

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-412/85-09
Docket No. 50-412
License No. CPPR-105 Priority _____ Category B
Licensee: Duquesne Light Company
Robinson Plaza Building No. 2
Suite #210, PA Route 60
Pittsburgh, PA
Facility Name: Beaver Valley Power Station, Unit 2
Inspection At: Shippingport, Pennsylvania
Inspection Conducted: April 15 - May 14, 1985
Inspectors: J. E. Tripp 6/3/85
for A. A. Walton, Senior Resident Inspector date
J. E. Tripp 6/3/85
for W. M. Troskoski, Senior Resident Inspector date
J. E. Tripp 6/3/85
for J. J. Priddy, Resident Inspector date
Approved by: J. E. Tripp 6/3/85
L. E. Tripp, Chief, Reactor Projects Section 3A date

Inspection Summary: Inspection on April 15 - May 14, 1985 (Report No. 50-412/85-09)

Areas Inspected: Routine, unannounced inspection by three resident inspectors (155 hours) of activities pertaining to previously identified unresolved items, information notices, electrical cable routing and pulling, cadwelding of reinforcing bars, instrumentation welding, welder qualification, disposition of nonconformance and disposition reports, daily site tours and review of excessive feedwater transient analysis.

Results: No violations were identified. Several previously identified violations and unresolved items have been corrected by the licensee and were inspected and closed during this inspection. The licensee's actions taken on two information notices were reviewed and found acceptable.

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DETAILS

1. Persons Attending Exit Interview

Duquesne Light Company

L. E. Arch, Senior Project Engineer
R. Coupland, Director, QC
C. R. Davis, Director, QA
D. W. Denning, Assistant Director, QC
C. E. Ewing, Manager, QA
S. D. Hall, Sr. Project Engineer
E. J. Horvath, Sr. Project Engineer
J. A. Hultz, Construction Liaison
C. E. Kirschner, Sr. QA Engineer
R. J. Swiderski, Startup Manager
J. W. Waslousky, Sr. QA Engineer

Stone and Webster Engineering

P. J. Bench, Asst. Superintendent, Engineering
H. W. Durkin, Superintendent, Engineering
H. F. Foley, Site Project Manager
N. F. Kokof, EA Engineer
A. C. McIntyre, Superintendent, Engineering
C. O. Richardson, Project Engineer
C. H. Wilbur, Asst. Project Engineer
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

Closed Unresolved Item (84-07-03) Cardinal Industrial Products Fastener Material.

A Region IV vendor inspection, conducted on October 11 - 14, and November 14-18, 1983, identified numerous concerns regarding compliance with the ASME Code for fastener material supplied by Cardinal Industrial Products Corporation. To resolve these concerns, Stone and Webster Engineering Corporation (SWEC) Procurement Quality Assurance Division performed an audit at the Cardinal Industries facility in Las Vegas, Nevada, from July 9 to July 13, 1984. There were three purchase orders directly placed by SWEC with Cardinal regarding the use of potentially unacceptable fasteners at the BVPS-2 site. As a result of the SWEC audit, Purchase Order 2BV-59135 was found acceptable. The other two purchase orders (2BV-59039 and 2BV-59435) were cancelled.

The above actions satisfactorily resolved direct purchases by SWEC from Cardinal. However, the inspector expressed concern regarding the possible use of this potentially unacceptable fastener material by SWEC's prime vendors, such as the mechanical and electrical contractors. Upon further investigation, the inspector determined by reviewing various documentation that Cardinal Industrial Products Corporation had been actively pursuing resolution of all the issues raised by the NRC Vendor Program Branch. Specifically, between August, 1984 and February, 1985, Cardinal Industrial Products Corporation developed an Action Plan which was primarily designed to determine any conditions on installed products that may have been adverse to safety and require notice under 10 CFR Part 21. In accordance with Cardinal Products Report #4 to customers dated February 22, 1985, this Action Plan consists of three phases: (1) subcontractor validation, (2) agency formalization and (3) certification review. The first two phases are substantially complete with no adverse findings. The certification review phase is still in progress. Cardinal Products reported results of over 360 verification tests of Cardinal's products where no deviations from requirements of the applicable material specifications were found. Thus, on a preliminary basis, there is a degree of confidence that Cardinal's materials have been safe and are in compliance with the chemical and mechanical requirements of the applicable material specifications. The inspector also determined that the NRC Vendor Program Branch has reviewed this Action Plan and deemed it acceptable and responsive to the concerns raised during the NRC inspections. The NRC Vendor Program Branch indicated in their letter dated February 11, 1985, that implementation of the Action Plan will be reviewed during a future inspection.

Based on these findings, the inspector considered this item acceptable and now closed.

(Closed) Unresolved Item (85-02-04) Figure 6.3-3, FSAR Configuration of Safety Injection System.

This item was unresolved because the FSAR flow diagram (Fig. 6.3-3) showed lines 2-SIS-006-12, 15 and 16 connected to reactor coolant loop lines number 21, 22 and 23, hot legs. The actual installation connects these lines to cold legs of the reactor coolant lines. In addition to this inconsistency, the inspector questioned whether any other project documents were affected by this FSAR error.

Stone and Webster Engineering reviewed this inconsistency and advised that FSAR Figure 6.3-3 had not been properly generated. The discrepancy occurred during the transcription of information from the flow diagram into a computer data base that is used to generate the piping drawings included in the FSAR. Stone and Webster updated the computer data base and corrected the FSAR, Figure 6.3-3, by Amendment 10.

Stone and Webster performed reviews to determine if other documents were affected by this subject computer data base and advised that another output document (Valve and Operating Number Diagrams) was affected. Stone and Webster updated this diagram to show the proper configuration of the piping.

Stone and Webster further advised that the computer data base does not provide input into any design control documents; however, they have verified that all engineering and design documents related to safety injection piping configuration are consistent.

The inspector reviewed the corrective actions taken on this item. Amendment 10 of the FSAR correctly identifies the safety injection piping flows.

The inspector had no further questions on this matter and this item is closed.

(Closed) Unresolved Item (82-11-02) Reinspection of HVAC, Piping and Electrical Supports

This unresolved item covered several findings in the HVAC, Piping and Electrical Support Installations. The licensee's actions regarding several of these findings are discussed in NRC Inspection Reports 50-412/84-03, 84-11 and 85-03. The electrical supports are identified as a separate unresolved item and addressed in Inspection Report 50-412/83-02, Item 04. The remaining open issue on this item regarded the reinspection of HVAC supports.

The licensee has completed a reinspection of all installed HVAC supports (829 supports) to determine the installed condition. This included such items as inspection of bolt spacings, brace types and locations, installation in proximity to other safety related items and as-built configurations as depicted on applicable drawings.

The reinspection identified one hundred and five (105) supports with unsatisfactory conditions. Stone and Webster Engineering has completed an evaluation of each reported condition and taken the following corrective actions. Reviews were made of existing calculations to support the as-installed condition. Where the existing calculation was insufficient to bound the as-installed condition, specific calculations were performed. Eighty-three (83) specific calculations were performed. Based on these calculations, all 105 supports were accepted as is. All BZ drawings were revised to reflect the as-built condition. The licensee dispositioned these items on Nonconformance and Disposition Report Number 19,495.

The inspector selected six supports and performed inspections to ascertain that corrective actions taken were adequate. The following supports were selected:

<u>Hanger Identification</u>	<u>Unsat Conditions Identified by the Licensee's Reinspections</u>
Support DSA 311	BZ specified Hilti bolts in two places for attachment to wall, Hilti were not used. Members were welded to an embedment plate.
Support 332	BZ drawing called for one brace. Two braces were installed.
Support 444	BZ drawing specifies items 12 and 13 are 4x4x.375 tube steel. 3x3x.250 tube steel was installed.
Support 450	Centerline of tube steel to centerline of plate not as specified on BZ drawing. Also, spacing between Hilti bolt to embedded plate violates the nine inch minimum requirement.
Support 473	BZ drawing specifies one brace to be installed to the north (NS) of support. Support was built with two braces (NS) and (FS).
Support 616	The 9 inch requirement from the Hilti bolt to any embedded plate is violated in two places.

The inspector reviewed the six drawings for the above listed supports and verified that revisions were made which now reflect the as-built condition. In addition, the inspector visually inspected each of the six supports and verified they agree with the current drawing.

Based on review of all pertinent data, the inspector found the licensee has taken adequate corrective actions on these issues. This item is closed.

(Closed) Unresolved Item (83-02-01) Cable Tray Connections

This unresolved item concerned the tolerance requirements for the splice plate holes and type of material used for the splice plate.

Inspection Reports 50-412/83-12, 84-02, 84-18 and 85-02 addressed certain corrective actions taken on this issue. The remaining issue regarded the type of material used in the splice plate for certain connections. The licensee established that all splice plates made of ASTM-A569 material would be replaced with ASTM-A606 Type 4 material. The ASTM-A569 was a commercial grade material and was not supplied with chemistry requirements or yield strengths.

The licensee has now completed the replacement program.

The inspector reviewed the licensee's corrective actions taken on this matter. This included a review of the engineering EFAR requiring the replacements. Based on this review, the inspector found this item acceptable and this item is closed.

(Closed) Noncompliance (85-02-02) Visual Indication on Reactor Vessel Internals

This noncompliance had identified that a linear indication apparently exceeded the acceptance criteria stated in ASME Section III on the reactor vessel internals. Based on this finding, a surface inspection, using liquid penetrant, was performed by Westinghouse, Pensacola Division. This division of Westinghouse was the fabricator and inspection agency for the reactor vessel internals. The inspection was performed in accordance with the original approved liquid penetrant procedure. The reinspection was witnessed by the inspector. The level III examiner from the Pensacola Division performed the test and evaluated them as acceptable to the stated criteria. The indication held slight residue of dye when the test was performed. The examiner then performed light cosmetic buffing of the area and repeated the examination. All indications were removed. Although the indication was visible to the inspector, ASME Code specified liquid penetrant examinations found the area acceptable.

In addition to witnessing the liquid penetrant examination, the inspector performed visual examinations of other areas of the internals. No discrepancies were noted and this item is closed.

(Closed) Unresolved Item (84-14-01) Quality Control Inspector Error.

(Closed) SDR (84-00-11) Quality Control Acceptance of Undersize Welds on HVAC and Pipe Supports.

This item was unresolved because the licensee had identified through welding audits, that welds were found undersize due to inspector error and other deficiencies. The licensee's investigation revealed the inspector errors involved three inspectors. One inspector had been assigned to the inspection of pipe supports. The other two inspectors performed inspections of HVAC supports.

The licensee has taken the following corrective actions regarding the subject deficiencies. Due to the complexity of this issue, these corrective actions are listed according to the specific concerns identified by the inspector; also, a discussion is provided indicating the manner in which the corrective action remedies each specific concern.

a. Deficient Welds Accepted by Site Quality Control (SQC) Inspectors

Upon determination that deficient welds on HVAC/pipe supports had been accepted by SQC inspectors, the licensee initiated a review of 100 percent of the supports inspected by the three subject SQC inspectors. The following are the results of this review:

Inspector (Type of Supports)	Total Number of Supports Inspected at BVPS-2	Number of Supports Reinspected	Number of Supports With Deficient Welds
A-HVAC	112	112	60
C-HVAC	111	111	38
D-PIPE	180	180	77
TOTAL	403	403	175

In addition to performing the above review and subsequent repair or evaluation of all supports originally accepted by SQC inspectors A, C, or D, the certifications for inspectors A and C were suspended; inspector D resigned prior to the discovery of these deficiencies.

For the 175 supports listed above that were determined upon reinspection to contain deficient welds, the supports were either reworked, repaired, or found acceptable with no further modifications required. The analysis of the safety implications for the 175 deficiently welded supports is discussed below.

The licensee has determined, through evaluation, that none of the supports with deficient welds could have adversely affected the safe operations of the plant, were the deficiencies left uncorrected. This is based on a variety of tests and evaluations that have been performed and which the licensee summarized as follows:

A majority of the deficient welds on the HVAC/pipe supports were slightly undersized fillet welds, up to 1/16 inch below the size specified by applicable engineering documents. For this general case, the 1/16 inch undersized fillet welds were evaluated for weld quality against the acceptance criteria of the applicable welding code (AWS D1.1), and evaluated for load bearing adequacy under actual design loads.

Fillet weld sizes are specified based on either loading criteria or weld quality criteria. Regarding weld quality criteria, minimum fillet weld sizes are established through the rules of the structural welding code for steel (AWS D1.1). (The minimum weld size based on weld quality criteria is used if this size exceeds the weld size determined by loading criteria alone; otherwise, the minimum size determined by loading criteria is used.) Fillet weld procedure qualification tests have been performed in accordance with Section 5 of AWS D1.1, using welds of sizes below those specified by various engineering documents at BVPS-2. These tests indicated that for the weld and electrode types specified for welding of supports at BVPS-2 (i.e., single pass or multiple pass fillet welds made with low hydrogen covered mild steel electrodes - type E7018), the fillet welds undersized by up to 3/16 inch are acceptable in accordance with the AWS D1.1 code requirements for use on carbon steel up to

1-1/2 inch thick, without the use of elevated preheat. Therefore, these tests demonstrate that load-bearing support welds which were specified by engineering documents to be fillet welds ranging in size from 3/16 inch to 5/16 inch, but which are undersized by up to 1/16 inch, will still exhibit acceptable weld quality as determined by the rules of AWS D1.1.

Regarding loading criteria, minimum fillet weld sizes were determined through calculations using the actual design loads for the supports. The licensee performed a review of these calculations with fillet welds undersized by up to 1/16 inch; the undersized weld still exceeded the calculated minimum fillet weld size based on design loading.

For the other less-numerous support weld deficiencies (including oversize welds, welds undersized by greater than 1/16 inch, weld surface irregularities, and improperly located or oriented welds), various analyses, evaluations, and reinspections have either indicated that the welds are acceptable, or that weld repair/rework is required; for those welds requiring repair/rework, further analyses have indicated that design stress limits would not have been exceeded for any deficient supports, nor would any supports have failed to maintain their structural integrity under any loading combinations.

All repair/rework necessary for any of the above deficient welds has been completed.

b. Other Large Bore Pipe and Equipment Supports

The deficient welds addressed above were all located on large bore pipe or equipment supports. Because of the implications of these deficient welds on the adequacy of other large bore supports constructed, installed, inspected and accepted at BVPS-2, a program was established by the licensee to reinspect 100 percent of these large bore pipe/equipment supports. This program, which has been completed for all previously installed supports, involved detailed physical confirmations that welds previously accepted by SQC inspectors met the current criteria of applicable inspection plans and applicable engineering documents. The results of this program were that approximately 1754 supports were examined and 393 supports were discovered as containing deficient welds. Of these 393 deficient supports, a majority required repair/rework to meet the drawing due to undersized welds. The licensee has advised that evaluations of the repaired/reworked supports indicate that the undersized welds noted would still have exceeded minimum size requirements calculated from actual support design loads.

It should be noted that the 100 percent reinspection program for large bore pipe and equipment supports was initiated at BVPS-2 prior to the discovery of the problems with the inspections performed by the three subject SQC inspectors; however, this was continued in order to rein-

spect and evaluate large bore supports that have not yet been fully installed, as well as to complete the evaluations of several previously installed large bore pipe/equipment supports.

c. Small Bore Pipe Supports

Because of the implications of the deficient large bore pipe support welds with respect to the adequacy of small bore pipe supports constructed, installed, inspected and accepted at BVPS-2, the licensee established a program to reinspect a sample of these small bore pipe supports. This effort, which has been completed, involved detailed physical confirmations that welds previously accepted by SQC inspectors met the requirements of applicable engineering documents. The results of this effort were that of the 94 small bore supports examined, only 3 supports were discovered as containing deficient welds. All three of these small bore supports required repair/rework. However, subsequent evaluations performed by the licensee indicated that these deficient welds would not have caused the supports to fail to maintain their structural integrity under any loading combinations.

In order for the licensee to determine whether further reinspections of small bore supports were required, evaluations were performed of an additional 100 randomly-selected small bore supports. These supports were assumed to be deficient in a manner exceeding the deficiencies noted in the 3 small bore supports discussed above (e.g., actual deficiencies were welds undersized by less than 1/16 inch along some portion of the fillet weld, while assumed deficiencies were 1/16 inch undersized welds along the entire weld length; etc.) The results of these engineering evaluations indicated that all of the 100 randomly-selected supports would have maintained their structural integrity under design loads with the assumed deficiencies. Therefore, based on the initial low rate of deficiencies found with QC-accepted small bore supports, and the conclusions of the engineering evaluation of an additional 100 supports, the licensee has determined that no further actions are necessary to demonstrate the adequacy of fillet welds on installed and accepted small bore supports.

d. Engineering Concerns

A small number of the pipe/equipment supports accepted by SQC but containing deficient welds is attributable to problems with the engineering program for supports. Specifically, the following difficulties have been identified with the engineering program for supports:

Numerous revisions to pipe/equipment support drawings have created confusion for construction and SQC, especially when drawing revisions are issued while supports are still being constructed or inspected.

- Existing administrative controls did not always ensure that the latest revisions to support drawings were used for the final acceptance inspection of various pipe/equipment supports.
- Unclear or conflicting information on support drawings has created confusion or ambiguity regarding the construction details and acceptable attributes for various pipe/equipment supports.
- Deficiencies with SQC-accepted supports have not always been appropriately identified as requiring an evaluation for reportability under the provisions of 10 CFR 50.55(e).

The above problems with the engineering program for supports has been extensively evaluated and generic impacts have been examined. Based on these considerations, the licensee has concluded that the problems would not have adversely impacted the safety of operations of the plant, were the problems to have remained uncorrected; however, to strengthen the engineering program for supports and enhance its efficiency, the following corrective actions have been taken:

- Steps have been taken to control the issuance of revisions to pipe/equipment support drawings. Specifically, these steps will limit the ways in which a support drawing can be revised (1) while the support is being constructed or inspected; and (2) following final inspection and acceptance of the installed support.
- The Stone and Webster Engineering Constructability Review Team has been reviewing pipe/equipment support drawings with the objective of clarifying the engineering direction provided through these, and other engineering documents. As a result of this effort, a majority of the pipe/equipment support drawings have been changed to eliminate the problems of confusing, conflicting, or ambiguous information.

Certain Nonconformance and Disposition Reports (N&Ds) which documented the deficiencies with various pipe/equipment support welds accepted by SQC, did not properly initiate the evaluation of these deficiencies under the provisions of 10 CFR 50.55(e). In one instance, the decision was not made nor documented by SWEC regarding whether a 10 CFR 50.55(e) evaluation should be initiated, and in the other instances, the engineering decision was pending for a lengthy period of time due to an ongoing analysis of the safety implications of the noted deficiencies. To mitigate these problems, the procedures governing the handling of N&Ds, and the procedures governing the handling of deficiencies with regard to 10 CFR 50.55(e) have been modified. Specifically, the changes to these procedures will ensure the licensee is notified in a timely manner of any deficient conditions being evaluated by Stone and Webster under the provisions of 10 CFR 50.55(e). These modified procedures will also ensure that the licensee is notified immediately of any deficient conditions for which there is evidence of a breakdown in the QA/QC program. Also, the licensee has modified the procedures governing the handling

of N&Ds to emphasize the decision-process regarding 10 CFR 50.55(e) evaluations, and to require appropriate management review of the decisions regarding 10 CFR 50.55(e) evaluations.

e. Construction Concerns

The inspector raised concerns regarding the number of deficient welds discovered on pipe/equipment supports when "first time" inspected by Quality Control. To examine these concerns, a review was performed by the licensee of a random sample of over 400 SQC inspection reports for large and small bore pipe supports. This review indicated that approximately 25 percent of the supports failed the initial SQC inspection due to welding related deficiencies. Because high rejection rates of constructed items can increase the probability of error for the QC inspectors involved, the licensee has taken measures to enhance the quality and adequacy of the construction program for pipe/equipment supports.

In conjunction with the program described in this report, construction will be using more clearly defined criteria to determine when an activity has been completed in accordance with applicable engineering documents; following this determination, construction will issue formal documentation informing SQC that an item has been constructed and is ready for inspection.

In addition to the above program, a "Quality Improvement Management Program" has been initiated at BVPS-2. This program requires that deficiencies noted by SQC be reviewed and discussed by SQC with appropriate construction personnel; in this manner, the reasons for the existence of the deficiency will be highlighted, and future conformance to applicable engineering requirements will be improved.

Also, the improvement of the engineering effort for pipe/equipment supports will aid in improving the construction program for pipe/equipment supports.

f. QA/QC Concerns

The initial deficiencies with QC-accepted HVAC supports were identified in June of 1984 in DLC QA Audit DC-2-84-20; subsequent investigations revealed the problems with the inspections performed by SQC inspectors A and C. The licensee's audit was a routine periodic examination of the site welding activities.

The initial deficiencies with QC-accepted large bore pipe supports were identified in October of 1983 in Stone & Webster Audit SPC-2; subsequent investigations revealed the problems with the inspections performed by SQC Inspector D. This audit was a routine periodic examination of contractor's welding activities onsite.

The SQC inspectors whose error rates were judged unacceptable have been either removed from further inspection duties involving pipe/equipment supports at BVPS-2 or retrained and requalified. The adequacy of other SQC inspectors' work regarding the welding of supports has been determined to be acceptable; this conclusion was reached through the exhaustive review and reverification of support welding, as described in this report. QC has implemented a sample reinspection program and a reverification inspection program of HVAC and pipe supports to assure through sampling, that each inspector is adequately trained and performing inspections in compliance with the established criteria.

A majority of the deficient pipe/equipment supports that had been accepted by QC, contained welds that deviated in a minor way from specified engineering requirements. To ensure more careful scrutiny of support welds, SQC Inspection Plans have been modified to emphasize and clarify the inspection of various weld attributes. In addition, a modified training program regarding the inspection of site welding activities has been developed and completed by all appropriate SQC personnel; this training program incorporated and discussed many of the difficulties and deficient inspections that have recently been noted.

Based on the detailed evaluations and numerous calculations performed on the deficient welds, the licensee has determined this item is not reportable and advised the NRC of this fact by letter dated December 3, 1984.

The inspector reviewed the details of many of the items discussed above. This included numerous interviews with SQC inspectors. Monitoring of inspectors performing inspections as well as spot checking of welds were performed by the Resident Inspector. Several reviews and discussions occurred with the Engineering Department regarding the corrective actions taken on this subject. Repair activities were routinely monitored by the Resident Inspector.

The inspector found the licensee's QA/QC program was effective, despite the fact a breakdown occurred, because all deficiencies were identified by the licensee's audit program.

All activities discussed above were found acceptable by the inspector. This item is closed.

(Open, Unresolved Item (84-18-03) Rigid Sway Strut Functional Interference

This unresolved item identified a potential interference between the strut paddle and the beam attachment of rigid sway strut supports. The inspector had observed on a size 40 strut, Number 2CCP-PSST-381A, that the designed 5 degree movement could not be achieved. In addition, during this inspection, the inspector observed similar problems on a size 20 strut, Number 2SIS-PSST-311T in the Safeguards area.

The supplier, Power Piping Company, has performed evaluations of this finding and advised the following actions are being taken:

- Power Piping is submitting a report to the NRC as required by 10 CFR Part 21.
- Rigid sway struts sizes 20, 25 and 40 manufactured from June, 1981, to July, 1982, may not allow the 5 degree rotation required.
- The problem can be corrected by notching the strut paddle in the area of interference.

The licensee has advised that the following actions are being taken to resolve this issue:

- Reinspection will be performed of all size 20, 25 and 40 strut assemblies.
- Interference problems will be corrected as specified by Power Piping.
- Inspection procedures are being changed to include QC inspections of the connecting pieces of all new installations to assure the required 5 degree rotation is achieved.

This item will remain unresolved pending the licensee's implementation of the requirements described above and subsequent review by the inspector.

4. Fire Damper Installation - Information Notice 83-69

The inspector conducted a review of the licensee's actions in response to IE Information Notice No. 83-69, issued on October 21, 1983, to alert licensees of potentially generic problems involving the improper installation of fire dampers in ventilation ducts which penetrate fire barriers in safety-related areas. DLC Quality Control had reviewed this matter for applicability to Unit 2 and had advised the DLC Nuclear Construction Division Engineering Group that a potential problem existed concerning D&DCR 2P-4278 (superseded by E&DCR 2PS-3295). In several areas, this E&DCR authorized the installation of fire dampers within ducts at a location other than at the three-hour fire rated wall or floor where the duct penetrates the wall or floor.

Stone and Webster Engineering reviewed this matter and noted that this arrangement was acceptable provided that (1) two 1-1/2 hour rated fire dampers are mounted in series in the duct as close as possible to the 3-hour fire rated wall or floor opening and (2) the ductwork between the fire dampers and the 3-hour fire rated wall or floor opening must be externally wrapped with fire resistant material to provide a 3-hour fire rated construction for this ductwork.

The inspector reviewed the construction status of E&DCR 2PS-3295 and determined that the work defined in this E&DCR was still incomplete. The inspector reviewed several locations in the Auxiliary Building as shown on Sketch Number

12241 - ABFSK-F of E&DCR 2PS-3295, where ductwork penetrated a 3-hour fire rated wall. Two 1-1/2 hour rated fire dampers were mounted in series in the duct, but the ductwork between the fire rated wall and the fire dampers had not yet been externally wrapped with the fire resistant material to conform to a 3-hour fire rated construction. This external firewrap requirement is shown on the Sketch Number 12241-ABFSK-45-2 by the unique symbol F. The inspector discussed this matter with SQC in relation to IP 7.4.1, Inspection of HVAC Systems. The inspector noted that the external wrapping of this ductwork is significantly different than the normal external insulation that portions of HVAC systems are required to have for HVAC performance considerations. As a result, the SQC inspection personnel could possibly overlook this requirement for fire wrapping unless IP 7.4.1 highlighted this inspection requirement. Accordingly, SQC revised IP 7.4.1 to include a separate note requiring SQC inspection personnel to specifically verify that HVAC ductwork is properly wrapped for fire rated construction considerations wherever the symbol F is shown on HVAC drawings to be inspected by SQC, such as E&DCR 2PS-3295.

Based on the incorporation of this inspection requirement into IP 7.4.1, the inspector considered this item acceptable.

5. Supports for Diesel Generator Exhaust Silencers - Information Notice 85-25

The inspector conducted a review of IE Information Notice 85-25, issued April 2, 1985, to alert licensees of a potentially significant problem pertaining to the effects of thermal conditions on supports for diesel generator exhaust silencers. The exhaust silencers, EDG-SIL-3A and 3B, are procured to the requirements of the diesel generator specification, 2BV-230 and they are described in Instruction Manual 2502-190-230-001 and Stone and Webster Drawing 2002-190-230-012. As shown on this drawing, each silencer has four supports which are bolted to a concrete base. Each of the two supports at the front end (inlet) of the silencer have a baseplate with four 7/8 inch holes which accept anchor bolts for securing the silencer to the concrete base. The four 7/8 inch holes in each baseplate for the supports at the rear end (outlet) of the silencer have a 3-inch slot to allow for thermal expansion of the silencers.

The inspector reviewed the construction status of both exhaust silencers and noted that Site Quality Control (SQC) had not yet accepted the installation of the silencers. All attributes of Inspection Plan (IP) 7.3.2, Installation of Mechanical Equipment, for the silencers had not yet been verified and signed off.

The inspector noted that neither IP 7.3.2 nor the diesel generator instruction manual on the silencer drawing had provided specific instructions concerning the installation of the anchor bolts and nuts in the slotted holes. Also, inspection in the field of the nuts on the anchor bolts inserted through the slotted holes revealed that these nuts were more than finger tight. Consequently, the inspector requested that Stone and Webster clarify the engineering requirements to construction for these connections so that the final installation allowed for thermal expansion of the silencer at the slotted holes.

Stone and Webster Engineering has advised SQC via E&DCR that the nuts on the anchor bolts at the slotted hole connections should be made up with no more than 5 ft./lb. of torque and that this will ensure proper functioning of these joints for thermal expansion considerations. SQC has incorporated this special consideration in the Inspection Procedure IP 7.3.2 for these exhaust silencers. On this basis, the inspector had no further comments and considered this item acceptable.

6. IP 8.4.1, Inspection for Cable Pulling

During a daily site tour, the inspector observed a multi-cable pull (8 cables) being conducted by Sargent Electric personnel from the Service Building to the Safeguards Building. The following cables were involved:

2 HCSBPC 002	2 HCSBPC 006	2 HCSBPC 011	2 HCSBPC 016
2 QSSBPC 801	2 QSSAPC 801	2 RSSBPC 019	2 SISBPC 039

These cables were being pulled into Duct 2DC906P20 in accordance with specific instructions provided by Stone & Webster Engineering in E&DCR 2PQ-1360. This E&DCR authorized construction, on a one time basis, to deviate from the normal requirement in the Electrical Installation Specification, 2BVS-931, concerning the maximum pull tension which is as follows: "For pulls involving several cables the maximum pull tension shall be determined by multiplying the number of conductors by the allowable tension of the weakest conductor or similarly using weakest cable tension." An earlier attempt of this same multi-cable pull was made and construction was unable to pull the cables since the maximum allowable pull tension of approximately 1,000 lbs. was reached and the cables did not move. Stone & Webster Engineering had on file a January, 1983, letter from Okonite, the cable manufacturer, that would allow a higher pull tension than that permitted by 2BVS-931 for multi-cable pulls. Stone & Webster Engineering incorporated this information into E&DCR 2PS-1360 which allowed construction to conduct the pull where the maximum allowable pull tension was now approximately 1800 lbs.

The pull was conducted and during the course of the pull, two cables (2QSSBPC 801 and 2QSSPAC 801) came off the pulling eye at the early stages of the pull. This condition was known to construction. Construction contacted Stone & Webster Engineering for instructions to proceed and received authorization to continue the pull with the six remaining cables. The inspector asked SQC if the maximum allowable pull tension was recalculated now that a lesser number of cables was being pulled. SQC was not sure if this had been done since the inspection procedure for cable pulling, IP 8.4.1, did not specifically require that the pull tension be recalculated.

IP 8.4.1, Inspection for Cable Pulling, has now been revised to accommodate the above concern of the inspector. Specifically, Section 5.2.6.1 and associated note now read as follows:

5.2.6.1 Verify that the number and type of cables being pulled and the bend radii of the pulling sheaves used match the details used for calculating maximum allowable pull tension. If different, verify that new calculations are done to reflect the actual condition.

5.2.6.1 NOTE: The above verification and recalculation shall also be performed if during the pull the number of cables being pulled and/or the rigging arrangements are changed for some reason, such as one cable breaks, the contractor elects to reduce the bundle for ease of pulling or alter rigging for ease of pull.

Stone and Webster Engineering is performing megger testing to assess the acceptance of the installed cable. Based on this revision of IP 8.4.1, the inspector had no further questions on this matter and this item is acceptable.

7. Cadwelding of Reinforcing Bars (Rebar)

The inspector audited the activities associated with installation of rebar in the containment building crane wall. The temporary construction opening in the crane wall is being filled with rebar and concrete prior to closing the construction opening in the Containment Building. During the period of April 23 thru April 30, 1985, the inspector performed numerous inspections of the rebar installation in this area. This included installing, cleaning, fitting and welding (cadwelding) of Number 11 rebar. The inspector interviewed the welders and discussed their qualifications. In addition, the inspector performed visual inspections of several completed welds to verify adequate penetration of the flux.

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

8. Welding of Instrumentation Tubing

The inspector audited the welding activities and associated documentation for welding in process on instrumentation line 2FWS-LT-485. The material is P-8 to P-8 and constructed in accordance with the requirements of ASME, Section III, Class 2. The weld procedure being followed is SPBV-300C, Rev. 7, using a tungsten inert gas welding process. The electrode being used was 1/16 inch diameter ER 308L material. The welder symbol was F194.

The inspector verified the weld procedure was applicable for the specified weld and that it was properly qualified. In addition, the inspector verified the welder (F194) was qualified and welding within the parameters of his qualifications.

After welding was complete, the inspector performed visual inspection of the weld to assess the weld quality.

All areas audited by the inspector were found acceptable. No violations were identified.

9. Routing of Electrical Wall Sleeves

During a site tour, the inspector observed that two wall sleeves penetrated the crane wall in containment at elevation 730 Ft. They were identified for routing of safety-related cable. The sleeves were marked 2 SWS020P01 and 2 SWS020P02. The sleeves penetrated the wall at 4'6" and 5'6" respectively from grid location 7. At this location, the sleeves are directly under the stairs in the Containment Building.

The inspector questioned the acceptance of this penetration into the stairway based on the following: Specification 2BVM-116 "Seismic Classification for Structures, Systems, and Components" states, "all structural members and supports within the stair enclosures throughout the plant area are nonseismic." The document further states that a Seismic Category II control is required for structures, systems and components that are not Seismic Category I, but whose anchorage and structural integrity must be maintained in order that Seismic Category I components are not adversely affected. Based on this requirement, the stairs should be constructed to Seismic Category II. Specification 2BVS-403 indicates the stairs are nonseismic. The licensee and Stone & Webster Engineering analyzed the condition and advised the inspector that the condition of the planned cable routing is unacceptable and the sleeves would be abandoned and marked on the drawing as such.

Drawing RE-37P-8D was revised on May 14, 1985, to state "Field To Abandon Sleeves and Label Not To Be Used."

The inspector reviewed the licensee's actions on this matter and based on the fact that no safety related cable was installed in these sleeves, no violation actually occurred.

Based on the corrective actions taken by the licensee, this item is acceptable.

10. Surface Indications on Parker Hannifin Weld-Lok Fittings

The inspector reviewed the licensee's actions relative to disposition of liquid penetrant indications observed on the base material of Parker Hannifin Weld-Lok fittings when the field liquid penetrant inspected the adjacent field welds.

The fittings are purchased and inspected in accordance with the material specification SA182. This specification requires liquid penetrant inspection when specified by the purchaser. In this case, liquid penetrant examinations were not specified. When the site welded to these fittings, the rules of ASME Section III required the weld to be liquid penetrant examined. The licensee's procedure PT-10 required the examination of welds to include 1/2 inch of base material on both sides of the weld. These inspections revealed linear indications in the base material of these fittings. To evaluate the severity of the surface indications, a sample of 300 fittings, taken from different code numbers, were returned to Parker Hannifin for evaluation. Liquid penetrant examination performed by the supplier on the 300 fittings found 60-70

percent of the fittings contained surface indications. All indications were explored and removed by localized grinding and/or electro-polishing the surface. Several indications were explored by metallurgical sectioning and microscopic examinations. This evaluation found the indications were open to the surface and approximately .002-.004 inch in depth, .004-.025 inch in length, running parallel to the surface. All indications were evaluated to be a minor fold of material on the surface obtained during the fabrication process. Based on this evaluation, Parker Hannifin certified the material as meeting the material specification, SA182, and the surface indications are classified as non-injurious. The material was returned back to the site for use.

The licensee had removed numerous indications from other fittings to establish whether the indications were irrelevant. After removal, wall thickness testing using ultrasonic examinations revealed the minimum wall remaining on the worst case was .125 inch. Engineering established a minimum wall thickness of .071 inch or greater as acceptable. Therefore, the licensee established the indications present in the base material were non-injurious, above minimum wall design requirements, and complied with all the ordering specification requirements.

The licensee revised the liquid penetrant procedure (PT-10), used in the field for weld inspection, to only include the weld and heat affected zone.

The inspector reviewed all documentation associated with this investigation and found this item acceptable. No violations were identified.

11. Exit Interview

A meeting was held with the licensee's representatives indicated in Paragraph 1 on May 14, 1985, to discuss the inspection scope and findings.