



**Commonwealth Edison**

One First National Plaza, Chicago, Illinois

Address Reply to: Post Office Box 767

Chicago, Illinois 60690

April 26, 1982

Mr. James G. Keppler, Regional Administrator  
Directorate of Inspection and  
Enforcement - Region III  
U.S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

Subject: LaSalle County Station Unit 1  
Response to NRC Inspection  
Report No. 50-373/81-48  
NRC Docket No. 50-373

Reference (a): C. E. Norelius letter to Cordell  
Reed dated March 22, 1981.

Dear Mr. Keppler:

This letter is in response to the inspection conducted by Messrs. H. M. Wescott, J. H. Neisler, R. N. Gardner, R. B. Landsman, and W. J. Key on December 1-4, 9-11, 14, 17, 29 and 30, 1981 and January 13, 1982 of activities at LaSalle County Station Unit 1. Reference (a) indicated that certain activities appeared to be in non-compliance with NRC requirements. The Commonwealth Edison Company response to the notice of violation is provided in the enclosure.

Please note that Commonwealth Edison Company does not agree that item 373/81-48-04B is an item of noncompliance. We are available for further discussion on this topic at your convenience.

On April 21, 1982, Mr. R. D. Walker of your staff granted Commonwealth Edison a 10 day extension for the 30 day response requirement for this report.

To the best of my knowledge and belief the statements contained herein and in the enclosure are true and correct. In some respects, these statements are not based upon my personal knowledge but upon information furnished by other Commonwealth Edison and contractor employees. Such information has been reviewed in accordance with Company practice and I believe it to be reliable.

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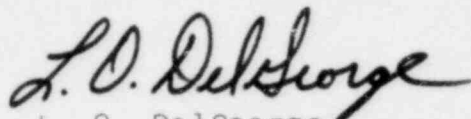
J. G. Keppler

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April 26, 1982

If you have any questions in this matter, please direct them to this office.

Very truly yours,



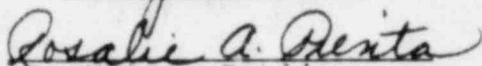
L. O. DelGeorge  
Director of Nuclear Licensing

lm

Enclosure

cc: NRC Resident Inspector - LSCS

SUBSCRIBED and SWORN to  
before me this 28th day  
of April, 1982

  
Notary Public

3936N

Enclosure

Notice of Violation - Item 1

(Item of Apparent Non-Compliance 373-81-48-01)

10 CFR 50, Appendix B, Criterion III, states "Design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design . . ."

Commonwealth Edison Company Topical Report CE-1-A, "Quality Assurance Program for Nuclear Generating Stations, "Revision 15, dated January 2, 1981, states in Section 3, that "Design changes are controlled through document revisions resulting from design change requests and/or design change notices and are reviewed and evaluated in the same way as the basic documents."

Contrary to the above, the following instances of failure to control design changes were identified:

- a. Incorrect dimensions pertaining to electrical Class 1E raceway supports CC-36 and CC-16 were incorporated in Field Change Requests (FCR) 372, dated November 20, 1978, and 2839, dated February 2, 1979. The subsequent review and evaluation of the subject FCR's did not identify the incorrect dimensions. As a result, the as-built condition of hangers CC-36 and CC-16 do not reflect the dimensional requirements identified on the latest design drawings.
- b. The revision to the length of electrical Class 1E conduit support CC-B, as identified on FCR 5489, dated January 28, 1980, was not incorporated onto subsequent revisions to Sargent and Lundy drawing 1E-1-3512C04. As a result, the as-built length of hanger CC-B does not reflect the dimensional requirement identified on the latest design drawings.
- c. The revisions to two structural beams, #98 and #175 at elevation 777'-11", inside of the drywell, as identified on numerous FCR's, have not been incorporated correctly into subsequent revisions of S&L drawings S-1353, S-1354 and S-1360. Furthermore, numerous FCR's are not being listed on the appropriate drawings. Additionally, there are discrepancies between design drawings and referenced FCR's. As a result, the as-built detail connection drawings do not reflect the actual as-built beam connections.

Response to 373/81-48-01A

Corrective Action

H. P. Foley issued FCR #8815 to indicate the correct dimension of 3'5" off of 11.2 line as the location of hanger CC-36. This FCR was incorporated onto design drawing 1E-1-3506A Sht. 1. H. P. Foley issued FCR #8924 to indicate the correct length of hanger CC-16 as 3'6". FCR #8924 was incorporated onto design drawing 1E-1-3464C01.

Action Taken to Prevent Recurrence

Discussion with H. P. Foley Field Engineers who generated the original FCR's (372 and 2839), indicates that the incorrect dimensions were simply mathematical errors, and, therefore, unique occurrences. The original FCR's (372 and 2839) were dated 11/20/78 and 2/2/79, respectively; since then, H. P. Foley has had and will continue to have, training sessions that stress the importance of accurate representation of field installations. Commonwealth Edison feels that the preparation and Q.C. review of H. P. Foley generated FCR's has been refined to a point where there would be extremely few, if any, incorrect dimensions.

Date of Full Compliance

Full compliance has been achieved as of April 5, 1982.

Response to 373/81-48-01B

Corrective Action

S&L has issued design drawing 1E-1-3512C04 revision M that indicates the correct length of hanger CC-B as 2'5".

Action Taken to Prevent Recurrence

Review of the incorrect dimensions indicates that it was a typographical error by an S&L draftsman which was not caught by the S&L reviewer. S&L has been reinstructed as to the importance of correct incorporation of FCR's onto design drawings. Per QCF 3-2 of the Q.A. Manual, the field engineer responsible for the generation of the FCR must review the design drawing(s) which incorporates the FCR for completeness and then sign and date the FCR to record this review. In addition, CECQ Q.A. does a review of a certain percentage of FCR's to verify both the correct field installation and design drawing revision.

Date of Full Compliance

Full Compliance has been achieved as of April 5, 1982.

Response to 373/81-48-01C

Corrective Action

General Response

The Structural design drawings reflect the designer's intent and the design requirements. In addition, detail fabrication drawings are prepared by the fabricator to facilitate construction. In this case, FCRs were utilized to approve, transmit, and sequentially record detail fabrication drawings prepared by the A/E for the contractor. Additionally, FCRs were generated to modify these details to suit unique field conditions. In both cases, these FCRs are approved only when they satisfied the designer's intent and the design requirements. Some minor details are shown on these FCRs which are needed for the actual construction but need not be shown on the design drawings. As a result, the design drawings may not reflect the incorporated FCR in its entirety. The exact amount of FCR detail which is incorporated into the Structural design drawings is left to the discretion of the design engineers. Failure to include any of these minor items on the structural design drawings does not jeopardize any intended functional and design requirements of the structural steel.

Specific Response to Instances Listed in Inspection Report

A. Connection of Beam #175 to Beam #201

The in-place items shown in Detail 1, S-1360, Rev. A were omitted in later revisions because of a draftsman's misunderstanding on incorporation of CECO FCRs into the design drawings. As a result, Detail 1 in S&L Drawing S-1360, Rev. C did not resemble the actual connection. The above drawing has been corrected to reflect the as-built condition.

CECO FCR #31667 was incorporated onto S&L drawings, but was referenced by the draftsman as FCR #31447 which appeared on that page of the FCR instead of the correct FCR #31667. The latest S&L drawings have been revised to list the relevant FCRs.

B. Connection of Beam #175 to Beam #153

The as-built connection did not resemble Detail 1 on S&L Drawing S-1360, Rev. C. The corrective action has already been discussed in Part A above. CECO FCR #31447 was not listed in the drawing release record of S-1360, Rev. A, but was referenced under the actual detail to indicate that the detail incorporated FCR #31447.

C. Connection of Beam #98A to Beam #98

Detail 2A on S&L Drawing S-1360, Rev. A shows the picture of a beam framing into a beam of larger depth. Both the beams 98 and 98A are 8" deep. Detail 2A reflected the intent of the design but did not resemble the as-built condition of the top and bottom shear plates. A new detail (Det. 29, S-1360, Rev. F) has been added to reflect the as-built condition.

The drawing release record of S-1360, Rev. A did not list FCR #31557 but FCR #31557 was noted under the actual detail. All other relevant FCRs have been listed in the latest S&L drawing revisions.

D. Connection of Beam #98 to Beam #163

This connection was detailed originally per Detail 23, S-1353, Rev. A. To incorporate the changes that resulted from FCR #31557, a new detail (Det. 2A, S-1360) was generated and the content of Det. 23 was copied into the new detail. The omission of the 3/8" stiffener plate was a copying error. The discrepancy has been corrected in the latest drawing revision.

The drawing release record of S-1360, Rev. A did not list FCR #31557, but FCR #31557 was noted under the actual detail.

CECo FCR #32316 was generated to dimension the bottom shear plate called out in Det. 2A, S-1360, Rev. A. This FCR did not affect the detail. Consequently, the S&L drawing did not require updating and FCR #32316 was not listed on the drawing.

E. Connection of Beam #98 to Beam #162

Due to some minor welding details that were not picked up on S&L Drawings, the detail did not reflect the as-built condition. The latest revision of S-1353, Rev. G picked up the minor discrepancies with CECO FCRs and now reflects the as-built condition.

A review of the structural steel design drawings versus submitted FCRs was conducted and completed. This review consisted of checks for drafting errors and checks to insure the relevant FCR detail information had been incorporated into the design drawings. The system for incorporating FCRs into final design packages is included as part of Attachment A - Structural Steel Design Process and Final Design Package.

Action to Prevent Recurrence

Personnel involved with the preparation and review of structural steel design drawings have been instructed to be more careful in their assignments.

Date of Full Compliance

Full Compliance has been achieved as of March 1, 1982.



Notice of Violation - Item 2

(Item of Apparent Non-Compliance 373/81-48-04)

10 CFR 50, Appendix B, Criterion V, states in part that, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings .... and shall be accomplished in accordance with these instructions, procedures, or drawings."

Commonwealth Edison Company Topical Report CE-1-A, "Quality Assurance Program for Nuclear Generating Stations", Revision 15, dated January 2, 1981, states in Section 5 that "Activities affecting quality are required .... to be prescribed by documented instructions, procedures or drawings." Section 3 states that, "Design evaluations .... will assure that designs and materials will conform to .... applicable codes, standards, regulatory requirements, SAR commitments and appropriate quality standards, as applicable."

Contrary to the above, the following instances of failure to comply with the requirements were identified:

- a. Structural high strength bolting inside of the drywell is not being performed to adequately documented instructions. As a result, the NRC inspector found that some nuts had been improperly installed and were loose to the extent that they could be turned by hand.
- b. The design basis bolting commitments as specified in the SAR's were not adequately translated into design drawings and internal documents; in that the high strength bolting practice actually implemented was not in accordance with the SAR's. This resulted in an inconsistency between the design basis and the SAR's.

Response to 373/81-48-04A

Corrective Action

Due to the large number of structural steel modifications in the containment, Walsh Construction Company and Commonwealth Edison Company personnel planned to tighten and/or torque all the bolts upon completion of all modification work. This work had not been completed at the time of the inspectors visit.

Previous installations were accomplished per AISC for friction type connections and a Sargent and Lundy instruction designed to introduce a bolt preload of 5 to 10 KIPS for bearing type connections.

As previously stated, a containment bolting reinspection has been completed. Bolt maps were utilized to verify that all necessary bolt tightening and/or torquing was accomplished.

#### Action Taken to Prevent Recurrence

To clarify the requirements for tightening bolts with jam nuts in bearing type connections, Walsh Construction Company procedure QCP-14 has been revised to incorporate the Sargent & Lundy issued pre-load requirements. Future installations will comply with this procedure.

#### Date of Full Compliance

Full compliance has been achieved as of April 5, 1982.

#### Response to 373/81-48-04B

The Item of Noncompliance was written against 10 CFR 50, Appendix B, Criterion V. As stated, this criterion says in part that "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings .... and shall be accomplished in accordance with these instructions, procedures, or drawings." Commonwealth Edison Company Topical Reports CE-1-A "Quality Assurance Program for Nuclear Generating Stations", Revision 15, dated January 2, 1981, states in Section 3 that "Design evaluations .... will assure that designs and materials will conform to .... applicable codes, standards, regulatory requirements, SAR commitments and appropriate quality standards, as applicable" (emphasis added).

The NRC inspector claims the design basis bolting commitments as specified in the SAR's were not adequately translated into design drawings and internal documents in that the high strength bolting practice actually implemented was not in accordance with the SAR's and resulted in an inconsistency between the design basis and the SAR's.

In the details of the inspection report, the NRC inspector cites FSAR, ANSI and AISC Manual references to establish the case for the non-compliance. Yet the inspector fails to reference FSAR Paragraph 3.8.3.1.6 which addresses galleries and gallery support steel inside the containment and states that "Beams which span between the shield or pedestal and the containment wall are provided with connections at the containment that allow for free thermal expansion." In addition, according to Paragraph C3 of the Commentary to the AISC bolting specification, ultimate shear strength of the high-strength is independent of initial clamping force. The initial clamping force or torque is provided to achieve joint rigidity and slip resistance. Since the bolts in the sliding connection are required to slip, torquing of the bolts is not required. However, the bolts are provided with two nuts, a standard nut and a jam nut to ensure against a loose nut falling off.

Both of the above facts were made known to the NRC inspector during the inspection and must be accounted when determining consistency between the design basis and the FSAR.



It is Commonwealth Edison Company's opinion that the design documentation is consistent between the FSAR and the design drawings. The use of friction type bolts in the slotted holes will defeat the intended functional requirements of the connections and be in conflict with the FSAR. We must insist the NRC withdraw this item of Non-compliance.

3936N

Notice of Violation - Item 3

(Item Apparent Non-Compliance 373/81-48-02)

10 CFR 50, Appendix B, Criterion X, states in part that "A program for inspection of activities affecting quality shall be established .... to verify conformance with documented instructions, procedures, and drawings, for accomplishing the activity."

Commonwealth Edison Company Topical Report CE-1-A, "Quality Assurance Program for Nuclear Generating Stations", Revision 15, dated January 2, 1981, states in Section 10 that "inspection ... will be conducted .... at the site during construction .... to verify conformance to applicable drawings."

Contrary to the above, the inspector determined that the connection of structural beam #176 at elevation 77'-11" inside of the drywell was not constructed as illustrated on S&L Drawing S-1354, Detail 63, dated October 14, 1981. Furthermore, quality control records indicate that Q.C., Q.A. and engineering had verified that the connection was constructed as shown on the drawings.

Response to 373/81-48-02

Corrective Action

The modification of previously installed structural steel is in accordance with Field Change Requests (FCRs) or Walsh Construction Co. telephone memos (WCCOs) included as part of FCRs. Walsh Q.C. personnel inspect the work shown on the structural steel related FCRs and WCCOs. The missing stiffener at the connection of beam 176 to 175 was not clearly shown on the FCR and was, therefore, not included in the Q.C. inspection. S&L has performed calculations to check the connection with two of the three stiffener plates and found the actual stress level below allowable limits. Additionally, the stiffener was installed per FCR #31964. This step was taken to restore the original design margin. Design drawings have been updated to incorporate relevant FCRs.

An augmented structural steel inspection program was conducted to insure no discrepancies existed which could result in beam members not being able to support the required design loadings. The inspection program consisted of reviewing containment structural steel modifications made by the Contractor with Field Change Requests (FCRs) and outside containment structural steel as-built construction compliance with shop drawings, FCRs, and pertinent information shown on the design drawings. The inspection program was performed by teams of Sargent & Lundy Structural Engineers and monitored by Commonwealth Edison Company Project Construction and Quality Assurance Department personnel. For each structural steel

Corrective Action (Continued)

member inspected, a package containing all the previously issued design information was prepared by Sargent and Lundy personnel. A team, consisting of two people, was given these packages for the comparison of the as-built construction with the design information. Each team was given training in the procedures to be used in conducting the inspection. The control of the inspection was maintained by Sargent and Lundy supervisors and project engineers.

A total of 487 beam members were inspected (379 inside containment, 108 outside containment). The results of the inspection are tabulated into the following four categories:

- |  |       |
|--|-------|
| I. Beams whose construction is in accordance with the latest details shown on shop drawings, FCRs, or design drawings.   | = 422 |
| II. Beams which have minor discrepancies with corresponding shop drawings, FCRs, or design drawings and would not affect their load supporting ability.                                    | = 52  |
| III. Beams which have minor discrepancies whose as-built design has been formally reviewed by Sargent & Lundy and are determined to be acceptable for supporting the required design load. | = 13* |
| IV. Beams with discrepancies which have been reviewed by Sargent & Lundy and found to be unacceptable for supporting the required load.  | = 0   |

\* Includes missing stiffener at the connection of Beam 176 to 175

The details of the inspections and results are included in Sargent & Lundy Engineers' reports "Report on Containment Structural Steel Survey" dated January 5, 1982, and "Report on Structural Steel Survey in Reactor, Auxiliary and Diesel Generator Buildings", dated January 26, 1982. These reports are on file at Sargent & Lundy Engineers.

The inspection results indicate there is reasonable assurance that structural steel components are built as designed. The basis for this conclusion is the following:

1. No discrepancies were found which could result in beam members not being able to support the required design loadings.

2. The discrepancies which were found were all minor in nature. The inspection program in place was based on a minimum 10% inspection requirement. Given this requirement it can be shown that some minor erection discrepancies may exist. The margins in the designs have been shown to adequately compensate for expected minor erection discrepancies.
3. In certain areas the augmented inspection program went beyond the 10% minimum inspection requirement. The number of beams found without any discrepancies is witness to the quality of erection work.
4. There is available an extensive amount of documented evidence recording the quality control findings and corrective actions during the structural steel erection work. The evidence is sufficient to indicate Q.C. personnel were performing their job to the extent necessary to preclude major discrepancies. Again the augmented inspection results confirm this fact.

#### Action Taken to Prevent Recurrence

In an effort to further strengthen their inspection program, Walsh Construction Company Procedure QCP-14 has been revised to detail the required Q.C. inspection coverage and the method the inspector will document the inspection results. The inspectors have been retrained in the use of the revised procedure.

#### Date of Full Compliance

Full compliance has been achieved as of April 5, 1982.

Notice of Violation - Item #4

(Item of Apparent Non Compliance 373/81-48-03)

10 CFR 50, Appendix B, Criterion VIII states, in part, "Measures shall be established for the identification and control of materials....these measures shall assure that identification of the item is maintained...."

Commonwealth Edison Company Topical Report CE-1-A, "Quality Assurance Program for Nuclear Generating Stations", Revision 15, dated January 2, 1981, states in Section 8, that "Assigned identification of materials, parts and components will be unique to the item. Identification will be on the item where practicable, and/or on records traceable to the item."

Commonwealth Edison Company Q.A. Program Manual, Revision 9, dated March 1980, states in Quality Procedure 8-1 that "The use of unique identification markings or numbers on items or records traceable to the items .... Identification shall be related to .... heat. The identification shall be related to the item and be traceable to pertinent technical or quality documentation."

The Manual of Steel Construction, ASIC, Sixth Edition, states in Paragraph 1.4.1.3 that "Unidentified steel, if free from surface imperfections, may be used for parts of minor importance, or for unimportant details, where the precise physical properties of the steel and its weldability would not affect the strength of the structure."

Walsh Q.A. Procedure #8, dated February 15, 1973, states in part that "Markings will be transferred to each part of an item before it is subdivided and will not be obliterated or hidden by surface treatment or coatings unless other means of identification are substituted...."

Contrary to the above, the inspector determined that in the connection of beam #176 to beam #175, the identification of high strength steel pieces used for the extension of the web and flange plates of beam #176 was not maintained to enable verification of quality.

Response to 373/81-48-03

Corrective Action

The identifying heat or code number for all supplied steel is verified at the time of receiving inspection. As each piece is subdivided, the identifying heat or code number is transferred to both pieces. Periodic surveillances by Walsh Quality Control are performed to assure compliance with the above requirement.

It should be noted that some acceptable heat or code numbers are identifiable on the web and flange pieces of beam 176. However, construction work in the area apparently has removed or covered some of the numbers so that identification of all the high strength steel in the connection is not possible. Furthermore, heat or code numbers of A36 steel have not been found in high strength steel applications.

To further assure that use of high strength has been in accordance with the design drawings, nondestructive tests have been made of 2 connections. Specifically, material measurements were made to verify that the required strength steel had been installed. The test results, a copy of which is included in Attachment B, indicate there is no reason to question that high strength steel was not used.

#### Action Taken to Prevent Recurrence

Walsh Q.C. inspections have always included a material verification, but the heat or code numbers were generally not documented. To assure the identification of high strength steel, Walsh procedure QCP-14 has been revised to require that the heat or code number for high strength steel be documented by the inspector.

#### Date of Full Compliance

Full compliance has been achieved as of April 9, 1982.



Notice of Violation - Item 5

(Item of Apparent Non-Compliance 373/81-48-05)

10 CFR 50, Appendix B, Criterion VI, states in part that "Measures shall assure that documents, including changes, are reviewed for adequacy and approved for release by authorized personnel."

Commonwealth Edison Company Topical Report CE-1-A, "Quality Assurance Program for Nuclear Generating Stations," Revision 15, dated January 2, 1981, states in Section 10 that inspection programs will be established. Section 6 requires that documents be controlled to assure that they are reviewed for adequacy and are approved by authorized personnel for issuance and use at locations where the prescribed activity be performed before the activity is started.

Contrary to the above, the documented and approved procedure or instruction to implement S&L's May 18th Letter of Direction was not available. An uncontrolled pocket book was being used by the independent testing laboratories' inspectors for this work. It is entitled, "Vendor Surveillance Ready Reference Guide." It was presented to the NRC inspector as representing the inspection procedures. The pocket book is undated, unsigned and marked "FOR INFORMATION ONLY".

Response to 373/81-48-05

Corrective Action

As discussed in the NRC inspection report (Section II Paragraph 4), the approved procedure for structural bolting inspection was QCP-15-SB Revision 1 at the time the NRC inspector reviewed this item at the site. Revision "0" of this procedure was not approved for use and thus was never used. All bolting inspections prior to approval of Revision 1 were performed in accordance with approved Procedure QCP-6-SSI. QCP-6-SSI has controlled inspection of Structural steel bolting since 4/5/77.

During the period of concern identified by the NRC Inspector, Structural Steel Bolting inspections were performed in accordance with QCP-6-SSI paragraphs 2.0 through 2.3. These paragraphs delineated the documents, codes, or specifications to which inspections were performed. However, in view of not wanting the specification (J-2592) or any other referenced documentation to be taken to the field, the Ready Reference Guides were distributed to cognizant inspectors following inspector certification. These guides became controlled documents in February, 1979 following direction from the testing agencies Q.A. Supervisor. Ready Reference guides were used to allow inspectors to have easy access to inspection criteria while in the work location.

Compliance to procedure QCP-6-SSI was verified by scheduled Q.A. surveillances of procedure implementation. Bolting inspection was verified to conform to requirements in this fashion (e.g., surveillances QS-2-78 dated 2/1/78, QS-SSI-1-78 dated 4/27/78, QAS-SSI-1-79 dated 2/22/79, and QAS-VS-1-79 dated 4/27/79).

In view of the above, it is felt that procedures were in place to control implementation of the independent testing agencies inspections to the May 18, 1978, letter. It was recognized that a procedure which addressed bolting in more detail was desirable and as a result, procedure QCP-15-SB was prepared. Corrective action to provide for a separate procedure for bolting inspection took place at the time of the NRC inspectors visit (i.e., QCP-15-SB, Revision 1). This procedure was used during the reinspection of bolting in the Unit 1 containment.

#### Action to Prevent Recurrence

All responsible personnel have been trained in the use of procedure QCP-15-SB. Letters dated 12/31/81 and 1/14/82 from the inspection agency document this training.

#### Date of Full Compliance

As of 12/31/81 the independent testing agency was working to the new procedure with trained personnel. Full compliance existed as of 12/31/81.

January 8, 1982

ATTACHMENT "A"

Commonwealth Edison Company  
LaSalle County Station

STRUCTURAL STEEL DESIGN PROCESS AND FINAL DESIGN PACKAGE

The process of Design documentation and preparation of drawings, as discussed in the following is in two parts:

- A. Design Process
- B. Design Package

A. Design Process

The steps taken in completion of Design Process are shown in the flow chart shown in Figure 1.

Following are the details of each step:

Step 1: Design Calculations

Based on loading information and following the Structural Design Criteria, Calculations are performed in conformance with the requirements of the following Quality Assurance and Structural Administrative Standards:

GQ-3.08: "Design Calculations"

SAS-22: "Preparation Review and Approval of  
Structural Department Design Calculations"

All calculations performed are reviewed and approved before the drawing is released for construction.

Step 2: Design Drawings

Based on the framing layout and design calculations prepared by the structural engineer, drawings are prepared. Design drawings are prepared in conformance with the following Quality Assurance procedures and Structural Administrative standards.

GQ-3.07: "Sargent & Lundy Drawings"

SAS-27: "Preparation, Review and Approval of  
Structural Department Structural/Civil Drawings"

All drawings prepared, are reviewed and approved before their release for construction.

Design drawings generally show framing member sizes and end reactions. Connection details and other fabrication details are generally shown on the shop drawings prepared by the detailers, (INRYCo, Inc., Venetian Iron, Venta Engineering, etc.) or FCR's, which show shop drawing type details (See steps 5&6) prepared by Sargent & Lundy's structural engineers, stationed at the LaSalle County site.

Step 3: Shop Drawings

The shop drawings prepared by the detailers show connection details and framing member fabrication details. The shop drawings are reviewed in detail, commented upon and returned to the detailer for resolution of comments with the S&L review status stamped on the drawings. The shop drawings are then distributed by S&L as per the project distribution list.

Step 4: Design Drawing Revisions

Design drawings are revised due to revisions in loads and their locations, as built piping analysis, and field interferences, etc., due to hangers and equipment. The revisions reflect modifications/stiffening as required. Calculations are performed associated with each design drawing revision.

Quality Assurance requirements as mentioned in steps 1&2 above are followed for the revisions as well.

Step 5: Field Change Request (FCR's)

FCR's are prepared in field and issued by Commonwealth Edison Company as per their Quality Assurance Procedure QP3-2 Form 3-2.2. For the processing of FCR's for which Engineering disposition is assigned to Sargent & Lundy, Project Instruction PI-LS-09 is followed.

There are two types of FCR's.

a) FCR's Which Show Shop Drawing Type Details:

Prior to April 3, 1981, changes made to structural framing were issued by Sargent & Lundy through drawing revisions and were detailed by INRYCO, Inc. through the normal shop drawing process. After April 3, 1981, revisions to structural framing have been detailed (connections and beam reinforcement) by Sargent & Lundy's Structural Engineers located at LaSalle County Station using FCR's. Structural Calculations as required are performed at the site for these details and are filed in the corresponding calculation books in Sargent & Lundy's main office. The fabrication and erection of the modifications are done by the site contractor (Walsh Construction Co.) using these FCR's. These FCR's are being retained as part of the permanent record.

b) FCR's, For Weekly Telephone Memos:

In order to resolve day to day field installation problems, due to interferences, the contractor's (Walsh Construction Co.) representative discusses the resolution of such problems with S&L Structural engineers and documents the same by preparing a telephone memo. Structural calculations required for the proposed changes are performed, reviewed and approved and filed in the calculation books. Each memo issued by the contractor (Walsh Construction Co.) bears a serial number. All memos issued during a particular period are combined under one FCR and issued by Commonwealth Edison Company for disposition. These FCR's are retained as part of the permanent record.

Step 6: Update Design Drawings

The updating of design drawings to incorporate as built information contained in the FCR, which detail extensively the modifications, is performed in sufficient detail to enable engineering personnel to be cognizant of modifications due to FCR. The updated design drawings reflect the same level of detail as the original prepared design drawing. The updated drawings note the appropriate FCR being incorporated and reflect this information in the drawing release block.

For members at each floor framing elevation, a list is maintained, which shows all the FCR's issued on a particular member. This list is filed in corresponding calculation books and details issued on the previous FCR's are referred to before making any additional changes.

B. Design Package

As listed below, the following constitute a complete design package.

1. Design Calculations - In the design control summary attached to each calculation book, reference is provided to the corresponding design drawings, loads, and load combinations, S&L structural standards, applicable codes and design criteria, used in the preparation of calculations.
2. Design Drawings - These are structural drawings prepared by Sargent & Lundy. The level of detail is defined in Step 2 of Part A.
3. Shop Drawings (Vendor Drawings) - These are detail drawings as prepared by the structural steel contractor, superstructure work contractor, concrete structures work contractor, or other contractors assigned the work by Commonwealth Edison Co. The shop drawings show fabrication and installation details for different structural members and are indexed on vendor drawings to Sargent and Lundy design drawings.
4. Field Change Requests - The FCR's are prepared in the field and issued by Commonwealth Edison Company. The FCR's show shop drawing type details for the revisions issued on the design drawings and also document the resolution of day to day field installation problems. FCR's are indexed in design calculations to corresponding beams.
5. Structural Specifications - The Sargent and Lundy specifications which govern construction of structural work are referenced on the structural drawings.



# DESIGN PROCESS

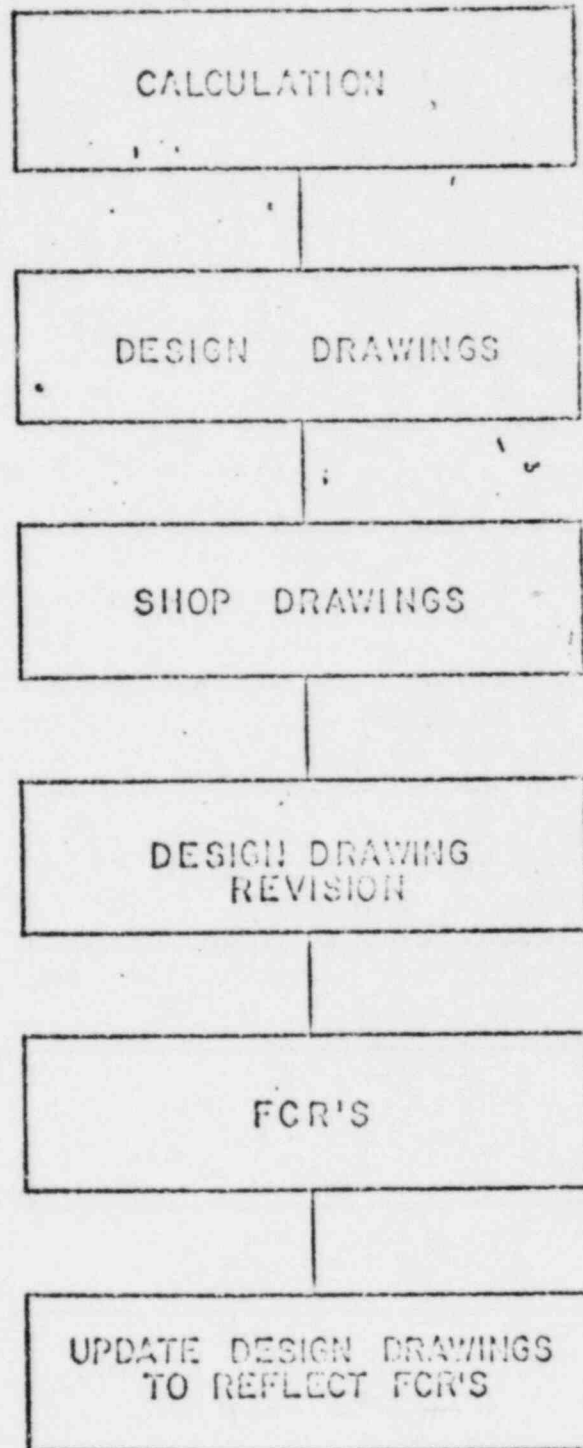


FIGURE - 1.

Attachment "B"

M-1382-82  
4-12-82

SYSTEM MATERIALS ANALYSIS DEPARTMENT REPORT

ON

STRUCTURAL STEEL COMPONENTS  
UNIT 1 CONTAINMENT, LASALLE COUNTY STATION

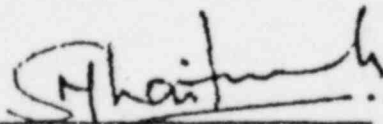
At the request of Mr. R. Rose, Project Construction, LaSalle County Station, an evaluation was performed to determine the approximate tensile strength of several structural steel components in the Unit 1 containment. The testing was requested to determine whether the steels met the minimum strength requirements. The heat numbers, stamped on the components, were not clearly readable, because of component overlap after construction.

The structural components to be tested were identified from blueprints and located by personnel of the Walsh Construction Company. The tensile strengths were obtained by conversion from hardness measurements, performed with a portable hardness tester, known as the Equotip, on each component identified. 2" x 2" areas were prepared by grinding in the regions of interest to remove the oxide layer, and ten hardness measurements were taken on each area.

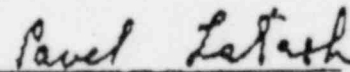
The hardness values, obtained from the testing were converted to equivalent Brinell hardness numbers and a correlation with tensile strength was performed. Table 1 lists the components tested, the equivalent Brinell hardness and the as determined tensile strength.

The results of the testing performed indicate that the tensile strength of the components tested exceed the minimum requirements.

Approved By:



Reported By:



Copies to: R.H. Holyoak  
R.T. Rose  
D.J. Skoza

TABLE 1

Structural Component Name & Identification Number or Location	Min. Specified Tensile Strength, ksi	Determined Hardness, Brinell Equivalent	Equivalent Tensile Strength, ksi
1. PL 1-5/8"x1'-2"x2'-10 1/2" Haunch Web (Extension)	70	147	74
2. PL 1-5/8"x12"x1'-1" Knife Plate	70	154	76
3. PL 1"x6-1/4"x1'-3/8" 1" Stiffener Plate 325°, Bottom	58	125	64
4. 1" Stiffener Plate 320°, Bottom	58	151	75
5. W21 x 147 Bottom Flange	70	147	74
6. Bottom Shear Plate	58	154	76
7. Bottom Flange Extension 2 1/2" T	70	166	83
8. Flange (W21) Replacement 1" T	70	154	76
9. 1" Angle 8 x 3 Sec 5-5	70	166	83
10. Cheek Plate Sec 5-5	70	158	80
11. 1" Stiffener Plate, Top, 320°	58	140	71
12. Diagonal 2 1/2" T Haunch	70	268	131