor on May 27, 1977;

g. The changes in the nonessential variables were supported by requalification;

h. The PQR complied with the requirements of RG 1.31.

The inspector had no further questions on this matter. No items of noncompliance were identified.

11. Welding Material Control

The inspector examined the controls on welding materials to assess the degree of compliance to project procedure and code requirements. The inspector performed visual inspections in weld material control stations and discussed the control requirement with cognizant personnel.

The inspector determined that the contractor had adequately established procedures for storage, distribution, and handling of welding electrodes, filler metal, consumable inserts, flux and gases. The materials were clearly identified and were retained throughout storage, handling and use. The surplus materials returned to issue stations at the end of the work shift were destroyed to prevent inadvertant use, misuse or mixup with acceptable materials. The welding materials were adequately protected from moisture, and were stored in containers and were baked in ovens for specified periods and at specified temperatures before issue. The controls were considered acceptable.

12. Location of Welded Attachment on Embedded Support Plates

During a walk-through inspection, the inspector observed that some pipe supports were located on their base plates such that the welded connection of the structural member to the base plate was at the edge of the base plate. The inspector also noted that some of the pipe support drawings prohibit attachment of structural member to base plate any closer than 1½" from the edge of a base plate. In response to the inspector's inquiry, the S&W engineering personnel stated that the requirement of edge distance was imposed very recently and this requirement does not in any way change the design criteria, however, does make a computer analysis easier for stress reconcilation purposes at the time of "As-built" verification and stress analysis. This item will be followed up by the inspector in a subsequent inspection at the time of "As-built" program review.

13. Welding Procedure Qualification

The inspector reviewed the welding procedure technique sheet SPBV-115A, Revision 3 and supporting procedure qualification test (PQT) Number 759456. This procedure is applicable for use on ASME Section III pipe welding. The contractor, Schneider, Inc. had certified the PQT for a qualified thickness range of .1875 to 2.624 inches with postweld heat treatment.

As stated in the ASME, B&PV Code Section IX and the licensee's specification 2-BVS-920 when welding on ASME III ferritic steel piping which requires post weld heat treatment, the weld procedure qualification must be qualified for not less than 80 percent of the total time at temperature applied to the base material.

The test sample used was 1.312 inches thick and received a post weld heat treatment of one hour per inch, for a total time of 1.3 hours. The requirements contained in the ASME, B&PV, Section III Code requires the production weld to be post weld heat treated at one hour per inch. Using the range certified of 2.624 and the requirement that the sample receive at least 80 percent of the production material, the qualified thickness would be limited to a maximum thickness of 1.624 inches. The licensee acknowledged this discrepancy and after investigating determined that this PQT had not been applied for thickness greater than 1.6 inches. The reference to ASME Section III was removed from the PQT and two additional PQs were added to the technique sheet which now qualified SPBV 115A up to 2.249 inches. The inspector had no further questions on this matter.

14. Cleanness Zone Requirements for Class 1, ASME, Section III Welding

From observations of welding activities on Class 1 pipe welding in the containment building and from review of inspection plan, IP 7.2 and IP 7.2.6 an apparent discrepancy was noted for cleanness zone requirements between the main coolant loop piping and the associated Class 1 piping. Inspection plan 7.2.6, paragraph 5.2, attribute ME-MS-024, has established a cleanliness zone IV while welding, while IP 7.2 for welding of associated Class 1 pipe weld establishes a cleanliness zone V. The inspector questioned the differences and was informed of the following:

Cleanness zone IV was established for the main loop of the reactor coolant system because the size of the pipe can and will be used by craft personnel for ingress and egress to major components, reactor vessel, etc. and therefore requires stricter controls for cleanness.

To clarify the licensee's position, a change is being made to FCP-906 which clarifies that after all weld joints in a cubical have the root weld installed, the cubical area will then be considered zone V cleanness on the outside of the pipe and the interior will remain zone IV cleanness. The inspector had no further questions on this matter.

15. Record Review

The inspector performed the below listed inspection to ascertain compliance with regulatory requirements.

a. Program for compliance with Regulatory Guide 1.71, Welder Qualification With Limited Access. This included a review of IP-7.2.

b. Program for control of tools used on stainless and carbon steel materials. This included discussions with tool crib attendants and other craft personnel. The licensee has modified IP-7.35 to include surveillance of this program.

c. Welding activities on feedwater flued head penetration repairs for compliance with I&E Bulletin 80-08. This included a drawing review, and selected review of radiographs. This item continues unresolved. (80-BU-08).

d. Nonconformance and Disposition reports numbers 6200, 6202, 6204 through 6208.

e. Postweld heat treatment (PWHT). This included a review of Engineering and Design Coordination Report number 2PS-1405A which updated the PWHT requirements to the Winter Addenda of the ASME B&PV Code.

No items of noncompliance were identified.

16. Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, items of noncompliance or deviations. Unresolved items identified during this inspection are discussed in paragraph 6.

17. Exit Interview

The inspectors met with licensee representatives (denoted in paragraph 1) on March 5 and April 2, 1982. The inspectors summarized the scope of the inspection.