

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

Region I

Report No. 50-412/82-08

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: July 7 - August 2, 1982

Inspectors: G. Walton
G. Walton, Senior Resident Inspector

Aug. 5, 1982
date signed

J. P. Reynolds
J. P. Reynolds, Reactor Inspector

8/15/82
date signed

H. Kerch
H. Kerch, Reactor Inspector

8/15/82
date signed

L. R. Plisco
L. R. Plisco, Reactor Inspector

8/17/82
date signed

Approved by: L. Tripp
L. Tripp, Chief, Reactor Projects Section
No. 2A, Projects Branch No. 2

8/17/82
date signed

Inspection Summary: Inspection on July 7 - August 2, 1982 (Report 50-412/82-08).

Areas Inspected: Routine, unannounced inspection by one resident inspector and three regional based inspectors of welding activities, nondestructive examination, instrument calibration, drawing controls, electrical installations, concrete placement, HVAC installation, specification review, storage, licensee action on bulletins and site tours. The inspection involved 199 hours onsite by four inspectors.

Results: Of the eleven areas inspected, one item of noncompliance was identified: Failure to protect electrical panels from airborne contaminants.

Region I Form 12
(Rev. April 77)

DETAILS

1. Persons Contacted

Duquesne Light Company (DLC)

- *W. Arvin, Senior Engineer
- +*R. Coupland, Director, QC
- +*H. Crooks, Assistant Director QC
- +*C. Ewing, QA Manager
- +*R. Fedin, Compliance Engineer
- + S. Hall, Senior Compliance Engineer
- C. Majumdar, Senior QC Engineer
- +*J. Markovich, Compliance Engineer
- + P. Orr, Deputy Project Manager
- +*R. Swiderski, Manager of Nuclear Construction

Stone and Webster (S&W)

- +*S. Adams, Superintendent of Construction
- +*C. Bishop, Resident Manager
- +*R. Faust, Site Structural Engineer
- +*R. Harris, Site Material Engineer
- *A. McIntyre, Head SEO

*Present at exit meeting held July 22, 1982.

+Present at exit meeting held August 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 and quality control records was observed.

No violations were identified.

3. Licensee Action on Previous Findings

(Closed) Unresolved Item (82-06-02): Electrical cable spool storage. The inspector observed the storage practices of safety related cable during a site tour. The storage area conditions were acceptable with respect to BVPS-2 Specification 2BVS-981 "Requirements During Storage" and ANSI 45.2.2-1972 "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants (During the Construction Phase)."

This item is resolved.

(Closed) IE Bulletin 79-09, G.E. AK-2 Circuit Breakers. The licensee responded to IEB 79-09 on June 21, 1979 stating that no G.E. Type AK-2 circuit breakers were being used on any system at Beaver Valley, Unit 2. The inspector has no further questions on this matter.

(Closed) IE Bulletin 79-25, Westinghouse BFD Relays. The licensee responded to IEB 79-29 on December 31, 1979 stating that relays of the type described in IEB 79-25 are not being used in any system at Beaver Valley, Unit 2. The inspector reviewed the documentation associated with this bulletin and has no further questions.

(Closed) Unresolved Item (82-04-01): Certifying Welding Procedure Qualification Test (WPQ). The inspector performed a detailed review of the below listed WPQs to determine compliance with the Schneider Quality Assurance Manual and ASME Section III.

759456	770366
760820	822248
761357	823217
765953	823772
776238	

The inspector determined that some of the WPQs were restricted to certain thickness limits to comply with ASME, Section III. All were reviewed and certified to ASME, Section III by the welding engineer as required by the QA Manual. The inspector also determined by record review and discussions with the weld engineer that no welding had occurred outside the limits placed on the WPQs when they were certified to ASME Section III.

This item is resolved.

(Closed) Unresolved Item (82-07-03). The inspector reviewed the actions taken by the licensee and Stone and Webster for assuring that liquid penetrant examination would be performed on both weld surfaces of the primary coolant loop piping.

Field construction procedure, FCP 906 and inspection procedure, IP 7.2.6 were reviewed after changes were made which clarified the requirements of liquid penetrant examination on the primary coolant piping welds. The two documents now specify a final nondestructive examination by radiography of the completed weld and liquid penetrant inspection of the external and accessible internal weld surfaces.

This item is resolved.

Unresolved Item (82-04-04). Discussions were held with the licensee, S&W and Schneider on the subject item. The NRC inspectors clarified their position that the entry on the WPS form of the total thickness range qualified for a multiprocess weldment consists of the maximum thickness qualified in deposited weld metal for each process. As suggested format QW-482 states, it is the intention of the Code to record the data required by QW-403 for each base metal-filler metal combination individually. The total thickness permissible in a welded joint is the actual thickness deposited by first process plus the maximum qualified deposited thickness of the second process.

The NRC inspector pointed out that the "T" in the range of thickness column of Table QW-451.1 of SCIX W81 is a typographical error and should be a "t."

The licensee has committed to review all welding procedures and limit the qualified thicknesses to each process. A review will be made of all previous welding to assure compliance with each qualified process. Revisions to the WPS and PQR will be revised as necessary. This item will continue to be unresolved pending action by the licensee and subsequent review by the NRC.

4. Reactor Protection Cabinets and Main Control Benchboards In Place Storage Conditions.

While inspecting the installation of safety related cables in the control building, the inspector observed that the ventilation filters and protective covers were not installed on Reactor Protection Cabinets, Control System Cabinets, and Main Control Benchboards. The unprotected equipment included Primary Process Racks Cabinet No. 2 Protection II, Cabinet No. 8 Control 4, and Rod Position Rack I (Control Building Elevation 707) and the Main Control Benchboards (Control Building Elevation 736).

BVPS-2 Specification 2BVS-981, Requirements During Storage, provides for maintaining the above equipment in Level B Storage conditions consistent with QA program endorsement of ANSI N45.2.2-1972, Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants. Protection from airborne contaminants had been afforded by temporary cabinet filters and covers. Field Construction Procedure (FCP) 11, Section 12.0 provides similar requirements for protection of permanent plant equipment, internal components, wiring and cables from transient conditions such as welding sparks, grinding chips, etc.

The inspector observed that no controls were evident to prevent atmospheric contamination of the sensitive instrumentation and controls equipment. Grinding on steel embedments was observed within 4 feet of the exposed cabinets without precautions to protect the equipment. The rooms were marked as Level B storage areas, but were not being controlled as such with respect to control of airborne contaminants.

The licensee was experiencing difficulties in meeting cable separation criteria (Reference: NRC Inspection Report 50-412/82-05, Unresolved Item 82-05-01) and had postponed all cable terminations until this separation problem had been resolved. While awaiting resolution, the licensee elected to continue cable pulling and had removed the temporary ventilation filters and protective covers to facilitate storage of the cable ends until they could be terminated. With the cable ends pulled through the ventilation filter openings, the filters and covers could not be replaced.

During discussions with the inspectors and Region I management, the licensee advised that this arrangement had been chosen to avoid damage to the cabinet internals, that they had recognized the potential for the introduction of airborne contaminants, and that they planned to thoroughly clean the equipment prior to energization and testing. The licensee noted that 2BVS-981 permitted filters and covers to be removed for work as long as work interruptions were less than one week. The inspectors advised the licensee that maintenance of storage conditions was required by their program in addition to any later cleaning, particularly in regard to transient, contamination producing activities. Cleanliness could be maintained by either directly protecting the equipment by covers, seals, filters, etc. or by control of the surrounding environment by control of area cleanliness and contaminant producing activities.

10CFR50, Appendix B, Criterion XIII requires that measures be established to control the storage and preservation of equipment to prevent damage or deterioration. Section 17.1.1A of the PSAR applies the guidance contained in WASH-1309 "Guidance on Quality Assurance Requirements During the Construction Phase of Nuclear Power Plants," dated May 10, 1974, which further endorses ANSI N45.2.2-1972 "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants (During the Construction Phase)," via Regulatory Guide 1.38 of the same title.

ANSI N45.2.2-1972 requires that instrumentation equipment shall be stored in Level B areas and requires that measures be established for protection from the effects of airborne contamination. Specification 2BVS-981 and FCP-11, discussed above, provide for implementation of measures consistent with ANSI N45.2.2.

Failure to provide adequate measures to prevent equipment damage or deterioration of the Reactor Protection and Main Control cabinets is a violation (82-08-01).

Related storage and housekeeping problems are documented in NRC Inspection Reports 50-412/82-01, 82-06, and 82-07; a related violation is discussed in NRC Inspection Report 50-412/87-06. The inspectors and Region I supervisors discussed the apparent need for additional licensee attention to this area during a telephone discussion with the DLC Manager, Nuclear Construction and his staff on July 26, 1982.

5. Electrical Cable - Records and Procedure Review

The inspector reviewed pertinent work and quality records of Category I (safety related) cables to determine whether the records and procedures reflect work accomplishments consistent with NRC requirements and licensee commitments in the areas of storage, identification and installation.

Documents and Procedures reviewed for this determination included:

- 2BVS-931, Specification for Electrical Installation;
- 2BVM-41, Criteria for Design and Identification of Electrical Cable and Raceway;
- FCP-431, Cable Pulling;
- FCP-411, Raceway Identification;
- IP-8.4.1, Inspection for Cable Pulling;
- Cable Pull Cards for cables 2FWBPC801 and 2SWSCOC702.

No violations were identified.

6. Welding of Incore Instrumentation Socket Welds

Discussions with the licensee were held on the applicability of the special limited accessibility qualification rules of RG 1.71 for the welding of the subject socket fillet welds. These joints require P8 to P8 socket fillet welds for the incore instrumentation tube to coupling joints and P8 to P43 socket fillet welds for the instrumentation tube to stub tube joints.

The center-to-center spacing of the welds is 10-12". A specific progression for making and testing of the welds will assure maximum accessibility. The welds will be made completely with the manual GTAW process. In addition to the normal qualifications specified in ASME Section IX, a special welder qualification test is used to qualify each welder. Limited accessibility is not included as a qualification requirement. The NRC inspector visually inspected the test assemblies used for the stub tube to instrumentation tube weld and the socket attachment test assemblies for the other instrumentation weldments. The NRC inspector discussed with Schneider and S&W personnel the metallurgical results of preliminary welds which indicated the need to eliminate the chamfer on the socket to prevent root microfissuring. The NRC inspector visually inspected 5 sets of macroetched sections of test assemblies and reviewed Pittsburgh Testing Laboratory (PTL) reports on 5 welders' tests. In production and in qualification, the root pass requires PT which is performed by QC inspectors who are also qualified as visual inspectors.

The inspectors discussed the applicability of RG 1.71 with cognizant NRC Standards personnel and determined the requirements of RG 1.71 were not applicable when visibility and adequate manipulation are not severely restricted.

The inspector reviewed the following documents associated with the stub tube welding:

- Special test, number 4 of FCP-601.3 Appendix 3, Revision 6, dated June 24, 1982, titled "Welder Performance Qualification Test";
- Westinghouse Electric letter ELM-W-618, dated February 12, 1982 which included process specifications 82127JN and 82128JS;
- FCP-903.4, pages 16 and 18 which contains special supplementary directions to the welder;
- IP-7.2.8 which contains the inspection requirements;
- Welding procedure specification, BV-504C and associated PQR 822248.

The inspector determined that the above documents comply with the requirements specified in ASME, Section IX for performance and procedure (QW-180) test assemblies.

The NRC inspector also reviewed W Forrest Hills to W Site letter MT-MNA-3605-82 and W Laboratory Report 82-315 which provided a metallographic evaluation of four P8 to P8 and two P8 to P43 socket fillet welds made by two welders (F042 and F035). The P8 to P43 welds were rejected due to root fusion. The NRC inspector reviewed additional records showing satisfactory welding on subsequent test assemblies.

No violations were identified.

7. Control of Sensitization in Austenitic Stainless Steel Weldments

Regulatory Guide (RG) 1.44 addresses the subject of potential service induced corrosion problems of sensitized austenitic weldments. The NRC inspector reviewed site documents to determine the degree of licensee commitment to this RG. Review of Section 17 of the PSAR and the guidance provided by WASH documents 1283, 1284 and 1309 did not show a commitment to RG. The subject is addressed in S&W Specification 920, on page 1-36 which commits to corrosion qualification by the testing of ASME SCIX PQR test assemblies. Corrosion qualification is by evaluation of the results of an (ASTM:A708) 72-hour boiling acidified copper sulfate IGA test. The results of the test are indicated on the PQR.

The NRC inspector reviewed WPS SPBV300Z, Rev. 1, which references PQR 760532. Review of PQR 760532 indicated "acceptable" corrosion test results. Also reviewed was Pittsburgh Testing Laboratory (PTL) Report 773308, dated March 24, 1977 which reported results for procedure SPBV300Z and WPS SPBV300C and its applicable PQR which is PQR 760783. The aforementioned WPS documents do not limit the weld heat input to that qualified in the PQR documents.

The control of sensitization by PQR test assembly corrosion evaluation requires control of heat input in the WPS document to the maximum heat input utilized in the PQR test assembly. RG 1.44 also recommends testing of the maximum carbon content anticipated and maximum and minimum thicknesses anticipated.

Review of the PTL report showed that the test report does not explicitly indicate the carbon content of the materials tested nor the PQR test assembly identification. Assuming that PQR 760532 was the test assembly tested in PTL Report 773308, the thickness of the material welded was 1.781" whereas a thickness of 0.1875" may be welded according to the WPS. The test utilized for evaluation was ASTM:A708 (formerly A393) which is a gross test for IGA compared to A262 which is referenced in RG 1.44.

The NRC inspector reviewed S&W Regulatory Guide Position 1.44R0/1, Rev. 1, dated November 10, 1975. This document commits to compliance to RG 1.44 with the exception of a substitution of ASTM:A708-74 for the A262 corrosion test and an increase in bend radius from $\frac{1}{2}T$ to 2T which is the ASME SCIX radius for welded specimens. The NRC inspector also reviewed NRC Standard Review Plan (NUREG-0800) 4.5.1 and 5.2.3 and discussed the interpretation of RG 1.44 with cognizant NRC:NRR materials personnel.

The review conducted to date does not clearly indicate compliance to the requirements of RG 1.44 or S&W Position 1.44R0/1. The following information is needed to complete the NRC review:

- (1) What was the carbon content of the base metal welded in the test assembly?
- (2) Were there tests conducted on the minimum thicknesses to be welded under the WPS document?
- (3) Why are the parameters indicated in the WPS documents not limited to those qualified in the PQR?

This item is unresolved (82-08-02).

8. Review of Nondestructive Examination (NDE) Personnel Qualifications

The NRC inspector (NDE Specialist) reviewed the qualifications of 10 NDE inspectors qualified to various levels in four inspection disciplines. Review of the records indicate personnel meet SNT-TC-1A experience and testing requirements.

No violations were identified.

9. Review of Reactor Coolant System (RCS) Piping Weld Radiographs

The NRC inspector (NDE Specialist) reviewed supplementary inprocess radiographs for the following welds (complete circumference):

-- 2-RCS-4-F1	50% complete
-- 2-RCS-4-F4-R1	50% complete
-- 2-RCS-8-F1	90% complete
-- 2-RCS-2-F1	90% complete

No penetrameters were used as the weld is not complete and the weld thickness radiographed differs considerably with that of the base metal. The quality level and defect types were typical of that to be expected for heavy wall stainless weldments. No unusual defects nor defect trends were observed.

The following completed Class 1 piping welds which were prepared for in-service examination were reviewed:

-- 2-RCS-3-F1
-- 2-RCS-9-F1
-- 2-RCS-6-F1

The radiographic technique utilized two penetrameters to cover the range of thicknesses encountered in the dissimilar thickness joint.

The film quality meets the requirements specified in ASME, Section III, 1971 and Winter 1972 Addenda which had no maximum limit for film density if two penetrameters for thickness variations are used. Review of the films indicated maximum densities exceeding 4.0; however, all films reviewed could be read between the two penetrameters.

The licensee has committed to revise the radiographic procedure and address the actions to be taken when the film density exceeds 4.0.

No violations were identified.

10. Welder Qualification

The NRC inspector conducted an indepth review of the welder qualification system. The purpose of the review was to determine if the licensee had an effective accurate system that met applicable code requirements for testing, evaluating test results, recording and updating welder qualifications.

No violations were identified.

11. Review of Welding Activities

The NRC visually inspected Reactor Coolant System (RCS) weldments in process, reviewed required weld history records of these welds, reviewed records of completed welds including review of radiographs, reviewed surveillance inspection reports for recent RCS welds, and reviewed filler metal certifications for the welds observed. The following welds, including Class 2 welds, were visually inspected:

- 2-RCS-4-F4 (Repair R-1)
- 2-RCS-5-F1
- 2-RHS-006-F04 (Class 2)
- 2-CHS-108-F05 (Repair R-2) (Class 2)
- 2-CHS-201-F01

No violations were identified.

12. Drawing Control

The inspector audited the following locations onsite to determine if the drawings being used were controlled and if the latest revisions were being used.

<u>Location</u>	<u>Drawing No.</u>	<u>Contractor</u>
Containment Bldg. Bottom Elevation	12241-RP-71B-6Q	Schneider
" " "	12241-RP-74A-7R	Schneider
" " "	12241-RP-74B-7M	Schneider
" " "	12241-RP-74C-6J	Schneider
" " "	12241-RP-82A-6H	Schneider
" " "	12241-RP-82B-6H	Schneider
Fuel & Decon. Bldg.	12241-RC-38C-3D	Dick Corp.
" " "	12241-RC-38D-5Q	Dick Corp.
" " "	12241-RC-38E-5P	Dick Corp.
" " "	12241-RC-38F-5V	Dick Corp.
" " "	12241-RC-38G-5S	Dick Corp.
" " "	12241-RC-38H-2Q	Dick Corp.
Main Steam & Cable Vault	SECO-1-510-C9, Rev. 6	Sargent Electric
" " "	SECO-1-510-C20, Rev. 3	Sargent Electric
" " "	SECO-1-510-C26, Rev. 8	Sargent Electric
" " "	SECO-1-510-C27, Rev. 7	Sargent Electric
" " "	SECO-1-510-C30, Rev. 2	Sargent Electric
" " "	SECO-1-510-C35, Rev. 5	Sargent Electric
" " "	SECO-1-510-C36, Rev. 1	Sargent Electric
" " "	SECO-1-510-C37, Rev. 3	Sargent Electric
" " "	SECO-1-510-C38, Rev. 3	Sargent Electric
" " "	SECO-1-510-C39, Rev. 0	Sargent Electric
" " "	SECO-1-510-C40, Rev. 6	Sargent Electric

The inspector compared the revision number found in the field against the document control issue station and found all issues were the correct revisions.

No violations were identified.

13. Calibration Program

The inspector audited the calibration program to ascertain compliance with the licensee's commitments. The following items were reviewed:

- Field Construction Procedure - FCP-501, Change Number 12, "Control of Measuring and Test Equipment;"
- Site QC Procedure - SQC-5.10, "Control of Measuring and Test Equipment;"
- Calibration Procedure - CP-1.0, "General Procedure for Calibration Lab;"
- Instrument calibration history card for oven thermometer S10T-149 and multi-amp motor overload relay and circuit breakers test set, Model MS-11, Serial 2980;
- Evaluation report of nine items found out of calibration for pressure gages and thermometers;
- Witnessed calibration of one pressure gage.

The review was made to determine the following:

- (1) Calibration frequency was met as prescribed by internal procedures and specifications;
- (2) Calibration and accuracy of each calibration was traceable to the National Bureau of Standards;
- (3) Identification by affixing a sticker to each item is controlled and accurately reflects the current calibration;
- (4) Recall system for recalibration is kept current;
- (5) Proper actions are being taken when an item is found out of calibration.

All items reviewed were found acceptable.

14. Procedure and Specification Review

The inspector audited the following documents to determine if the technical content contained within met the licensee's commitments to the ASME codes, regulatory guides and PSAR requirements:

- Specification 2BVS-39 - Fabrication of Pressurizer Support Structural Components;
- Procedures FCP 601.14, Change 2 - Stud Welding and FCP 906, Revision 6 - Installation of Reactor Coolant System Piping.

No violations were identified.

15. Placing of Concrete on Reactor Containment

On July 28, 1982, the inspector observed portions of the concrete pour being made on the top dome of the reactor containment building to determine compliance with the PSAR and ACI commitments. The inspector observed truck and pump placement, pumping and discharge methods and quality control activities associated with the pour. The inspector found all areas inspected in compliance with the licensee's commitments.

No violations were identified.

16. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable, items of noncompliance, or deviations. One unresolved item was identified and is discussed in paragraph 3 of this report.

17. Exit Interview

Meetings were held with the licensee representatives indicated in paragraph 1 on July 22 and August 2, 1982, to discuss the inspection scope and findings. A summary of inspection findings was also provided to the licensee at the conclusion of the report period.