

U.S. NUCLEAR REGULATORY COMMISSION
Region I

Report No. 50-412/84-11
Docket No. 50-412
License No. CPPR-105 Priority -- Category A
Licensee: Duquesne Light Company
435 Sixth Avenue
Pittsburgh, Pennsylvania 15219

Facility Name: Beaver Valley Power Station, Unit 2

Inspection At: Shippingport, Pennsylvania

Inspection Conducted: September 4-7, 1984

Inspector: *K. A. Manoly*
K. A. Manoly, Reactor Engineer

10/26/84
date

Approved By: *J. P. Durr*
J. P. Durr, Chief, Materials and Processes
Section, EPB

11/2/84
date

Inspection Summary:

Inspection on September 4-7, 1984 (Report No. 50-412/84-11)

Areas Inspected: Routine, unannounced inspection by a region-based inspector to followup on licensee actions relating to several open items in the area of HVAC, electrical, piping and equipment supports. The inspection involved 25 hours of direct inspection time onsite and 8 hours of inspection time at the regional office.

Results: No violations were identified.

8411290539 841107
PDR ADOCK 05000412
G PDR

DETAILS

1. Persons Contacted

Duquesne Light Company

- J. Carey, VP - Nuclear Group
- E. Woolever, VP - Nuclear Construction
- R. Coupland, Director QC
- L. Arch, Site Engineer - Mechanical
- H. Good, Sr. QC Weld Spec.
- H. Siegel, Engineering Manager
- * H. Crooks, Assistant Director QC - Mechanical
- C. Majumdar, Assistant Director QC - Electrical

Stone and Webster Engineering Corporation (S&W)

- * R. Raysircar, Project Engineer
- C. McIntire, Superintendent Engineering
- R. Wittschen, Licensing Engineer
- * R. Faust, Principal Structural Engineer
- * N. Sacco, Equipment Qualification Engineer (Corp. Office)

USNRC

G. Walton

* Denotes persons not present during exit meeting.

2. Licensee Action on Previous Inspection Findings

2.1 (Closed) Violation (412/82-11-01):

The violation was identified in the HVAC support drawings and installations. Three specific findings were cited in this violation:

- Drawing BZ-516D-16-4A, "Detail F", was used for attaching support DSA 207 to the wall using Hilti bolts. The drawing tolerance allowed the movement of bolt hole location such that they exceeded the supporting design calculation.
- Drawings BZ-539C-71-2 and BZ-516D-72-1C specified support connections as welded attachments to embedded plates; however, installations were performed using Hilti bolts.
- Drawings were interpreted to allow switching methods of support connections without engineering approval, resulting in drawings not showing the as-built condition.

The licensee responses of January 31, 1983 (Letter #2NRC3-005) was reviewed by the inspector. The specific findings were addressed as follows:

- The supports identified in the violation were reviewed and found acceptable as installed. The licensee committed to the inspection of the balance of all installed seismic HVAC supports for deviations from BZ installation drawings. The majority of the supports have been inspected and found acceptable.
- BZ drawing details would either show preferred attachment detail or would include fully prequalified specific alternatives which could be used without engineering approval.
- The scope of the as-built inspection program included the documentation and evaluation of supports which utilized connections other than those prequalified by engineering calculations.

The DLC re-inspection program of as-built HVAC supports was implemented on November 18, 1982 (Memorandum DLC-SQC-0836-2C). The estimated completion date was January 14, 1983. This date was revised to March 31, 1983 (DLC-SQC-0836-2G). The inspector reviewed memorandum DLC-SQC-0836-2H of April 6, 1983 indicating that all but 58 inaccessible supports were inspected by SQC. Presently, (28) of these (58) inaccessible supports have been inspected. The licensee will provide the NRC with the completion date for inspection and review of the (30) remaining supports by the end of September 1984.

The inspector concluded that the licensee's corrective action had addressed the violation findings satisfactorily by implementing a 100% back-fit inspection and review program of installed HVAC seismic supports. This item is closed.

2.2 (Open) Unresolved Item (412/82-11-02):

The unresolved item covered several findings in HVAC support installations. The findings included deeper bolt holes than allowed by procedure; switching of bolt lengths from that specified by drawings; conflicting instructions on drawings as related to bolt lengths and minimum embedment depth; installation of angles at base versus plates; requirement of minimum gap between baseplates and walls of 1/8" not being met; implementation of minimum gap of 1/8"; acceptability of baseplates with two Hilti bolts; and the applicability of these findings on pipe supports and electrical installations.

The inspector reviewed the licensee's response to these findings in the January 31, 1983 letter which covered the HVAC violation above.

The response to the general concern of anchor bolt hole lengths, bolt spacing, and bolt tolerances was addressed by revising procedure FCP-103 for installation of concrete anchor bolts and by eliminating all bolt length and embedment depth information from the engineering drawings. Revision of FCP-103 also included the requirements for maintaining proper spacing between anchor bolts. Attachment 3.2 of the procedure provides minimum spacing of bolts if they are not specified on the drawings.

The revised FCP-103 installation procedure was reviewed by the inspector and found acceptable.

The licensee's response to the qualification of two anchor base plates was provided in procedure NP(B)-272-Z15 which was found to be acceptable.

With regard to gaps between base plates and concrete walls, the licensee's response was that gaps were not restricted on engineering drawings. Engineering and Design Coordination Report (E&DCR) No. 2PS-2413 and 2426 restricted gaps to a maximum of 1/8" under base plates at one or more holes. The inspector reviewed S&W's memorandum No. SDM 84-01 which addresses the shimming requirements for surface mounted plates. The memorandum provides the inspector acceptance criteria for gaps, and the installation procedure when shimming is deemed necessary. These requirements were included in the revision to Specification 2BVS-920 (Field Fabrication and Erection of Piping), and Procedure 2BVS-935 (Installation of Ventilation and Air Conditioning Systems). These documents were reviewed by the inspector and were found acceptable.

The inspector reviewed the results of the licensee's back-fit inspection and review of support installations to date. They are summarized as follows:

- HVAC Support: (628) supports were inspected and (2) supports were found to exceed the minimum 1/8" gap. As indicated in the violation item (82-11-01) above, there are thirty remaining supports to be inspected for gap tolerances to complete this activity.
- Pipe Supports: (553) supports which were accepted prior to the issuance of the revised inspection procedure IP-10.1 on 12/15/83 were reinspected and (6) supports were found to exceed the gap tolerance limit. The inspector reviewed the procedure IP-10.1 for backfit inspection program of pipe supports. The licensee terminated the backfit reinspection activity because of very low rejection percentage.

- Electrical Supports: Tolerances in these installations are covered under unresolved item (83-02-04) (paragraph 2.3 below).

This unresolved item will remain open until completion of the 100% backfit inspection program for HVAC supports.

2.3 (Open) Unresolved Item (412/83-02-04):

This item is related to gap tolerances on electrical support installations. Initially, a gap was identified between cable tray support 2TX307Y and the concrete wall in the service building. Subsequently, other gaps were identified between electrical support plates and the concrete wall or embedment plates.

The corrective actions taken by the licensee in response to these findings were addressed in inspection report 84-03.

The inspector questioned SQC on the status of backfit inspection of electrical support installations. The licensee's response was that the limited inspection of (160) support installations in the control building had resulted in (36) unsatisfactory findings where support plates exceeded the 1/8" gap tolerance limit. This effort was terminated in February 1984, pending a re-evaluation by the licensee's management of the backfit program in the control building in light of the many identified problems in other aspects of electrical installations in that building. This item will remain open pending NRC review of the licensee's backfit inspector program in the control building.

2.4 (Closed) Significant Program Weakness (412/83-05-04):

Several deficiencies in the area of design control were identified in inspection report No. 412/83-05. These deficiencies, and other previously identified violations and unresolved items, were attributed to weaknesses in site engineering performance.

Some of the specific weaknesses identified in the above inspection were corrected and closed in subsequent inspections. The remaining open items included deviations from ANSI N45.2.11 as related to documentation of applicable design input and various other design related deficiencies in activities performed by site engineering personnel.

The inspector reviewed the following documents in the area of document control:

- Procedure for revisions of drawings by the site engineering group, 2BVM-203
- Procedure for interim drawing control, 2BVM-212
- Procedure for revisions of specifications by the site engineering group, 2BVM-204

An audit of site structural drawings was performed to assure that Intra-and Inter-Disciplinary reviews had been performed in accordance with Engineering Assurance Procedure EAP-5.4 and Procedure 2EVM-203 above. The drawings reviewed by the inspector are listed below:

- RC-36R-5D
- RC-37E-6A
- RC-36R-5B
- RC-30K-3N

No violations were identified.

In the design related area, the inspector conducted interviews with cognizant S&W structural engineers and performed a technical audit of structural design calculations of conduit supports. The installation of conduit supports is performed by Sergeant Electric to the generic criteria in RE-52 series drawings. Supports which deviate from this criteria or require attachments to cable tray supports are qualified individually by engineering calculations. These special design packages will contain one of the following requests:

- Informal Request for Attachment (IRA)
- Request for Information (RI)
- Request for Approval (RA)

The documentation of design calculation packages is performed in accordance with procedure 2BVM-154 for preparation, review and filing of structural calculations. The following design calculations were reviewed by the inspector:

1. Calculation #55EC(F).245 for conduit supports #3012-WTD-2&2249-S (Request #IRA.C.088SS)
2. Calculation #55EC(F).246 for conduit support #2245-S (Request #IRA-C-086.S)
3. Calculation #55EC(F).250 for conduit supports #2331-K thru 2334-K & #2837-AP (Request #IRA-C-108-S)
4. Calculation #55EC(F).256 for conduit support #2041-S (Request #IRA-C-112-S)

The inspector also reviewed Stone and Webster's technical resolution for the evaluation of baseplates with an eccentric attachment or with multiple attachments. The results of the evaluation and the specific recommendations were incorporated in the revision to the procedure for evaluation of symmetric baseplates EMTR-612.

No violations were identified in the above reviews. Thus, this item is closed.

2.5 (Closed) Deviation (412/83-05-02)

The deviation from ANSI-N45.2.11-1974 was identified in the area of design control. Three specific examples were provided in the deviation finding:

1. Failure to identify designated personnel as qualified reviewers for approval of design documents. This finding was closed in inspection report #84-09.
2. Failure to confirm telephone reviewer's approval on design changes. This finding was closed in inspection report #84-07.
3. Failure to identify applicable design input. This finding was closed in Section 2.4 of this report which covered the significant program weaknesses (item #412/83-05-04).

This item is therefore closed.

2.6 (Open) Violation (412/83-07-01)

The violation was related to the practice of using the nominal wall thickness of fittings to determine the weight of piping components when performing piping stress analysis in lieu of the actual weights of these fittings. The generic implication of this violation to the analysis of safety related piping systems was addressed by the licensee in a final report submitted to the NRC on August 20, 1984 (Attachments to Duquesne Light's letter #2NRC-4-127). The Mechanical Engineering Branch (MEB) of the office of Nuclear Reactor Regulation (NRR) is assuming the responsibility for the review and acceptance of the licensee's response.

The initial finding which triggered the violation was identified during the review of the Emergency Diesel Generator Exhaust piping systems EDG3-1 and EDG14-1. Various fittings were found to have twice the nominal wall thickness. This overthickness resulted in a considerable increase in dead weight reactions on supports for this piping system.

The inspector reviewed the licensee's final report, identified above, which addresses the generic evaluation of overthickness in pipe fittings. The report did not specifically address the initial finding in the EDG piping system.

The inspector requested that the engineering evaluation for qualification of the emergency diesel generator exhaust piping system and supports be submitted for NRC reviews.

This item will remain open pending the review of licensee's response.

2.7 (Open) Unresolved Item (412/83-12-02)

This item is related to the installation of process control panels. Several panels were found to be welded to the base. However, vendor installation drawings show bolted connections to the base. In addition, FSAR Table 3.10B-1 indicates that the seismic qualification was based on bolting the panels to the base.

The inspector conducted an interview with cognizant licensee representatives to address the above finding.

The licensee indicated the process rack support (I-beams), which is anchored to the concrete floor, was not provided with matching bolt holes to enable bolting to the base of the panels.

As a result, E&OCR #2P-1866 was issued to provide alternate welding attachment detail, and these details were subsequently incorporated in S&W drawing #12241-RE-27N.

The licensee's A/E (S&W) indicated that the qualification of welded process panels will be conducted in a two-part program which will include insitu testing of panels to determine their dynamic characteristics and performing stress analysis for qualification of as-built welded installation connections.

The qualification of the process control panels will be handled under a large program which will encompass IE Information Notice 50-21 for anchorage and support designs of seismic mechanical and electrical equipments.

The overall program is coordinated for auditing by the seismic qualification review team (SQRT) performed by the Equipment Qualification Branch (EQB) of NRR.

This activity will be concluded before system release prior to fuel load.

The licensee will perform an evaluation of the extent of deviations in process control panel installations, and will provide the NRC with a description of the qualification procedure and schedule for completion of this activity.

This item will remain open pending review of the licensee's response.

2.8 (Open) Unresolved Item (412/83-12-03)

The unresolved item is related to observation of unsupported length of cables between raceways which could impact on the raceway loading and cable bend radius.

Licensee specification No. 2BVS.931 originally limited the length of unprotected cable to 3 feet.

As a result of a number of nonconformances identified by licensee QC citing unsupported cable lengths exceeding the 3 feet limit, the specification was revised by changing the term "unsupported" to "unprotected".

The inspector reviewed E&DCR #2PS-3346 which was initiated on 2/14/84 for clarification of the unsupported and the unprotected cable lengths. The disposition was to refer to revision 4 of the specification for definition of the unprotected length, and to limit the unsupported length to 4½ feet. The inspector also reviewed E&DCR #2P-4491A which was initiated on 8/17/84 for verification of unsupported seismic cable lengths. The disposition of the E&DCR was to revise the specification and incorporate a table of acceptable lengths depending on the type and number of cables in trays. For a fully loaded tray, the maximum unsupported length is 2 feet.

A cognizant licensee representative indicated that a maximum unsupported cable length of 4½ feet was an IEEE requirement for cable lengths between horizontal trays. The disposition of E&DCR #2P-4491A was intended to cover the structural requirement for maximum load on tray rungs and supports.

Two other findings were identified in the main steam and cable vault room:

- Cables from wall sleeve #2WL342W01 to horizontal conduit #2CL936WA which terminates inside a pull box located approximately at elevation 740', were deformed at the location where they rest on the collar of the conduit. The collar was also found to be deformed due to the pressure created by the weight of unsupported cables. The cables are routed inside the pull box to a vertical sleeve #2FL342W07 at the floor level.

A temporary support was provided in using a tie wrap around the cables and a timber piece situated across the opening of the vertical sleeve inside the pull box.

- Unsupported vertical cables on vertical tray #2TC326P between elevations 745 and 765. The cables are looped over the top rung of the tray, which experienced a visible deflection due to the weight of the cables being supported. Tie wraps were used to provide some vertical support to the cables along the vertical tray run. This type of temporary support will damage the cable insulation due to the pressure exerted by the tie wraps on the insulation.

The licensee was informed of the above observations. An engineering evaluation will be performed to address the issue of unsupported cables in the construction stage, in the absence of seismic loading on the electrical installations. This evaluation will be completed within a month for NRC review. This item remains open.

3. Unresolved Items

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

4. Exit Interview

During the course of this inspection, meetings were held with licensee representatives to discuss the inspection scope and findings. No written material was given to the licensee.

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on September 7, 1984. The inspector summarized the scope and findings of the inspection.