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TECHNICAL REPORT

TR-5599-3

FINAL REPORT

INDEPENDENT DESIGN REVIEW
SUSQUEHANNA STEAM ELECTRIC STATION

AUGUST 23, 1982

PENNSYLVANIA POWER AND LIGHT COMPANY
TWO NORTH NINTH STREET
ALLENTOWN, PENNSYLVANIA 18101

TECHNICAL REPORT TR-5599-3

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1.0 INTRODUCTION

This report presents the results of an Independent Design Review (IDR) performed by Teledyne Engineering Services (TES) at the request of Pennsylvania Power and Light Company (PP&L). The IDR was performed on a portion of the Main Feedwater System at the Susquehanna Steam Electric Station (SSES) for all applicable Service Levels excluding pipe break analysis and pipe whip restraint design. The portion of the system subject to review is indicated in Figure 1.

The review involved the Design and Quality Assurance process that was imposed by documentation on the Susquehanna Station. The responsibility of TES was to determine whether the imposed process was acceptable with respect to specified criteria and was successfully implemented. Additionally, TES was responsible to determine whether the as-built configuration was represented by the design documents and complied with the applicable specifications. The final area of review was to determine whether the design documents reflected the commitments of the Final Safety Analysis Report (FSAR).

2.0 APPROACH

TES formed a Project Team whose responsibility was to conduct the review. Various tasks were delegated to teams who were responsible for reviewing the specific activity and reporting to the Project Manager. An independent committee was formed to review all Potential Findings and Observations. This committee was composed of three senior members of the TES staff with experience in design, Code requirements, utility activity, structural analysis, organization and management. The IDR was performed under the requirements of the TES Quality Assurance Manual and was subject to audits by the Project Quality Assurance Engineer (PQAE). An additional assignment of the PQAE was to perform that portion of the IDR related to Quality Assurance. In both roles the PQAE reported

through the Manager, Quality Assurance. A Project Organization Chart is presented in Figure 2.

3.0 PROGRAM PLAN

The program was separated into eight tasks:

Task 1 - Design Process and Control

Task 2 - Design Procedures

Task 3 - Review Interface Procedures

Task 4 - Implementation of Design and Interface Procedures

Task 5 - Determine As-Built Configuration

Task 6 - Compare As-Built Documentation to Plant Configuration

Task 7 - Design Documents Vs. FSAR

Task 8 - QA Process and Audit Findings

A general description of each task follows.

3.1 Task 1 - Design Process and Control

TES reviewers met with Bechtel to determine the process used in taking design requirements and developing construction drawings. The process of developing and controlling revision to the design was also reviewed. Interfaces between internal Bechtel organizations was determined by following the process of:

(1) Specification of design requirements,

(2) Development of preliminary design,

(3) Piping analysis,

(4) Support location and selection,

(5) Support analysis,

(6) Effect of loading on building structure,

(7) Equipment loading requirements,

(8) Development of construction drawings, and

(9) Revisions to design.

Interface between Bechtel and external organizations were determined by following the process of:

(1) Transmittal of information to external organizations,

(2) Review of procedures by Bechtel,

(3) Review of design by Bechtel,

(4) Transmittal of developed information to Bechtel and inclusion in the internal Bechtel design process,

(5) Dealing with field and engineering changes, and

(6) Dealing with nonconformances.

This task began with the identification and cataloging of all design documents received by TES. The primary documents which define and control the design process are the Bechtel QA Manual and Project Engineering Procedures Manual.

The basic organizational structure for the SSE Unit 1 design was determined in a meeting at the Bechtel San Francisco offices on May 23, 1982. The reviewers then reviewed the applicable sections of the Bechtel Manuals in order to define and become familiar with the process of taking design requirements and developing a final design of the Feedwater System.

On June 14 and 15, 1982, TES reviewers met with project personnel at the Bechtel offices in San Francisco to further define and evaluate the design process and control. Appendix 1 contains the trip

report which includes a detailed summary of persons interviewed, items discussed and documents reviewed.

Several portions of the process are shown graphically in Figures 3, 4 and 5.

Stress Isometric Design Process Flow Chart (Figure 3) shows the design process which controls the system stress isometric. The stress isometric includes the system geometry, support locations and hanger guidance data.

Bechtel - Subcontractor Interface Process Flow Chart (Figure 4) shows an example of the design process as it involves design subcontractors. Bechtel utilized URS/Blume to perform limited scope support evaluation calculations.

Support Detail As-Built Process Flow Chart (Figure 5) shows the design process which evolves an approved support detail from field as-built data.

3.2 Task 2 - Review Design Procedures

Procedures, instructions and methods associated with developing the design of the feedwater system were made available to TES. These were reviewed in detail particularly to determine whether they provided guidance that was in compliance with established criteria.

In the process of performing individual reviews the availability of procedures was critical. After completing a task review, any questions raised by the reviewer that involved procedural controls were transmitted to the reviewers responsible for this work. This technique allowed the TES reviewer to develop a list of requirements that were necessary to resolve outstanding questions. A review of Bechtel

procedures was made to determine if the area in question was covered and how. If procedures covering the area were not available at TES an Open Item was issued requiring response by Bechtel.

The purpose of this task was to determine the adequacy of available procedures, instructions, and methods associated with the development of the feedwater system design. The reviewers familiarity with the procedures also proved to be a prerequisite to the completion of Tasks 1, 3 and 4.

All documents listed in Appendix 7 were subject to review as required.

TES reviewers met with project personnel at the Bechtel San Francisco office on June 14 and 15, 1982. At this time additional documents were reviewed and procedure implementation was observed. A detailed trip report is included in Appendix 1.

Included with this task was the review of the Design Specifications against FSAR criteria, applicable Codes, NRC and other design requirements.

Applicable Codes included B&PV Code Section III - 1971 through Winter 1972 Addenda, ANSI B31.1 - 1973 and AISC 7th Edition.

3.3 Task 3 - Review Interface Procedures

This task was required in order to determine if the available interface procedures were sufficient to support the design process.

Using the process determined in Task 1 and design procedures obtained in Task 2, the reviewers determined what interface procedures and instructions were required to implement them. Available

documentation was then reviewed in order to determine the adequacy of recorded interface procedures as they apply to the development of the feedwater system design. Procedures reviewed included individual, group, and company levels of interface.

Interface methods commonly utilized included:

- Coordination print circulation
- Use of Hanger Guidance Sheets
- Intercompany transmittals
- General distribution (specifications, etc.)
- Memo generation

Reviewers observed the design interfaces being used on a visit to the Bechtel San Francisco office. The interfaces used were verified against specified interfaces which in turn were evaluated against the interfaces the reviewers deemed necessary for proper control.

In large design organizations utilizing a number of engineering disciplines the availability of interface procedures is critical. Each discipline can control its own work well but if procedures are not available to require and control the transmittal of information between disciplines then the design process can break down.

3.4 Task 4 - Implementation of Design and Interface Procedures

The first three tasks related to the availability and applicability of documented procedures and controls. This task required TES to determine if those procedures and controls were followed. This is an extremely important task in the IDR since the availability of procedures, instructions and controls does not insure implementation. Implementation of an established and acceptable design process is the proof that appropriate controls exist and that review of a sample can lead to conclusions concerning the whole process.

This task involved review of all design documents (analysis, drawings, specifications, etc.) to determine their adequacy with respect to criteria. Interfaces were also reviewed by determining if loads, locations, information, etc., were transmitted properly from discipline to discipline. For example, loads from piping analysis must be transmitted to support design to civil/structural. The detailed review of documentation in this task provided significant insight into the implementation and control of the design process.

3.5 Task 5 - Determine As-Built Configuration

TES prepared an isometric of the system being reviewed which did not include any dimensions. The field personnel had to physically measure the system to determine actual dimensions. Each measurement was performed separately by two different individuals who both were required to sign the isometric. Location and type of supports were determined. Nameplates were reviewed. Available movement on snubbers and springs was determined. Location of valve operators relative to the pipe was obtained. Clearances between pipe/components and adjacent structure were determined. Additionally, a number of photographs were taken to be used in the review of Task 6.

3.6 Task 6 - Compare As-Built Documentation to Plant Configuration

As-built documentation was obtained from Bechtel which was specified as being representative of the plant configuration. This documentation included:

(1) Piping Drawings,
(2) Support Drawings,
(3) Component Drawings
(4) Loads,
(5) Analyses, and
(6) Stress Reports

The drawings were compared with the plant configuration data obtained by TES in Task 5. Any differences were first checked against allowable tolerances specific in Bechtel pocedures. Those differences outside allowable tolerances were reported.

In addition the loads, analyses, and Stress Reports were the documents used to perform the review effort in Task 4.

3.7 Task 7 - Design Documents Vs. FSAR

The documents provided by Bechtel were reviewed to determine if they complied with the commitments of the FSAR. Since the FSAR referenced Bechtel Topical Reports and GE Owner's Group Reports, these were also reviewed. The design documents were compared with these requirements to determine compliance. Items such as load combinations, seismic analysis techniques, Code requirements, and classification were reviewed in detail.

3.8 Task 8 - QA Process and Audit Findings

TES Quality Assurance personnel reviewed the process established by PP&L and Bechtel for auditing work activities. Findings and their resolution were reviewed in detail, particularly those related to the feedwater system. The Quality Assurance programs of PP&L, Bechtel, Cygna Energy Services and URS/J. A. Blume & Associates were also reviewed.

The Project QA Engineer was responsible for this activity and reported directly to the Manager, Quality Assurance.

4.0 DEFINITIONS

In any review process the definition of terms used for reporting items by the individuals involved is important to understand since they form the basis of conclusions reached by all parties. The following definitions are used in this IDR.

4.1 Open Item

An item requiring further review or more information before a decision can be reached. An Open Item can become a Potential Finding, an Observation or a Closed Item but cannot remain an Open Item in the TES Final Report.

4.2 Closed Item

An item which after further review can be closed.

4.3 Potential Finding

An item which the reviewer and TES Project Manager feel could have an impact on the adequacy of the design or QA process. All Potential Findings were submitted to the Project Review Internal Committee for disposition. A Potential Finding can become a Finding, Observation or a Closed Item but cannot remain a Potential Finding in the TES Final Report.

4.4 Finding

An item which the Project Review Internal Committee has reviewed and has determined impacts the adequacy of the design or QA process.

4.5 Observation

An item which the Project Review Internal Committee has reviewed and has determined does not impact the adequacy of the design or QA process but has significance relative to conservatism, design practice or applicable procedures.

5.0 REPORTING PROCESS

The following reporting process was adhered to by members of the IDR project team.

5.1 Items developed by individual reviewers were submitted to the Project Manager in writing using the Reviewer Report Form (RRF). The definitions presented in Section 4.0 above were used by the reviewer to classify the item.

5.2 The Project Manager (PM) reviewed each RRF with the individual responsible for its generation. This process required the PM to review the documents which formed the basis for generation of the RRF. A Project Manager Resolution Form (PMR) was generated and required the signature of both the PM and the Reviewer to indicate agreement with the PM classification of the item. Items classified as Closed were forwarded to Document Control. Items requiring more review or information were classified according to their severity based on current information and transmitted to PP&L, NRC and Bechtel for response. Items classified as Potential Findings and Observations and not requiring more review were forwarded to the Project Review Internal Committee for disposition. All PMR's with associated RRF's were maintained as QA records in Document Control.

5.3 The Project Review Internal Committee reviewed those items forwarded to it by the PM. The committee reviewed the data which formed

the basis for the item and interviewed the reviewer and PM. The committee developed a position on the consequence of the item as it related to the adequacy of the design or QA process and completed an Internal Committee Resolution Form (ICR). The position presented in each ICR required a minimum of two signatures of committee members as well as the PM. Those items classified as Findings or Observations on the ICR were forwarded to PP&L, NRC and Bechtel. All ICR's were maintained as QA records in Document Control.

5.4 After receipt and review of Findings and Observations, PP&L and Bechtel responded with additional information, proposed changes to existing documentation and/or remedial action. This new information was reviewed by the Project Manager and representatives of the Project Review Internal Committee to determine its adequacy. If revision to the classification of the item was called for this was done. All Findings and Observations submitted to PP&L, NRC and Bechtel are included in this Final Report even though they may have been reclassified after review of new documentation.

5.5 Reports resulting from this IDR were submitted concurrently to the NRC, PP&L and Bechtel. The dates and identificiation of reports submitted prior to this Final Report were as follows:

Identification	Date
Initial Status Report TR-5599-1	May 7, 1982
Second Interim Report TR-5599-2	June 10, 1982
Open Item Report Letter 5599-9	June 30, 1982
TES Findings Letter 5599-11	July 21, 1982

(Cont'd) Identification	Date
TES Observations Letter 5599-12	July 23, 1982
TES Findings and Observations Letter 5599-13	July 27, 1982

6.0 MEETINGS AND TRIPS

Any meetings or trips to Bechtel or the site made by TES project personnel were recorded on Trip Reports. The reports essentially provide an outline of the purpose of the meeting, what was discussed, who was present at the meeting and any documentation that was received by TES. These Trip Reports are part of the Project QA Records and are included in this report as Appendix 1.

A major meeting was held at TES on August 10, 1982 between PP&L, Bechtel, NRC and TES. The object of this meeting was to discuss outstanding Findings and Observations which were previously transmitted by TES Letters 5599-11, 12 and 13. Found in Appendix 8 is an attendance list for that meeting. The details are included within the body of this report and will be referenced as resulting from that meeting.

7.0 PROJECT PROCEDURES

Specific procedures were developed by TES for performing this IDR. These procedures were related to the general program plan, staffing, specific task implementation and the project QA requirements. The specific procedures applicable to this project are included in Appendix 2 and are listed below.

Description	Number
TES Project Plan for Independent Design Review of Susquehanna Steam Electric Station	Engineering Procedure EP-1-015, Rev. 3
Method of Determination of As-Built Configuration of Feedwater System - Susquehanna Steam Electric Station	Engineering Procedure EP-5-004, Rev. 0
Reporting of 10CFR21 Offenses	Engineering Procedure EP-1-016, Rev. 0
Project QA Procedure	PQAP 5599, Rev. 2

In addition to the specific project procedures above there are standard Technical Engineering Procedures (TEP), Engineering Instructions (EI) and the TES QA Manual which are applicable to this project.

8.0 SUMMARY OF REVIEW

In the process of this IDR 94 items were opened by review team personnel. Items which were not closed by the Project Manager Resolution were transmitted to PP&L, Bechtel and the NRC. Bechtel prepared responses to all items and transmitted these to TES. The reviewers responsible for generating the individual items reviewed the Bechtel response and established a position by preparing a revision to the outstanding RRF. The revised RRF with supporting documentation was presented to the Project Manager. After this review, revised PMR's were prepared, signed and the item disposed of in accordance with the reporting process outlined in Section 5.0 of this report.

All items categorized as Findings and Observations by the Project Review Internal Committee were transmitted to all parties. In the interim period the NRC requested a meeting at the staff offices in Bethesda, Maryland. At that meeting it was agreed that the TES Final Report would not be issued until PP&L and Bechtel had responded to all Findings and Observations. The meeting of August 10, 1982 at TES was the initial response to that direction. This was followed up by detailed responses by Bechtel. Those responses were reviewed and modifications of classifications of items made accordingly.

The following summary will provide item categorization for the entire IDR which is essentially separated into two phases. Phase 1 is a report of the IDR results prior to the direction of the NRC that a Final Report not be issued until PP&L and Bechtel had responded to all Findings and Observations. Phase 2 is a report of the final classification of all items based on the Bechtel response. Additionally, a number of Finding and Observation items address a specific area or process and these have been lumped into one item in Phase 2. References to the appropriate item numbers of Phase 1 are made for all Phase 2 items so that each item can be tracked.

8.1 Phase 1 Summary

The 94 items opened by review team personnel and responded to by Bechtel resulted in the following categorization:

Total No. of Items	-	94
Closed Items	-	67
Observations	-	17
Findings	-	10

A specific Finding or Observation may impact more than one area of the review process. In order to assess whether a specific area

of the design or QA process was impacted each Finding or Observation was assigned to the affected review areas. A summary of impacted areas follows:

Review Area	Findings	Observations	Total
Interfaces	1	3	4
Procedures	2	1	3
Design and QA Process	4	2	6
Specifications	2	3	4
Analysis	3	3	6
Supports	5	10	15

A detailed summary of each item opened by the review team is given in Table 1. Using this table the categorization of items as they proceeded through the review process can be followed. This report only includes details on Findings and Observations. All Closed Items are TES QA records and are available for review.

8.2 Phase 1 Details

The following details are summaries of individual items that were categorized as Findings and Observations at this phase in the IDR. The individual RRF, PMR, ICR and Bechtel responses for each of these items are included in Appendix 3 for Findings and Appendix 4 for Observations.

(1) Finding Number 1 (ICR No. 5599-1)

In Bechtel Design Specification 8856-M-175, Revision 5, the transient condition "Loss of Feedwater Pumps, Main Steam Isolation Valves Closed" is classified as an Emergency Condition. Based on the requirements of

ASME, BPVC Section III (Code) this classification precludes this event from consideration in the fatigue evaluation. However, the Code in Paragraph NB-3113.3 requires that an event classified as an Emergency Condition:

> "shall not cause more than 25 stress cycles having an S_a value greater than that for 10^6 cycles from the applicable fatigue design curves of Figures I-9.0."

This event, "Loss of FW Pumps MSIV Closed" is specified as occurring ten times. For each occurrence, three step changes in temperature from 546F to 40F and one step change in temperature from 546F to 100F is specified. Additionally recovery from 40F to 546F at various times is also specified. Based on the specified conditions, more than 25 stress cycles having an S_a value greater than that for 10^6 cycles from the applicable fatigue curves will occur. This event will have a significant impact on the fatigue life of components and must be considered in the fatigue evaluation. This can only be accomplished by classifying the event as an Upset Condition.

(2) Finding Number 2 (ICR No. 5599-2)

This finding is related to inclusion in the Stress Report of the Operating Condition defined in Finding Number 1 above and no further explanation is required here.

(3) Finding Number 3 (ICR No. 5599-7)

Bechtel specifications allow as-built piping supports to be excluded from consideration in reanalysis if the as-built stiffness is greater than the stiffness used in the orginal analysis. This can result in the acceptance of a support whose stiffness is an order of magnitude greater than designed and considered in the analysis. Increasing the stiffness of a support can result in redistribution of loading, differences in frequency response of the system and can be unconservative. This is particularly applicable to thermal expansion and other strain controlled conditions. Some control of the magnitude of discrepancy and/or assurance that significant increases in stiffness will not jeopardize the design is required.

(4) Finding Number 4 (ICR No. 5599-9)

The referenced ICR includes four items, only one of which is classified as a Finding (Item C). The concern here is the same as that outlined in Finding Number 1 with respect to the Operating Condition "Loss of FW Pumps, MSIV Closed" as well as the proper consideration of the Start-up Condition transient. A number of branch connections exist on the feedwater piping in close approximation to the reactor vessel. The start-up condition results in ΔT_1 values of 191F for the main piping run in this region while the weldolets only experience a ΔT_1 of 32F. The reason for these differences is not explained in the documentation provided and it is the review teams opinion that ΔT_1 values in the weldolet should be higher.

(5) Finding Number 5 (ICR No. 5599-12)

The Bechtel specification for Nuclear Service Valves requires that functional testing be performed with operating pressure in the valve. The functional test was performed with a disk ΔP of 800 PSI. Maximum operating pressure is specified as 1950 PSI. The valve data sheet for this valve only requires a 35 PSI maximum differential operating pressure. It appears that this Finding can be resolved by the receipt of more information by the review team or an update of the Bechtel specification. However, until that occurs this item will remain a Finding.

(6) Finding Number 6 (ICR No. 5599-13)

The Bechtel Specification 8856-M-175, Revision 5, lists the SRV transient as occurring 7650 times the temperature and pressure changes given in the Bechtel Specification are in agreement with GE Specification 22A2925, Revision 6, for "SRV Discharge" but the number of cycles (7650) seems excessive. In the Stress Report the ΔT's associated with SRV are not considered for all 7650 cycles. Bechtel's response indicates that the SRV temperature and pressure variations given in the Design Specification are only applicable for Turbine Trip plus SRV. The other 7600 cycles are for combination of OBE and SRV. This may be the case, however there is no documentation available to support this position and the Design Specification requires consideration of 7650 cycles of SRV.

(7) Finding Number 7 (ICR No. 5599-14)

This finding addresses an interface between the civil/structural group and the pipe support group. The location of a support on the building structure is not correct in the civil/structural calculations. The support location is actually offset from the existing box beam (building structure) and requires analysis by civil/structural of a plate added to the box beam. Since civil/structural does not have the proper support location they are not aware the plate is required. Additionally, the effect of the support loads imposed on the building structure will not be properly considered since the location is wrong on civil/structural calculations.

(8) Finding Number 8 (ICR No. 5599-16)

This Finding is related to the process used by Bechtel in reconciling as-built differences with as designed. Based on the information available to TES the weld, which has been accepted by Bechtel, is inadequate. In general, the reconciliation process does not require documented evidence of acceptance of each item and this results in the reviewer having to perform calculations to determine adequacy. In some cases inadequacies exist.

(9) Finding Number 9 (ICR No. 5599-23)

This Finding is also related to the Bechtel reconciliation process. A field walkdown is performed to determine the location of small pipe supports. These

supports are often attached to large piping supports and the Bechtel process requires reconciliation of the additional loading on the large support due to the small pipes attached. There is no objective evidence available to TES to indicate this has been performed for all supports.

(10) Finding Number 10 (ICR No. 5599-24)

This Finding is also related to the Bechtel reconciliation process. The original support design is inadequate for the applied loading. The reconciliation calculation requires a four-sided weld as an acceptable fix, however this redesign is not shown on the support drawing. The support drawing weld adequacy is not determined in current documentation. An additional weld between the support and the shield wall is shown to be inadequate by the Bechtel calculations yet no redesign is required or performed.

(11) Observation Number 1 (ICR No. 5599-10)

The Bechtel Design Specification requires use of the 1971 Edition, 1972 Winter Addenda of Section III. A Bechtel Project Technical Specification (8856-M-419) allows the use of different Code Effective dates for attachments, nameplates, installation, etc., all of which may be different than the Design Specification. For example, three different Code Editions and six different Code Addenda are used in the feedwater design process. The Bechtel Technical Specification is not referenced in the Design Specification and there is no obvious vehicle for assuring proper implementation.

Further there is no evidence that use of Code Effective Dates and Addenda other than those in the Design Specification have been reviewed to determine the impact of Code rules in areas other than design (i.e., fabrication, materials, examination, etc.)

(12) Observation Number 2 (FCR No. 5599-15)

This Observation addresses the potential for unconservative results for situations in which the thickness of the branch connection is greater than the run wall thickness. The flow rate in the branch has a significant impact on the film coefficient and use of the run flow rate is not always conservative.

(13) Observation Number 3 (ICR No. 5599-17)

This Observation addresses the Bechtel reconciliation process and though the specific support is acceptable the process is not adequately documented (see Findings 8, 9 and 10).

(14) Observation Number 4 (ICR No. 5599-18)

This observation addresses the Bechtel reconciliation process (see Findings 8, 9 and 10).

(15) Observation Number 5 (ICR No. 5599-19)

This observation addresses the Bechtel reconciliation process (see Findings 8, 9 and 10).

(16) Observation Number 6 (ICR No. 5599-20)

This observation addresses the Bechtel reconciliation process (see Findings 8, 9 and 10).

(17) Observation Number 7 (ICR No. 5599-21)

This observation addresses the Bechtel reconciliation process (see Findings 8, 9 and 10).

(18) Observation Number 8 (ICR No. 5599-22)

This Observation addresses the consideration of the effect of supplemental steel on the stiffness of supports. Although no Industry Standard exists some standard position should be taken by Bechtel so that a general determination of adequacy can be made.

In fact the Bechtel response indicates that the effect of supplementary steel on support stiffnesses is considered except for main beams, floors, walls and other "Building Structure." This is an appropriate response and this item is improperly classified. In the Phase 2 reporting this item will be Closed.

(19) Observation Number 9 (ICR No. 5599-25)

This Observation addresses the Bechtel reconciliation process (see Findings 8, 9 and 10).

(20) Observation Number 10 (ICR No. 5599-26)

This Observation addresses the consideration of the mass of special pipe clamps and associated hardware in

performing dynamic analysis. The additional mass (weight of some special clamps is 1185 pounds) will increase loads and can effect frequency calculations. For the feedwater system reviewed the special clamps utilized are close to anchors and therefore will not have significant impact. For other systems no determination can be made.

(21) Observation Number 11 (ICR No. 5599-27)

This Observation addresses the effect of bolt bending in the design of special clamps. For the feedwater system the shear at the bolt clamp interface does not exist and therefore no bolt bending will occur. However since no bolt preload is specified conditions can occur in which the clamp is loose and not supported by the piping as an elastic foundation. In such cases with a load applied at an angle to the clamp bolt shear could occur. The procedure presented by TES does not address bolt bending and/or loads applied at an angle other than thru the bolts or 90° to the bolts.

(22) Observation No. 12 (ICR No. 5599-3)

The Design Specification refers to 33 documents which provide requirements necessary to satisfy the Code. The referenced documents do not have appropriate revisions and/or dates listed so that any revision could be used. Further there is no indication that the Certifier of the Design Specification has reviewed and accepted the referenced documents. The Bechtel response indicates that an ASME Survey Team came up with a nonconformance on this same issue. The resolution of that

nonconformance was to require Certification of the referenced documents by a Registered Professional Engineer (not necessarily the Design Specification Certifier) and the removal of revision numbers from documents referenced in the Design Specification. Further control of the documents would continue as before. Procedures exist which provide for coordination between affected groups in the preparation and certification of documents.

TES has seen no objective evidence of coordination between groups. Further, TES does not agree that removal of revision numbers is appropriate action with respect to Design Control.

(23) Observation Numbers 13, 14 and 15 (ICR Nos. 5599-6, 5 and 4)

These three Observations address as-built conditions which are outside the tolerances allowed in the installation specifications. The differences are not significant enough to impact design of the feedwater design.

(24) Observation Number 16 (ICR No. 5599-8)

The reinforcement calculation of branch connections required by the Code were not included in the Stress Report. This does not affect adequacy of the Feedwater Design and is applicable only to control of the document.

(25) Observation Number 17 (ICR No. 5599-9, Items A and B)

Branch reinforcement calculations not included in stress report.

8.3 Phase 2 Summary

The ten Findings and seventeen Observations of Phase 1 were transmitted to PP&L, Bechtel, and the NRC. After receipt of that information a meeting was held on August 10, 1982 at TES offices. This meeting was called to address each Finding and Observation and to determine the following:

(1) Additional information existed (that was not currently available to TES) which would answer an outstanding item.

(2) TES had information on hand that addressed an outstanding item.

(3) Corrective action had to be initiated to address an outstanding item.

(4) The potential for lumping of outstanding Findings or Observations that really addressed one area of concern (i.e, reconciliation process).

At the conclusion of this meeting it was determined that sufficient information was available at TES to reclassify Finding Number 5 (ICR No. 5599-12). For all other Findings Bechtel provided additional information and/or corrective action. As noted in Section 8.2 of this report sufficient information was available at TES to reclassify Observation Number 8 (ICR No. 5599-22). For all other Observations Bechtel provided a response.

The new information provided by Bechtel in response to discussion of each Finding and Observation was reviewed and presented to the Project Review Internal Committee. At the conlcusion of this review, any oustanding Findings or Observations which addressed the same area of the Design or QA Process were lumped into a single item.

The ten Findings and seventeen Observations resulting from Phase 1 were finally categorized as follows:

No. of Phase 1 Findings	-	10
Findings Closed	-	4*
Findings	-	2*
No. of Phase 1 Observations	-	17
Observations Closed	-	8*
Observations	-	3*

*This number reflects the lumping together of original items which address the same area of the Design or QA Process. This process is discussed below.

A summary of the areas impacted by the Findings and Observations above follows:

Review Area	Findings	Observations	Total
Interfaces	1	2	3
Procedures	1	2	3
Design and QA Process	1	2	3
Specifications	1	1	2
Analysis	1	2	3
Supports	1	1	2

The two Findings and three Observations are, in some cases, the result of consolidation of a number of Phase 1 Findings and Observations. The following table indicates the final categorization of Phase 1 items as a result of the Phase 2 review.

Phase 1 Item	ICR No.	Phase 2 Categorization
Findings		
1	1	Finding No. 1
2	2	Finding No. 1
3	7	Close
4	9C	Observation No. 3
5	12	Close
6	13	Close (1)
7	14	Finding No. 2
8	16	Close
9	23	Finding No. 2
10	24	Finding No. 2
Observations		
1	10	Close (1)
2	15	Close
3	17	Finding No. 2(2)
4	18	Finding No. 2(2)
5	19	Finding No. 2(2)
6	20	Finding No. 2(2)
7	21	Finding No. 2(2)
8	22	Close
9	25	Finding No. 2(2)
10	26	Close
11	27	Observation No. 2
12	3	Observation No. 1
13	6	Close

(Cont'd) Phase 1 Item Observations	ICR No.	Phase 2 Categorization
14	5	Close
15	4	Close
16	8	Close
17	9A & 9B	Close

(1) TES is closing these items based on a commitment to future action by Bechtel. PP&L should verify that the action is performed in accordance with the outlines of the Bechtel response.

(2) These Observations have been included with Finding No. 2 only because they address the same area of the design process. As individual items some of them would be closed as a result of the Bechtel response.

8.4 Phase 2 Details

The following details are the TES conclusions reached as a result of a review of the Bechtel submittals resulting from the August 10, 1982 meeting. The individual RRF, PMR, ICR and Bechtel responses which make up each item are included in Appendix 5 for Findings and Appendix 6 for Observations.

(1) Finding No. 1 (Phase 1 Finding Numbers 1 and 2)

The Bechtel response is unacceptable. The "Loss of FW Pumps, MSIV Closed" should not be classified as an Emergency Condition. The sixth sentence of Bechtel response states the following:

"If the latter was to be the case, for a given condition that may have more than 25 cycles, the same condition would be classified differently from one system to another depending on the amplitude of the stress cycles."

This is the correct approach. Section III of the ASME, BPVC is a component Code and Plant Events (Operating Conditions) must be dealt with on a component basis. This approach will, in fact, result in classification of a specific Plant Event into various Operating Conditions depending on the component being considered and the amplitude of the stress cycles associated with that condition.

The Bechtel interpretation of the Code for this Finding is given in their response to Finding Number 2. It will be responded to by TES here. The major error in the Bechtel Code interpretation is in their third point.

"The requirement of maintaining S_a to below endurance limit for stress cycles greater than 25 applies to primary type loads only. Under this .... "

Operating Condition category is 2.25 S_m. This value is significantly greater than S_a at 10^6 cycles from the fatigue curves in the Appendices. The following example comparisons are given.

Material	2.25 S_M @ 500F	S_a at 10^6 Cycles
SA 106 Gr. B	45,250 PSI	14,000 PSI
SA 376 TP 304	39,400 PSI	25,000 PSI

The reason that NB-311.3.3 of Section III addresses number of cycles and stress amplitude is concern for the effect of a given condition on the fatigue adequacy of the component. To eliminate from consideration a condition that results in more than 25 cycles of a stress amplitude of the magnitude associated with this condition is not correct and is unconservative.

The fact that Bechtel has performed a study calculation to demonstrate that Code criteria is not exceeded even if this event is considered is not an acceptable response. In order to comply with Code criteria, Bechtel had to revise their calculations for other conditions to eliminate any conservatisms that existed. The real TES concern is that the philosophical approach used by Bechtel is not in compliance with the Code (as TES understands the formulation of those rules) and this can have effects beyond the specific system being reviewed and the specific plant event (Loss of FW Pumps, MSIV Closed) being discussed.

Further, a review of the Bechtel study calculations indicates that a significant change in the expansion moments was made for Conditions 9, 13 and 16. The new calculations use an expansion condition of the pipe at 100F and the RPV at 100F. Since the RPV is still hot TES feels that the condition for expansion moments should be pipe at 100F and the RPV at 420F (SHTD 100F). This is the condition used in the original Bechtel analysis. This effect is significant since the use of SHTD 100F would increase the calculated value of S_n to the region where significant K_e values are applied to the alternating stress.

(2) Finding Number 2 (Phase 1 Finding Numbers 7, 9 and 10, and Observation Numbers 3, 4, 5, 6, 7 and 9)

A significant number of comments have been generated on the support design process. Most of these comments are related to reconciliation of as-built geometry by the support designer. The concern is basically associated with acceptability of the as-built support. Two major items (Finding Nos. 7 and 10) have been responded to by Bechtel in this Phase 2 portion of the review but they only tend to support that the process did not work.

The response to Phase 1 Finding No. 7 indicates that the pipe support reviewer and checker determine whether a relocated support was a significant enough change to warrant a Civil department review. In the case of the specific support of concern no Civil review is apparent. However, there is a new plate required in the as-built design which is the responsibility of the Civil department. The support design group calculations indicate that the plate will be handled by the Civil group and the Civil calculations do not address the plate since they do not know the support is located on it without having the as-built geometry forwarded to them. In the final Bechtel submittal the plate has been analyzed by the Civil department as a result of the TES findings.

The response to Phase 1 Finding No. 10 indicates that the weld at the shield wall is acceptable after reducing the conservatism in the original analysis and performing a detailed computer solution of the support. It is apparent that this weld was not aceptable by inspection as originally stated by Bechtel.

Responses to Finding Number 9 and the Observations listed under this Finding were reviewed and in some cases indicate the Observation could have been closed if sufficient detail was provided in the Bechtel reconciliation process. During the August 10, 1982 meeting at TES, Bechtel indicated that group meetings and training sessions were held to explain procedures used in the reconciliation process. Further, the reviewer checks each item and determines acceptability and even crosses each item off that he judges is acceptable on a check print. None of this information is retained by Bechtel nor is there any record maintained of meetings or training sessions for this purpose.

(3) Observation No. 1 (Phase 1 Observation No. 12)

This item will remain as an Observation since it is TES' opinion that sufficient control by the preparer of the Design Specification over the documents referenced is not maintained. The registers submitted by Bechtel do not include accompanying procedures which indicate the process of control used. At the August 10, 1982 meeting it was indicated that these existed and the Bechtel response lists ten new Project Procedures which have been initiated to control this. However, these have not been submitted and reviewed by TES. PP&L should review these new procedures to assure themselves that they provide the necessary control.

(4) Observation No. 2 (Phase 1 Observation No. 11)

This item will remain as an Observation. The major reason for this is that no information in the form of

design drawings, procedures, instructions, etc., has been presented to demonstrate that bolt tightening of some type is a requirement. The final Bechtel response that "bolt tightening is a QC Inspection attribute and field verification item" is meaningless without some defined bolt tightness requirements.

TES pointed out at the August 10, 1982 meeting that the special clamp could be a concern when it was not tight on the pipe. It was suggested that installation requirements may cover this. No information of this sort has been made available.

(5) Observation No. 3 (Phase 1 Finding No. 4)

This item will remain an Observation since a review of the Bechtel calculations provided with their response indicates that mixing in the feedwater pipe due to flow in the reactor vessel was not considered. For the Feedwater System this effect results in a beginning temperature at the branch connection of 210F versus the 173F obtained by Bechtel. This difference is considered by TES to be insignificant. However, geometries could exist in which the branch connection lies in the flow mixing zone and the Bechtel approach used in the Feedwater System would be more unconservative (ie., the closer the branch connection is to the flow in the RPV the greater the problem).

9.0 INDEPENDENCE

The independence of the reviewer is important in the successful performance of an IDR.

In order to qualify as an independent reviewer for the design verification program at SSES, all personnel assigned to the project complied with the following:

(1) Key project personnel shall have no present or past work experience in design of the Susquehanna Steam Electric Station in the areas to be reviewed.

(2) Project personnel shall not be active on any other active Susquehanna Steam Electric Station projects.

(3) No project personnel shall have members of their immediate family (parents, spouse, children and grandchildren) who are employed by PP&L.

(4) During the term of the project no project personnel and their immediate family shall have cumulative ownership interest in PP&L which exceeds five percent of their gross family annual income.

The most important factor in completing this design verification program is competence. This competence must be based on knowledge and experience in the matters under review. The company and individuals involved should also be independent. Independence means that the individuals and company involved must be able to provide an objective, dispassionate technical judgement, provided solely on the basis of technical merit. Their integrity must be such that they are regarded as a reputable company or individuals.

In the process of this IDR, TES was given freedom to perform the review as we deemed appropriate. There was no pressure applied by PP&L and/or Bechtel to obtain information or influence results. TES received the utmost of cooperation from both PP&L and Bechtel in the performance

of our tasks. It is our opinion that the successful completion of this IDR was highly dependent on the cooperation of PP&L and Bechtel and their recognition of the importance of TES independence.

10.0 CONCLUSIONS

A substantial number of documents were reviewed by the TES review team and a good understanding developed of the design, QA and interface process existing for the Susquehanna Steam Electric Station.

In any design for a project of the magnitude of a nuclear plant two processes actually exist:

(1) That defined by Procedures and Instructions and
(2) That which actually occurs.

For Item 1 above an established process exists and is detailed in scope. The interfaces between departments that are required to control changes are present. Some departmental procedures are not as well established or defined. For Item 2 above, in general, the process defined by Procedures and Instructions is followed. In some departmental cases there is reliance on word of mouth direction or instructions rather than definitive procedures. In the reconciliation of as-built geometry there is too much reliance on the judgement of the reviewing engineer. In this area Bechtel defined a process that was used which is quite complete and required the reviewer to address the acceptance of individual items on the as-built configuration. However, no records of this detailed review are required to be kept so review of the process is difficult. Further, review by other departments relies on the judgement of an individual not in those departments. The IDR resulted in cases where detailed analysis or changes were required to indicate acceptance of an item in response to a specific Finding or Observation.

A second area of concern is the Design Specification. It is TES' opinion that the requirements of the Code have not been properly addressed with respect to Operating Condition categorization. Bechtel does not concur with TES. Further, TES feels the use of a substantial number of references that are not controlled by the preparer of the Design Specification can be problematic. This item was also raised during an ASME survey of Bechtel and a resolution proposed to ASME. TES does not agree with that resolution.

There are some differences between TES and Bechtel in the analysis of piping and supports. These are minor with respect to the Feedwater System.

In conclusion, TES is concerned with two areas that do not allow us to make any extrapolation to the total plant design and QA process:

(1) Reconciliation of as-built conditions and
(2) Design Specification requirements.

Bechtel responses to TES Findings and Observations in these areas indicate that there should be no impact on safety for the Feedwater System. Further documentation, Design Specification revisions and analyses have been agreed to by Bechtel to substantiate this and these must be reconciled by PP&L.

Table 1 - Review Log Summary

Independent Design Review

Susquehanna Steam Electric Station Unit 1 - Feedwater System

Review Log Summary

RRF No.	Description	Reviewer Category	PMR No.	Proj. Org. Category	ICR No.	Rev. Comm. Category	Comments
1	Stops in springs	Open	1	Closed	N/A	N/A	Rev. 2 Closed Item
2	Clearance	Open	2	Closed	N/A	N/A	Anal. deflection indicates OK
3	Clearance	Open	3	Closed	N/A	N/A	Anal. deflection indicates OK
4	Snubber Dim.	Open	4	Closed	N/A	N/A	
5	As Built Vs. Designed	Open	5	Closed	N/A	N/A	
6	Load Listing Wrong	Open	6	Closed	N/A	N/A	Rev. 1 Closed Item
7	Support Location	Open	7	Closed	N/A	N/A	
8	Iso. Dimension	Open	8	Closed	N/A	N/A	Rev. 1 Closed Item
9	Support Location	Open	9	Closed	N/A	N/A	
10	Clearance	Open	10	Closed	N/A	N/A	Analy. deflection indicates OK
11	Inadequate Doc.	Open	11	Closed	N/A	N/A	Rev. 1 Closed Item

RRF No.	Description	Reviewer Category	PMR No.	Proj. Org. Category	ICR No.	Rev. Comm. Category	Comments
12	Support Location	Open	12	Closed	N/A	N/A	Rev. 1 Closed Item
13	Support Location	Open	13	Closed	N/A	N/A	Rev. 1 Closed Item
14	Histrograms not Checked	Open	14	Closed	N/A	N/A	Rev. 1 Closed Item
15	P&ID	Open	15	Closed	N/A	N/A	
16	Flex Runs Not Checked	Open	16	Closed	N/A	N/A	Rev. 1 Closed Item
17	Film Coefficients	Open	17	Observation	15	Observation	
18	ME-912 Runs	Open	18	Closed	N/A	N/A	Rev. 1 Closed Item
19	T Values	Open	19	Closed	N/A	N/A	Rev. 1 Closed Item
20	T Values	Open	20	Potential Finding	9	Observation and Finding	
21	Thickness Used in T Calc.	Open	21	Closed	N/A	N/A	Rev. 1 Closed Item
22	Data Reference	Open	22	Closed	N/A	N/A	Rev. 1 Closed Item
23	T Values	Open	23	Closed	N/A	N/A	Rev. 1 Closed Item
24	SRV T Omission	Open	24	Potential Finding	13	Finding	

RRF No.	Description	Reviewer Category	PMR No.	Proj. Org. Category	ICR No.	Rev. Comm. Category	Comments
25	Code Variation	Open	25	Closed	N/A	N/A	Rev. 1 Closed Item
26	T Values	Open	26	Closed	N/A	N/A	Rev. 1 Closed Item
27	Indices	Open	27	Closed	N/A	N/A	Rev. 1 Closed Item
28	Seam Weld	Open	28	Closed	N/A	N/A	Rev. 1 Closed Item
29	T Values	Open	29	Potential Finding	13	Finding	
30	Elbow Conn.	Open	30	Closed	N/A	N/A	Rev. 1 Closed Item
31	Report. Cert.	Open	31	Closed	N/A	N/A	Rev. 1 Closed Item
32	Fab. Branch Conn.	Open	32	Observation	8	Observation	
33	1" Line Analy.	Open	33	Observation	10	Observation	
34	Lug Evaluation	Open	34	Closed	N/A	N/A	Rev. 1 Closed Item
35	Oper. Cond. Categorization	Open	35	Potential Finding	2	Finding	
36	Sht. 3 Deleted	Open	36	Closed	N/A	N/A	Rev. 1 Closed Item
37	Cal. Ref.	Open	37	Closed	N/A	N/A	Rev. 1 Closed Item
38	Support Calc.	Open	38	Closed	N/A	N/A	Rev. 1 Closed Item

RRF No.	Description	Reviewer Category	PMR No.	Proj. Org. Category	ICR No.	Rev. Comm. Category	Comments
39	Support Calc.	Open	39	Potential Finding	24	Finding	
40	Procedures	Open	40	Closed	N/A	N/A	Rev. 1 Closed Item
41	EPM 8856	Open	41	Closed	N/A	N/A	Rev. 1 Closed Item
42	Angle Tolerance	Open	42	Closed	N/A	N/A	Rev. 1 Closed Item
43	Angle Tolerance	Open	43	Potential Finding	4	Observation	
44	Angle Tolerance	Open	44	Closed	N/A	N/A	Rev. 1 Closed Item
45	Angle Tolerance	Open	45	Closed	N/A	N/A	Rev. 1 Closed Item
46	Angle Tolerance	Open	46	Closed	N/A	N/A	Rev. 1 Closed Item
47	Angle Tolerance	Open	47	Potential Finding	5	Observation	
48	Angle Tolerance	Open	48	Observation	6	Observation	
49	Design Spec.	Potential Finding	49	Potential Finding	1	Finding	
50	Design Spec. Rev.	Potential Finding	50	Potential Finding	3	Observation	
51	Design Spec.	Open	51	Closed	N/A	N/A	Rev. 1 Closed Item

RRF No.	Description	Reviewer Category	PMR No.	Proj. Org. Category	ICR No.	Rev. Comm. Category	Comments
52	AP Anal.	Open	52	Closed	N/A	N/A	Rev. 1 Closed Item
53	Anchor Displ.	Open	53	Closed	N/A	N/A	
54	Anchor Displ.	Open	54	Closed	N/A	N/A	Rev. 1 Closed Item
55	Support Model	Potential Finding	55	Potential Finding	11	Closed	
56	Calc. 876	Open	56	Closed	N/A	N/A	Rev. 1 Closed Item
57	ME-101 Calc.	Open	57	Closed	N/A	N/A	
58	Calc. 876	Open	58	Closed	N/A	N/A	
59	RS Merging	Observation	59	Closed	N/A	N/A	
60	Calc. 876	Open	60	Closed	N/A	N/A	Rev. 1 Closed Item
61	Calc. 876	Open	61	Closed	N/A	N/A	Rev. 1 Closed Item
62	AP Response Spectra	Open	62	Closed	N/A	N/A	Rev. 1 Closed Item
63	Calc. 876	Potential Finding	63	Closed	N/A	N/A	Rev. 1 Closed Item
64	Flued Head	Open	64	Closed	N/A	N/A	Rev. 1 Closed Item
65	Anchor Bolts	Open	65	Closed	N/A	N/A	Rev. 2 Closed Item

RRF No.	Description	Reviewer Category	PMR No.	Proj. Org. Category	ICR No.	Rev. Comm. Category	Comments
66	Support Calc.	Open	66	Observation	18	Observation	
67	Support Calc.	Open	67	Closed	N/A	N/A	Rev. 1 Closed Item
68	Support Calc.	Open	68	Potential Finding	23	Finding	
69	Support Calc.	Open	69	Closed	N/A	N/A	Rev. 1 Closed Item
70	Support Calc.	Open	70	Closed	N/A	N/A	Rev. 1 Closed Item
71	Support Calc.	Open	71	Observation	17	Observation	
72	Support Calc.	Open	72	Closed	N/A	N/A	Rev. 1 Closed Item
73	Support Calc.	Open	73	Observation	19	Observation	
74	Support Calc.	Open	74	Closed	N/A	N/A	Rev. 1 Closed Item
75	Support Calc.	Open	75	Closed	N/A	N/A	Rev. 1 Closed Item
76	Analysis ISO	Open	76	Closed	N/A	N/A	Rev. 1 Closed Item
77	Analysis ISO	Open	77	Closed	N/A	N/A	Rev. 1 Closed Item
78	Analysis ISO	Open	78	Closed	N/A	N/A	Rev. 1 Closed Item
79	Support Calc.	Observation	79	Observation	20	Observation	
80	Support Calc.	Open	80	Observation	22	Observation	

RRF No.	Description	Reviewer Category	PMR No.	Proj. Org. Category	ICR No.	Rev. Comm. Category	Comments
81	Vlv. Qual.	Open	81	Closed	N/A	N/A	Rev. 1 Closed Item
82	Vlv. Test. Req.	Potential Finding	82	Potential Finding	12	Finding	
83	Vlv. Test.	Open	83	Closed	N/A	N/A	Rev. 1 Closed Item
84	Vlv. Compliance	Open	84	Closed	N/A	N/A	Rev. 1 Closed Item
85	Special Clamp	Open	85	Closed	N/A	N/A	Rev. 1 Closed Item
86	Clamp Qual.	Open	86	Potential Finding	27	Observation	
87	Support Calc.	Open	87	Observation	21	Observation	
88	Adequacy Calc.	Observation	88	Observation	25	Observation	
89	Support Calc.	Open	89	Potential Finding	16	Finding	
90	Support Calc.	Open	90	Closed	N/A	N/A	Rev. 1 Closed Item
91	Support Stiff.	Open	91	Open	7	Finding	
92	Clamp Weight	Open	92	Potential Finding	26	Observation	
93	Civil/Struc. Inter.	Open	93	Potential Finding	14	Finding	
94	Check Valve	Open	94	Closed	N/A	N/A	Rev. 1 Closed Item

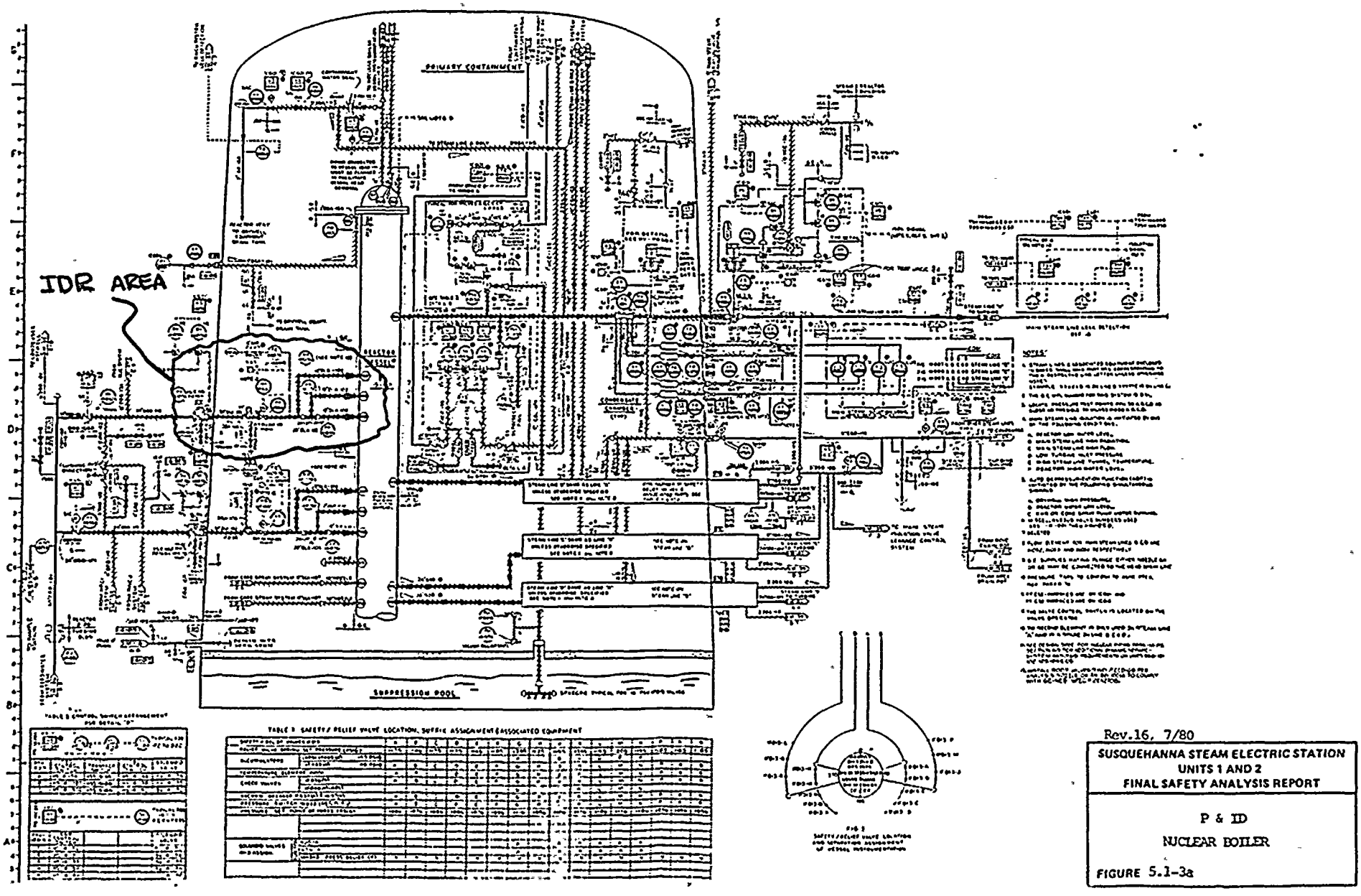


Figure 1 - Main Feedwater System Subject to Independent Design Review

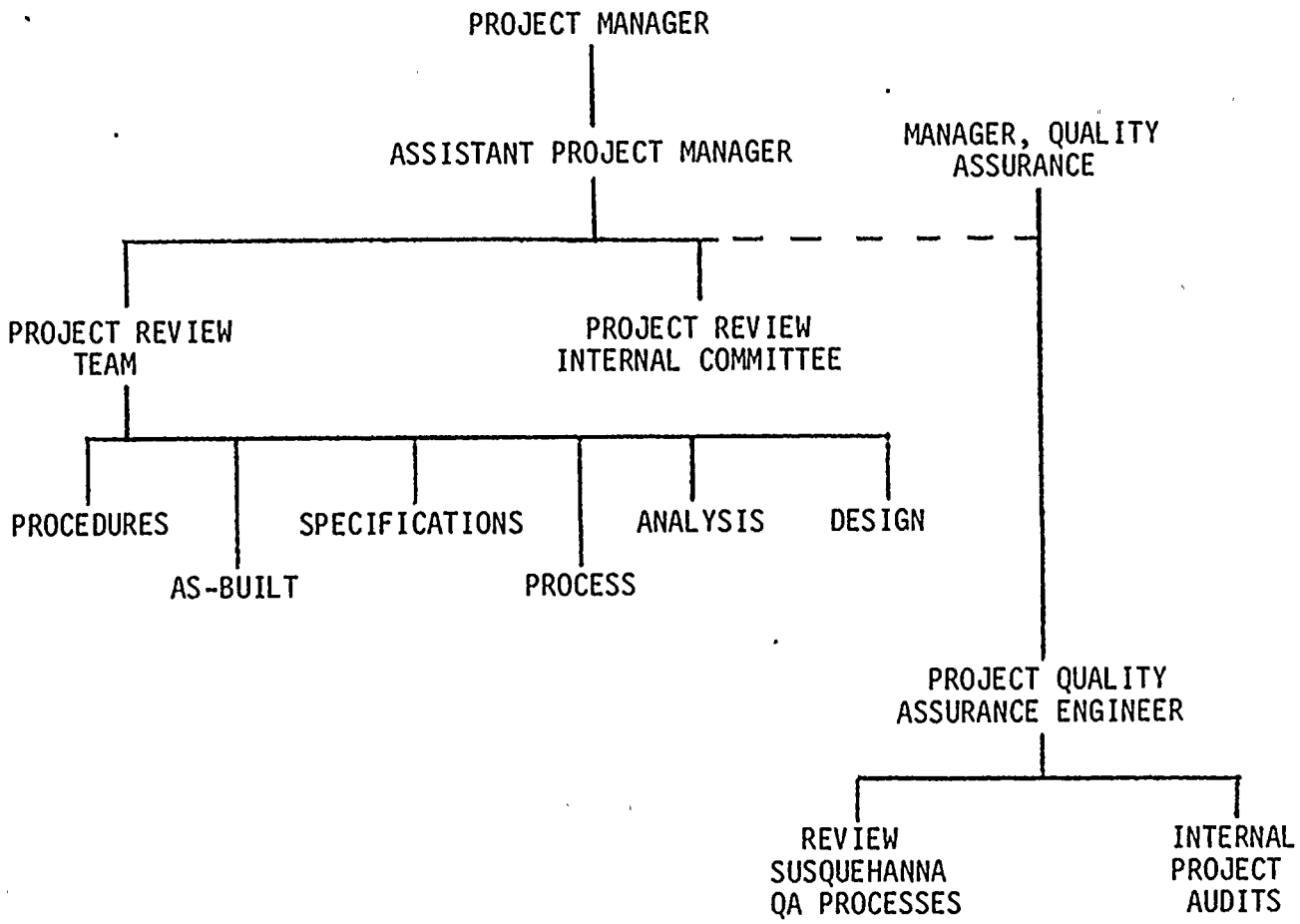
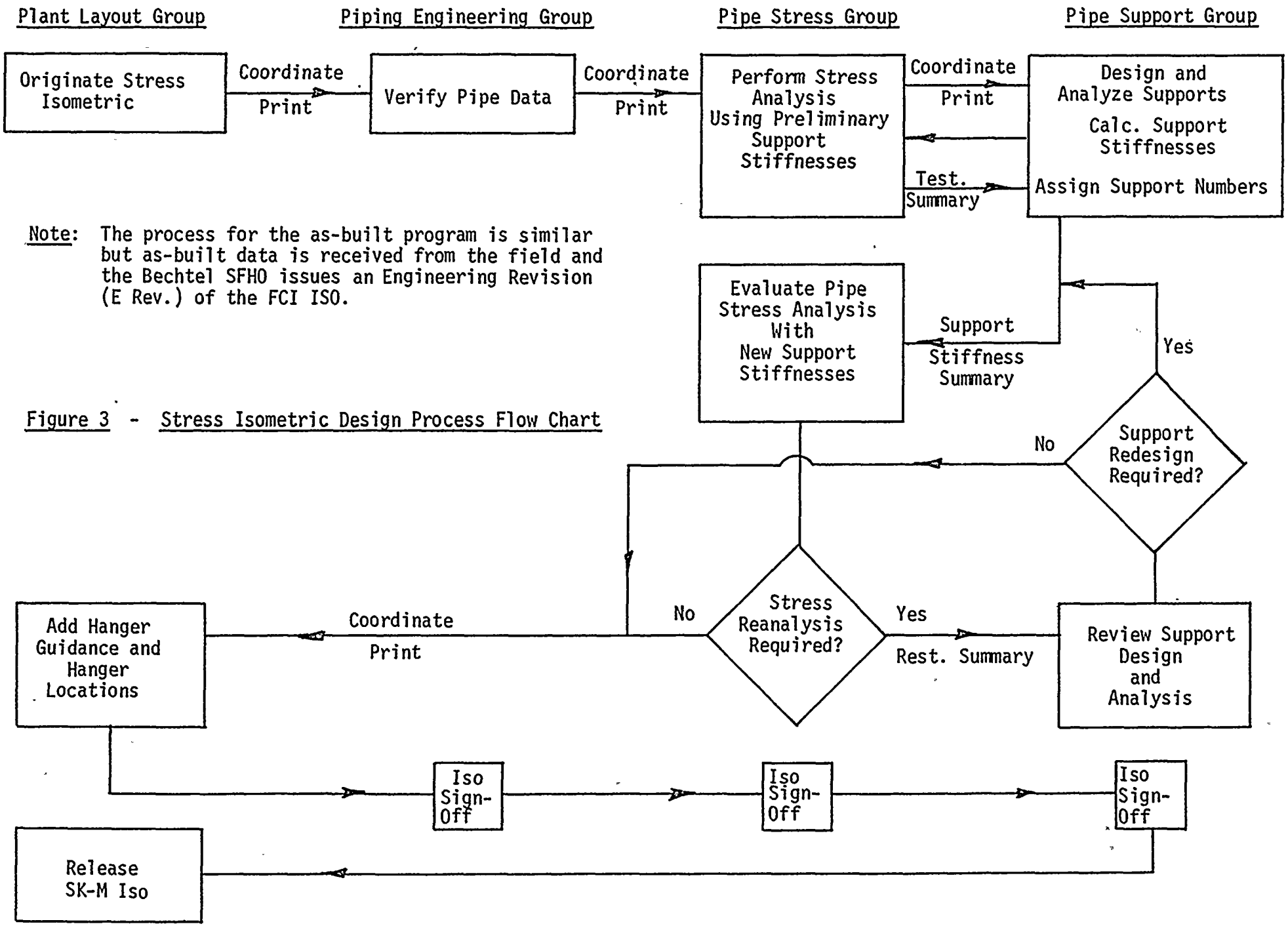


Figure 2

Project Organization Chart



Note: The process for the as-built program is similar but as-built data is received from the field and the Bechtel SFHO issues an Engineering Revision (E Rev.) of the FCI ISO.

Figure 3 - Stress Isometric Design Process Flow Chart

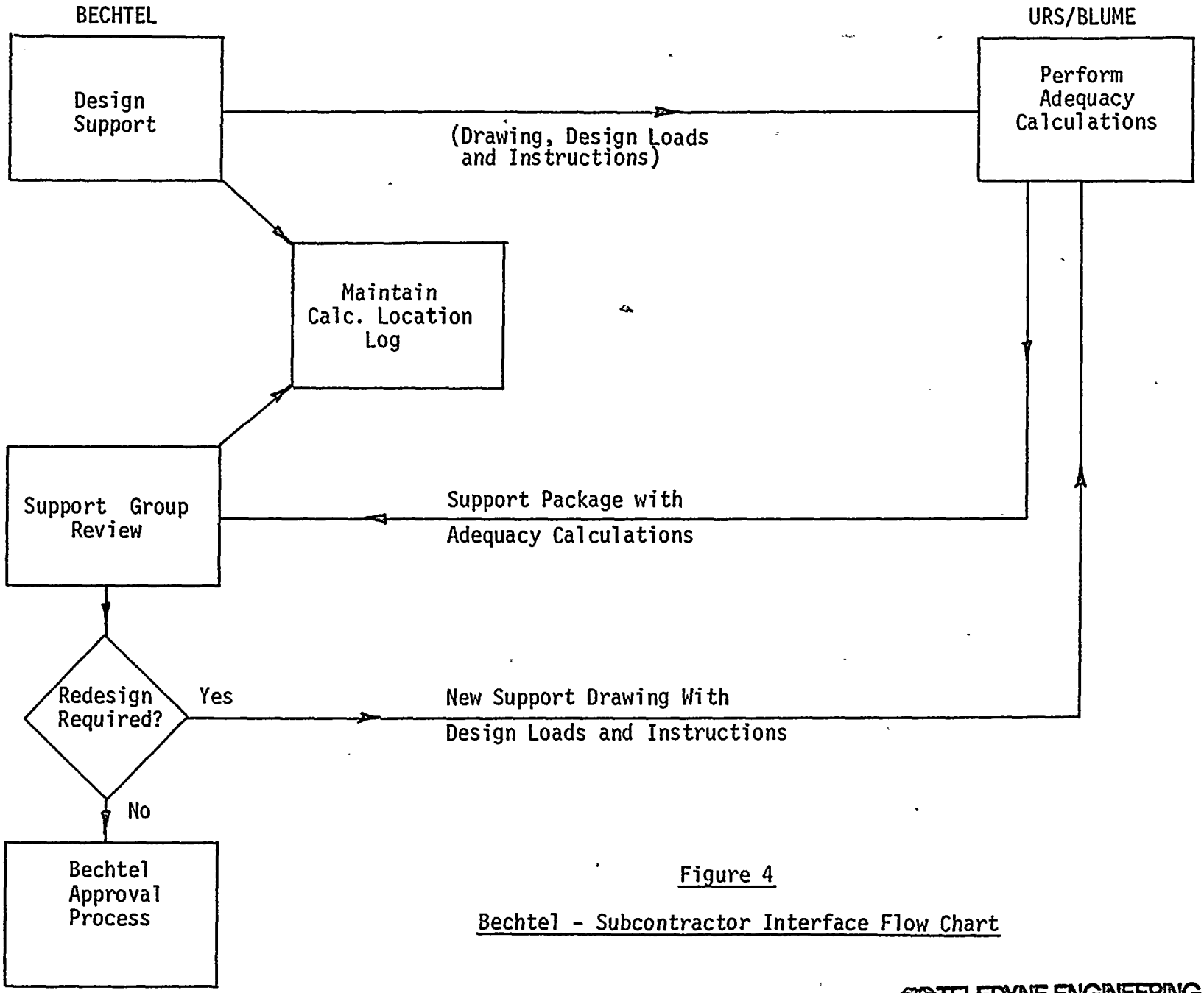


Figure 4

Bechtel - Subcontractor Interface Flow Chart

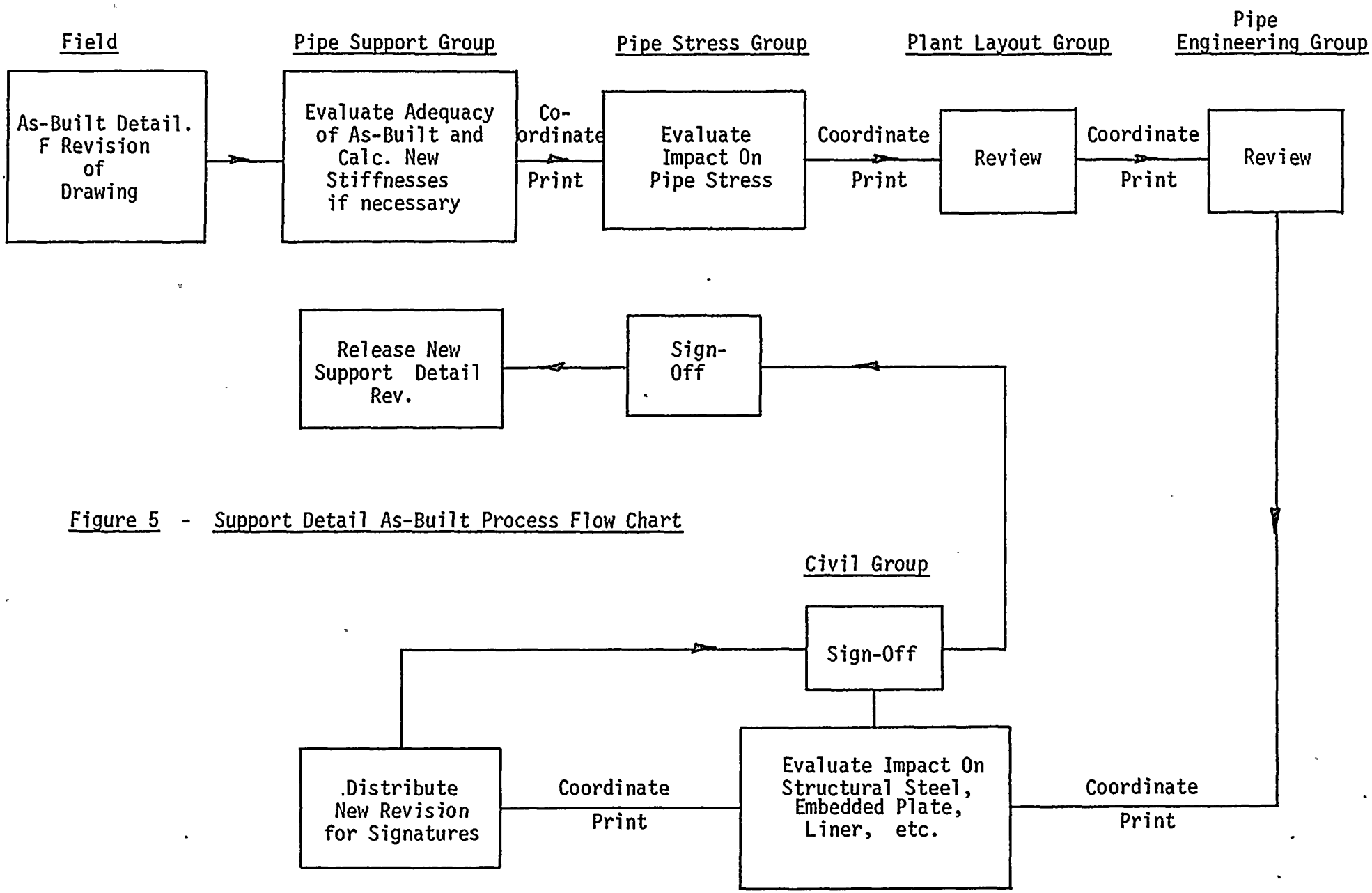


Figure 5 - Support Detail As-Built Process Flow Chart

APPENDIX 1

TRIP REPORTS

TELEDYNE ENGINEERING SERVICES RECORD COPY

CONTROLLED DOCUMENT

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES

TES PROJ. NO. 5599

DATE 5.7.82

TRIP REPORT 1443

Visit to Bechtel Power Corporation
San Francisco, CA

PROJECT 5599

Independent Design Review of
Susquehanna Steam Electric Station Unit 1
Feedwater System for Pennsylvania Power & Light Company

March 23, 1982

R. D. Hookway
R. A. Enos
D. Messinger
V. M. Chauhan

RDH, RAE, DM and VMC arrived at Bechtel Power Corp. at approximatley 9:00 AM. Participants in the meeting are listed on Attachment No. 1.

The following significant issues were discussed:

1. TES reviewed the Engineering Procedure EP-1-015, TES Project Plan for Independent Review of SSES Feedwater System.

2. PP&L stated that the review of the pipe break analysis and pipe whip restraints is not part of the independent review.

3. TES reviewed the Project QA Program to obtain the Bechtel and PP&L personnel contacts for communications.

   Bechtel contacts are:

   L. Memula - Project, Main Contact
   R. V. Parekh - Project
   J. Weyandt - Project
   J. Bloomquist - Quality Assurance

   Pennsylvania Power & Light contacts are:

   W. Rhoades - Project
   D. Sattar - Project
   J. Kenney - Contractual
   R. Schwan - Quality Assurance
   C. Dvorscak - Technical Data

4. PP&L stated that the review would include all present and future as-built information and its reconciliation.

5. Bechtel discussed the general design and analysis process for piping, piping components and supports.

6. A sample of stress and pipe support calculations were presented by Bechtel for discussion:

   a. ME101 Piping Computer Analysis for operating and design conditions.

   b. Superpipe Piping Computer Analysis for the AP analysis only.

   c. Pipe support calculations packages were reviewed and it was determined that Bechtel had two other companies prepare some of the calculation packages.

7. The extent of the work performed by other contractors for Bechtel was discussed.

   a. EES and J. Blume Assoc. performed support calculations under Bechtel's direction and all of the work was reviewed and approved by Bechtel.

   b. G.E. performed all reactor pressure vessel nozzle evaluations.

   c. Tube Turns performed the containment penetration stress analysis and fabricated the penetration flued head to Bechtel's design and specifications.

8. Bechtel stated that the final, signed off, As-Built drawings would be ready in a few weeks. The drawings at present are Preliminary As-Builts.

9. Bechtel stated that the Final Stress Report for the feedwater system is scheduled to be issued June 1, 1982.

10. Based on the scheduled issue date of the Final Feedwater Stress Report, TES stated that the Final Independent Review Report would be issued two weeks after receipt of the Final Feedwater Stress Report and As-Built documentation.

11. TES would schedule its SSES Unit 1 walkdown for the week of April 5, 1982.

12. Request for different procedures, documents, calculations, drawings, reports, computer analysis and other required information for the review are listed on Attachment No. 2.

13. Bechtel would have some portion of the requested information ready by the next morning to be carried back to Boston. D. Messinger agreed to stay in San Francisco and pick up the package to expedite getting the information. The remaining computer analysis and reports would be mailed. D. Sattar requested the remaining package be sent Federal Express or some other means of transportation.

The meeting was adjourned at approximately 4:00 PM.

Richard A. Enos
Assistant Project Manager

alt

cc: Trip Report File
D. F. Landers
R. A. Enos
R. D. Hookway
D. Messinger

TELEDYNE
ENGINEERING SERVICES

ATTACHMENT #1

ATTENDANCE LIST

Name	Position	Company
Richard Enos	Asst. Proj. Mgr.	Teledyne
Don Messinger	QA Supervisor	Teledyne
Val Chauhan	Senior Engineer	Teledyne
Bob Hookway	Manager, Projects	Teledyne
Jack Weyandt*	Asst. Proj. Eng.	Bechtel
Lingagoud Memula	SSES Project - Plant Design Deputy Group Supervisor	Bechtel
Tarek K. Emera	Plant Design - Stress Staff Coordinator	Bechtel
Leo Spensko*	Proj. Quality Engineer	Bechtel
Alan Jorgensen*	Quality Assurance	Bechtel
H. Cruz*	SSES Proj. Group Supervisor	Bechtel
Vic Kagaoan*	Area Leader (Pipe Support)	Bechtel
Ben Arya*	SSES Proj. Stress Group Leader	Bechtel
Dale Sattar	Senior Project Engineer	PP&L
Chuck Dvorscak	Project Engineer	PP&L

*Part Time Attendance

TELEDYNE
ENGINEERING SERVICES

ATTACHMENT #2

Information and Documents Requested from Bechtel

1. Feedwater piping analysis, ME101 computer runs and supporting input calculations.

2. Feedwater piping Class 1 evaluation, ME912 and ME913 computer runs.

3. For each feedwater valve:

   a. Valve design specifications
   b. Valve stress report
   c. Valve seismic qualification report

4. For containment penetration:

   a. Penetration design specification
   b. Penetration stress report

5. Bechtel Quality Assurance Manual (Controlled Copy).

6. Bechtel Engineering Procedures Manual (Controlled Copy).

7. Feedwater pipe support calculations and details.

8. Extra set of feedwater piping and support detail drawings to take to the site for Task 5.

9. Individual seismic response spectra which went into the ME909 spectra enveloping computer program.

10. Feedwater stress report.

11. Feedwater Superpipe computer run for AP analysis (input and output only).

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 5.7.82

TELEDYNE
ENGINEERING SERVICES

TRIP REPORT 1444

Project 5599

Visit to Susquehanna Steam Electric Station Unit 1
Berwick, PA

April 6-7, 1982

Tuesday, April 6, 1982, I arrived at the SSES site at approximately 3:00 PM and was met by Bob Saccone from PP&L. The balance of my Teledyne field crew, Leo Barron and Eric Woods, were still in Boston, snowed in at Logan Airport, due to the snow storm. The purpose of this trip was to perform Task 5 of the TES Project, Determination of "As-Built" Plant Configuration. This effort was now cancelled and re-scheduled for next week. I had driven down to the site, so Bob and I decided to walk the feedwater line inside containment tomorrow, Wednesday, to review what insulation would have to be removed from the pipe.

Wednesday morning, April 7, 1982, I was met at the SSES site by Bob Saccone and Donald Washaver, both from PP&L. We walked the feedwater line from the containment penetration X-9A to the three reactor pressure vessel nozzles, N4D, N4E and N4F. Most of the support locations did not have insulation around the pipe and the only insulation that would have to be removed was mainly at elbows and other pipe attachments.. It was decided by Bob that the insulators would work with the TES field crew next week. There was no storage room avilable to store the insulation and this would speed things up and reduce the insulators work load.

Having finalized what would be done next week, I left the site and headed home.

Eric A. Solla
Project Engineer

alt

cc: Trip Report File
D. F. Landers
R. A. Enos
D. Messinger

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TES PROJ. NO. 5599
DATE 5.7.82

TRIP REPORT 1445

Project 5599

Visit to Susquehanna Steam Electric Station Unit 1
Berwick, PA

RECORD COPY
PROJ. NO. 5599

April 12-14, 1982

Monday afternoon, April 12, 1982, Teledyne employees, E. A. Solla, L. E. Barron, and E. K. Woods arrived at the SSES site and were met by Bob Saccone of PP&L. The purpose of this trip was to perform Task 5 of the TES Project, Determination of the "As-Built" Plant Configuration. Bob escorted us to the containment and left us to start measuring the feedwater system inside containment. We had brought a twenty five foot tape, an eight foot wood ruler, a plumb bob and a level to aid us in taking field measurements. To record our field measurements, we brought with us a TES undimensioned isometric drawing of the feedwater system from the containment penetration X-9A to the three reactor pressure vessel nozzles, N4D, N4E and N4F. We also brought with us a full set of the support drawings for field verification. The site supplied us with a Polaroid camera to document support configurations, valve orientation and other areas of interest. Two site insulators were instructed to aid us in our field effort.

Starting at the containment penetration X-9A and working toward the reactor pressure vessel nozzles, we proceeded to document the field configuration of the feedwater system. Dimensions were taken between the penetration, valves, pipe whip restraints, supports, tangent points of elbows and all attachments to or on the pipe. Dimensions to the welded seams were sometimes taken for ease of measurement. All dimensions were taken by two people separately and recorded on the isometric with each dimension initialed by both. The slopes of pipes were determined by recording the distance along the axis of the pipe and the corresponding change in the horizontal distance, measured off the vertical, using a plumb bob to determine the vertical reference line. All springs were checked for size, settings and clearances around and below the clamps. There was one spring which still had travel stops in place, the setting was recorded with the stops in and there appeared to be a clearance problem. A list of the springs is included as Attachment 1. Snubbers were checked for size, setting, load rating, pin-to-pin dimension and the angle of the snubber off the horizontal. There was one snubber with a wrong pin-to-pin dimension on the as-built and two snubbers with possible clearance problems. A list of the snubbers with problems is included as Attachment 2. Rigid supports were checked for direction, clearances and general configuration. On support SD-DBA-104-1H, angles were used instead of plates for Item 3. Pipe whip restraints were checked for clearances and type of shims (i.e., no shim, shimmed or EAM, energy absorbing material). For areas where the EAM was shaped to match a curved section and not centered, the maximum and minimum clearances were recorded. When the EAM clearance was uniform, only one dimension was recorded. The minimum clearance was recorded for supports that were shimmed. All support measurements were taken by two people separately and recorded on separate sheets of paper for each support and initialed by both. The support drawings were checked for general configuration only.

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Photographs were taken of all supports. When there were attachments to the pipe, the locations were recorded and photographs taken. The name plate data was recorded for all valves and the distance and orientation of the centerline of the valve body to the approximate centerline of the operator was recorded. Photographs of the valves were taken. When it was necessary to have the metallic insulation removed, to measure the pipe, the two insulators would remove the insulation and replace it as soon as we were finished. The time in which the insulation was off the pipe was kept to a minimum and no insulation was left off overnight.

All photographs were numbered and recorded in a log. A general description or support number was recorded on the back of each photograph for ease of identification.

Wednesday afternoon, April 14, 1982, we completed the as-built verifications for the feedwater system between penetration X-9A and RPV nozzles N4D, N4E and N4F.

We left the site late Wednesday afternoon and flew back to Boston that evening.

Eric A. Solla
Project Engineer

Leo E. Barron
Engineer

Eric K. Woods
Assistant Engineer

alt

cc: Trip Report File
D. F. Landers
R. A. Enos
D. Messinger

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ATTACHMENT 1

SPRING HANGER LIST

Spring Hanger Mark No.		Remarks	Setting Inches/Pounds
DLA-101-H2	Size 19-D	Travel Stops See Note 1	1 3/8"/17,200
DLA-102-H1	Size 18-D	No Stops	1 1/8"/1,200
DLA-102-H3	Size 14-A	No Stops	2 7/8"/3,950
DLA-102-H4	Size 17-D	No Stops	3 3/4"/10,750
DLA-102-H5	Size 15	No Stops	3 1/2"/5,670

Note 1: Clearance between pipe clamp & grating is 3/8".

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ATTACHMENT 2

SNUBBER LIST

Snubber Mark No.	Remarks
DLA-102-H2	Clearance below clamp is 1/8"
DLA-102-H8	Clearance below clamp on snubber #1 is 3/4"
DLA-102-H9	Pin-to-pin dimension on drawing is 1'-4 3/4"
	Pin-to-pin dimension measured is 2'-4½"
	Angle of snubber on drawing is 44°
	Angle measured is 36°

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TES PROJ. NO. 5599
DATE 5-7-82

TRIP REPORT NO. 1448

PROJECT 5599

Visit to Pennsylvania Power & Light, Allentown, PA

April 28 and 29, 1982

Purpose:

TES Audit of PP&L to determine the control and implementation of its Quality Assurance requirements on A&E and suppliers of engineering services.

Pre-Audit Conference

A Pre-Audit Conference was conducted at PP&L on April 28, 1982 with Mr. R. A. Schwan, Assistant Manager - NQA. The TES auditor (D. Messinger) stated the purpose of the audit and the necessity for the independence of TES in this activity and that the TES audit report of findings, observations or comments would not be discussed with PP&L during the audit or presented for discussion at an exit meeting upon completion of the audit.

Mr. Schwan explained that PP&L audits were not general in nature (18 Point Criteria) but rather, were specific to areas of concern to PP&L.

It was agreed that the TES Auditor would begin the activity by performing an in depth review of the PP&L audits of Bechtel, San Francisco and then determine the extent of review required for other suppliers of Engineering Services.

The scope of this Indepedent Design Review applies to the Susquehanna Steam Electric Station and in particular to the Main Feedwater Line design control audits, if this is discernible with PP&L audits of Bechtel.

The TES Auditor was introduced to Mr. Bill Gulliver, Supervising Engineer - NQA and Mr. Bill O'Donnell, Senior Project Engineer - NQA who would interface with the TES Auditor, as it was agreed that during the performance of the review some discussion might be necessary for clarification of PP&L Audits, reports and any correspondence included in the audit files.

TES Independent Review Activity

The TES auditor reviewed the Audit Files of PP&L for audits scheduled for the A&E (Bechtel) and selected several audits based on the audit activity. These audits were reviwed to determine conformance with the planned schedule, adequacy of audit questions to the activity involved, identification of findings, observations or comments, request for corrective action, acceptance by PP&L of corretive action and follow-up audits until satisfactory closeout of corrective actions was achieved.

Following is a list of the PP&L audit files that were reviewed by the TES Auditor.

Audit No.	Audit Dates	Audit Requirement	Results
B1	2/22-25 1972	Program Implementation & Adequacy	10 Findings Constant follow-up by PP&L with closeout on 11/21/74
B116	9/20-23 1976	Bechtel/GE Design Interface	3 Findings Final closeout 12/21/77
B129	2/13-16 1978	Program Implementation & Adequacy	6 Findings Final closeout 9/29/80
B138	6/4-7 1978	Mechanical Calculations	5 Findings involves 44 Calc. Packages requiring corrective action. All items open. Per letter dated 12/21/81 from Walter J. Rhoades, Nuclear Group Leader - PP&L to H. F. Lilligh, Bechtel. These will remain open until PP&L review of final design calcs. as part of Engineering Turnovre Program (ETO).

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Audit No.	Audit Dates		Audit Requirement	Results
B140	7/30-8/2	1979	Civil Calculations	2 Findings - extensive in content concerning calculation clarity and calculation completeness pending ETO review as B138 above. Note for B138 and B140. PP&L Nuclear Plant Engineers to perform ETO.
B146	2/25-28	1980	Bechtel Field Instructions	5 Findings Closeout 3/24/81
B147	2/25-28	1980	ASME Section III Pipe Support Design	7 Findings Closeout 3/24/81
B148	3/17-21	1980	Review/Approval of Supplier Engineering Docs.	10 Findings 5 Closeout 5 Open with partial acceptance by PP&L. Follow-up audit by PP&L being accomplished.
B150	7/28	1980	Design Change Packages and Configuration Control	11 Findings Final closeout 8/18/81
B151	9/28-31	1980	ASME Piping & Hanger Design	14 Findings Final Closeout 8/18/81
B156	2/18-19	1981	Implementation of Completed Checklists and Component Data Sheets	5 Findings 2 Closeout 3 Open as of 4/29/82
B158	5/19-21	1981	FSAR Table 3.11-6 Design Basis Calcs.	6 Findings 6 Open items as of this review. Note: Per PP&L letter PL1-14858, HVAC system design review to be done by independent design audit by "off project Bechtel and PP&L personnel" scheduled for week of 9/21/81. (No evidence in audit file). Bechtel completed response to 6 findings not accomplished until 11/4/81.

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Audit No.	Audit Dates	Audit Requirement	Results
B159	3/16-15 1981	Configuration Control Change Control	6 Findings 3 Closed 10/14/81 3 Open as of this audit.
B160	6/22-25 1981	Verify As-Built Drawing Design Per Bechtel EPM Procedures	20 Findings 17 Closed 3 Unresolved as of this audit.

TES Auditor Conclusions

All of the listed audit files were reviewed to determine that all audit findings were reported, corrective action was accomplished or is being accomplished and all findings were closed.

The following observations were made by the TES Auditor.

1. All audits were conducted on schedule in accordance with the Audit Plan.

2. Audit findings were followed up until final closeout.

3. Audits which still have open items are being followed up regularly, persuant to final closeout.

4. The PP&L corrective action log was up to date.

5. All auditing personnel involved were certified by training and examination.

It is the opinion of the TES Auditor that PP&L QA Program Audits are adequately implemented and effectively performed and documented in accordance with codes, standards and regulatory requirements.

Donald Messinger

Donald Messinger, Lead Auditor
Quality Assurance Supervisor
Teledyne Engineering Services

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TRIP REPORT NO. 1457
PROJECT 5599
VISIT TO BECHTEL
SAN FRANCISCO, CALIFORNIA
MAY 10, 11, 12, 13 1982

PURPOSE: TES review of the Bechtel Quality Audit System to determine the control and implementation of Bechtel's Quality Assurance Program and to verify the effectiveness of corrective actions for audit findings. Bechtel is a main supplier of engineering and analytical services to Pennsylvania Power & Light, for the design of Piping Systems and Pipe Supports.

PRE-AUDIT CONFERENCE

A Pre-Audit conference was conducted at Bechtel on May 10, 1982 with Mr. John Blomquist, lead Q.A. Engineer and Mr. Allan Jorgensen, Q.A. Engineer. The TES Auditor (D. Messinger-Q.A. Supervisor) stated the purpose of the audit and the necessity for the independence of TES in this activity and therefore the TES report of any findings observations or comments would not be discussed with Bechtel during the audit or presented for comments and discussion at an exit meeting upon completion of the audit. Mr. Messinger also stated that the scope of this Independent Design Review applied to the Susquehanna Steam Electric Station, and in particular, to the Main Feedwater Line design control audits, if this could be distinguished in the audits performed by Bechtel.

It was agreed that the TES Auditor would make an in depth review of Bechtel Internal Audits and then determine the extent of review required. It was decided that Mr. Jorgesen would serve as the interface with the TES Auditor, in the event that, during the performance of the review, some discussion might be necessary for better understanding of the Bechtel Audits, correspondence or reports that might be included in the files.

TES INDEPENDENT REVIEW ACTIVITY

The following Bechtel Audit Plans were reviewed by the TES Auditor and were used as the basis for the scope of this task:

(a) Quality Audit System Rev. 3-D Dated 3/6/81
(b) Supplier Quality Audit Program Rev. 1-C Dated 10/16/78
(c) Quality Audits By Quality Assurance Management Rev. 4-C Dated 2/17/79
(d) Project Quality Assurance Audits Rev. 2-E Dated 5/19/80

The TES Auditor reviewed the Bechtel Audit files and selected several audits based on the activity audited. These audits were reviewed to determine conformance with the planned schedule, adequacy of the audit questions to the activity involved, identification of findings, observations, comments, request for corrective action, acceptance by Bechtel of corrective action and follow-up audits until satisfactory closeout of the corrective actions was accomplished.

Following is a list of the Bechtel Audit files that were reviewed by the TES Auditor:

Audit No.	Audit Date	Audit Requirements	Results
1	8/14/72	Calculations	6 findings-constant follow-up-closeout 3/13/73
5	12/29/72	Design Dwgs & Specs.	2 findings-closeout 2/16/73
13	11/20/73	Design Deficiency Processing	3 findings-closeout 2/5/74
17	3/25/74	Control Systems	0 findings-acceptance 4/8/74
24	8/21/74	Vendor Q.A Manuals	18 checklists-one checklist not signed-not dated-no reference to discipline being audited, 20 findings-follow-up constant-closeout 2/7/75
15-2-1	8/22/75	Disposition of NCR's	0 findings-acceptance 9/11/75

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Audit No.	Audit Date	Audit Requirements	Results
4-2-1	2/18/75	CAR Control	3 findings-following closeout 9/2/75
3-11-1	8/18/75	Nuclear Piping Systems	6 Design Specs. reviewed-1 finding-closeout 2/6/76
3-2-1	5/30/75	Project Engineering Design Calcs.	8 calc. packages reviewed 6 findings-5 closeout on 8/22/75-one closeout on 11/13/75
3-4-1	5/22/75	Project Engineering Design Interface	2 findings-one closeout on 6/2/75-one closeout on 8/14/75
15-2-2	5/28/76	NCR's	0 findings-acceptance 6/1/76
3-10-3	8/13/76	Material Requisition	0 findings-acceptance 8/19/76
6-1-5	9/14/79	Supplier Document Evaluation	176 Documents reviewed-0 findings acceptance 9/14/79
3-9-5	12/23/77	Processing FCR's	Approx. 1200 entries, 250 entries reviewed one finding-closeout 2/16/78
3-3-6	8/10/79	Project Specifications	0 findings-1 observation corrected during audit-acceptance 8/13/79
3-6-5	8/16/79	Design Deficiency Processing	one finding-closeout 9/13/79
3-11-4	5/8/78	Design of Nuclear Piping	20 specs reviewed-0 findings acceptance 5/31/78
3-12-P-4	5/25/78	Pipe Supports, Hangars, Restraints	Dwgs, Iso's, Specs, Calcs. reviewed-0 findings
3-4-6	11/3/78	Design Interface Routing Slips for coordination of Bechtel vendor documents	Routing logs reviewed 230 Routing Slips 0 findings-acceptance 11/6/78
3-7-6 3-8-6	10/31/78	Engineering Dwgs and DCN's	90 Dwgs & 180 DCN's reviewed-1 finding-closeout 12/7/78
3-1-6	1/18/80	Design Criteria added & reviewed criteria to FSAR	13 FSAR Change Notices reviewed 0 findings-acceptance 1/22/80 (Note: Some cover sheets reference SAR, some reference FSAR

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Audit No.	Audit Date	Audit Requirements	Results
3-6-6	8/11/80	Design Deficiency Processing	2 findings-continuous follow-up-closeout 12/1/81
3-2-9	9/24/80	Design Calcs.	4-findings-continuous follow-up-closeout 12/18/80
3-8-9	11/21/80	Engineering Dwgs and Dwg Change Notices	3 findings-continuous follow-up-closeout 9/16/81
3-9-8	12/12/80	Field Change Requests	2 findings-continuous follow-up-closeout 1/13/82
6-4-8	12/5/80	Supplier QA Program Selection & Eval.	10 Supplier QA Manuals reviewed-0 findings-acceptance 12/5/80
3-12-7	2/20/81	Design & Procuremnt Pipe Supports, Hangars, Restraints	38 Documents reviewed 1 finding-closeout 7/20/81
30-6-2	9/30/81	Design Change Package	200 Documents reviewed-2 findings-QAF #2 closeout 12/2/81 -QAF #1 still open, pending resolve by Project Engr.
30-10-2	12/30/81	Large & Small Pipe As Builts	5 small pipe & 5 large pipe As-Built Packages reviewed 3 findings QAF #1 & #3 close-out 2/23/82 QAF #2 still open-completion data was scheduled for 2/19/82-no response yet.
3-2-13	4/23/82	Design Calcs.	30 "Q" designated calcs. reviewed plus 50 calcs. checked for filming & indexing-6 findings QAF #6 completed & closeout 5/6/82-remaining five are still open-response due 4/30/82-not received yet.
3-6-8	2/26/82	Design Deficiency Processing	45 reviews made-one finding closeout 4/8/82
30-6-3	4/16/82	Design Change Package	Approx. 250 areas reviewed-0 findings-acceptance 4/16/82
3-3-1	4/25/75	Project Engineering Specs.	38 Specs. reviewed-3 findings-QAF #1 closeout 7/8/75-QAF#3 closeout 8/26/75-QAF #3 closeout 9/28/75

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Audit No.	Audit Date	Audit Requirements	Results
3-7-1	4/18/75	Project Engineering Dwgs.	132 Documents-0 findings-acceptance 4/18/75
9-11-6	6/13/80	Nuclear Piping System	20 Specs Reviewed-0 findings acceptance 6/13/80
3-4-10	11/3/81	Design Interface	290 items reviewed-0 findings acceptance 11/5/81
7-2-1	1/21/75	EPM-Project	5 findings-continuous follow-up-closeout 8/25/75 (Note: No cover letter in audit package signifying final closeout of audit)
OE-273	6/9/81 6/10/81	Vendor Audit (Cygna-EES)	3 findings-2 closeouts. One open finding not approved by Bechtel as yet.
OE-284	11/17/81-11/19/81	Vendor Audit (URS/JA BLUME)	2 findings-CAR's responded-but not approved by Bechtel as yet.

The qualifications & certifications of all auditors, involved in the above listed audits, were reviewed, twelve of the auditors records were satisfactory, one auditor (E. Y. Wong) had no record of examination in his file and there was no record of one auditor (A. Zimmerman) in the file at all. Mr. Zimmerman performed his audit in 1972. The prerequisite of certification did not become effective until 1974 per ANSI/ASME.

TES AUDITOR CONCLUSIONS

All of the listed audit files were reviewed to assure that audit findings were identified & reported, corrective action was accomplished or is being followed up and open items (findings, observations, comments) are resolved & closedout.

The following observations were made by the TES Auditor:

1. All audits reviewed were conducted on schedule in accordance with the Audit Plan.
2. Audit findings were followed up until final closeout.
3. Audits which still have open items are being followed up regularly.

4. The Bechtel Audit log is properly maintained & updated to reflect open audits & final closeout of audits.

5. Although corrective actions are not always responded to within the Bechtel requested response time, surveillance & follow-up to closeout of findings is properly monitored.

It is the opinion of the TES Auditor that the Bechtel Q.A. Audits are effectively implemented, performed & documented in accordance with Codes Standards and regulartory requirements.

As it had previously been determined at a meeting with PP & L and Bechtel in March 1982, supplies of Engineering & Analytical services had been used by Bechtel, to perform some design calculations on the SSES Project. The TES Auditor, therefore, requested Bechtel to contact; (1) Cygna Energy Services & (2) URS/JA BLUME & Associates, the two companies that supplied these services; and arrange for him to perform a review of their Q.A. Auditing Program & Audits. Arrangements were made by Jack Blomquist for the TES Auditor to perform these reviews on May 12 & May 13.

On May 12, 1982, the TES Auditor & Mr. Tarek E. Emera, Design Plant Coordinator for Bechtel went to Cygna Energy Services.

A pre-audit conference was held at Cygna, with Mr. Paul D. DiDonato, Q.A. Operations Supervisor, Mr. Raymond E. Hamati, Project Manager & Mr. Robert A. Falcioni, Vice President in attendance. Mr. Emera served as the interface between the TES Auditor and Cygna personnel.

The TES Auditor again stated the purpose of the audit & the necessity for TES independence during & upon completion of the review. Mr. Paul DiDonato served as the interface with the TES Auditor.

After reviewing the Cygna audit files, the TES Auditor selected to review all the audits that had been presented to him.

Following is the list of Cygna Audits that were reviewed by the TES Auditor, for conformance to planned schedule, adequacy of audit questions to the activity involved, identification of findings & observations, request for

corrective actions was accomplished.

Audit Date	Requirement	Findings
4/8-11/80	NQAM Rev. 5 Sections 2,3,4,5 Program Implementation	12 findings-11 findings closeout by 8/28/80 QAF #4 still open-completion due 6/82
5/21-22/81	NQAM No.Ref. to Rev. of Sections Calc. Benders	1 finding-closeout 6/2/81
10/13-17/81	NQAM Rev. 6 Sec III	0 findings-accepted
3/9-11/81	verified computer program	5 findings-closeout by 10/29/81 extensions beyond 30 days requirement requested & granted.
5/5/81	Calc. Preparation & computer application	1 finding-closeout 11/17/81
9/3/81	Calc Preparation	2 findings-closeout 11/17/81
10/9/81	calcs, computer output & project files	0 findings-accepted
9/3-4/81	Project Files Calcs Design Verification Computer Binders	15 findings-closeout 10/9/81
9/3/81	Files, Calcs Binders for As-Built Piping Review & Re-Analysis	4 findings-closeout 11/10/81

The audits referenced the requirement source but only, in some cases, that it was the NQAM-no revision or section reference.

The TES Auditor also checked the qualifications certifications of the Auditors involved & found that Mr. S.J. Strati & Mr. P.D. DiDonato were certified by oral exam. Mr. DiDonato had been certified by written examination prior to employment with Cygna & provided the TES Auditor with evidence to that effect.

The TES Auditor found the Cygna Q.A. Audit Program was adequately implemented, performed & documented with results reported, corrective action taken & audit findings & observations closed. Open items are still under surveillance audit follow-up.

On May 13 the TES Auditor again met with Mr. Tarek E. Emera of Bechtel & went to the offices of URS/J.A. BLUME. Mr. Emera served as the interface between the TES Auditor & URS/BLUME. The pre-audit conference was held with the following URS/BLUME personnel:

Mr. Ajay R. Shah, Project Manager
Mr. Philip W. Wong, Project Manager
Mr. Jeffrey L. Egeberg, Manager-Equipment & Piping
Ms. Nancy Aden-Gleason, Quality Assurance Manager

The TES Auditor, as at Bechtel & Cygna Energy Services, stated the purpose of the audit & the necessity for TES independence in this activity.

It was agreed that the Q.A. Manager for UTS/BLUME, Ms. Aden-Gleason would be the interface with the TES Auditor in the event of the need for clarification of any URS/BLUME audit documents.

The following list of audits were reviewed by the TES Auditor to determine conformance to a planned schedule, adequacy of audit checklist to the activity audited, identification of discrepencies, request for corrective action, corrective action taken & surveillance audits until satisfactory closeout of corrective actions.

Audit No.	Audit Date	Audit Requirement	Results
8103-1	3/13-17/81	criteria, interface control, design Reviews, Calcs. computer programs, Dwgs(Piping Analysis & stiffness calcs.)	3 findings-closeout 4/9/81
8103-2	5/12/81	Same	0 findings-accepted 5/12/81 (Note: The checklist doesn't always reference "not applicable" when audit checklist question does not address applicable activity

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Audit No.	Audit Date	Audit Requirement	Results
8103-3	9/15-21/81	Same	2 findings-closeout 10/30/81 (Note: Audit checklist requires sign off by audit team members per QAM Ref. 6.1 (c) 4th. Par. This is not always done on checklists, some pages signed by only one auditor-some pages not signed at all.
8103-4	7/16-21/81	Piping Analysis	2 findings-closeout 10/2/81
8103-5	4/27-28/82	Piping & Pipe Support work prior to transfer D.C	0 findings-accepted 4/28/82 (Note: Same person initialed checklists for both auditors.

The TES Auditor also reviewed several Design Review Calcs. (Stiffness & Maximum Load Capacity Calcs) for completions. The attached review list did not always reference by ID number the calcs to be reviewed in each calculation package.

REVIEW OF ALL AUDITS AT URS/JA BLUME

All audits were conducted on schedule and were in accordance with the audit plan.

The TES Auditor found all the URS/BLUME audits done on the SSES Project (8103) were completed & closed out.

It is the opinion of the TES Auditor that the URS/BLUME Q.A. Audit program was adequately implemented, performed & documented & in accordance with codes, standards & regulatory requirements.

Donald Messinger

Donald Messinger, Lead Auditor
Quality Assurance Engineer
Teledyne Engineering Services

DM:cbw
attachments
1 - DFL
1 - Trip Report File
1 - DM
1 - QA Project File
1 - RAE

The TES Auditor found the Cygna Q.A. Audit Program was adequately implemented, performed & documented with results reported, corrective action taken & audit findings & observations closed. Some items are [illegible] surveillance audit follow-up.

On May 13 the TES Auditor again met with Mr. Frank G. Moore of Cygna & went to the offices of UES/Cygna & UES/BLUME. A pre-audit conference was held between the TES Auditor & UES/BLUME. The pre-audit conference was held with the following UES/BLUME personnel:

Mr. Alay R. Shah, Project Manager
Mr. Philip W. Wong, Project Manager
Mr. Jeffrey L. Epperg, Manager-Equipment & Piping
Ms. Nancy Adler-Nielson, Quality Assurance Manager

The TES Auditor, as at Bechtel & Cygna Energy Services, stated the purpose of the audit & the necessity for TES independence in this activity.

It was agreed that the Q.A. Manager for UES/BLUME, Ms. Adler-Nielson would be the interface with the TES Auditor in the event of the need for clarification of any UES/BLUME audit documents.

The following list of audits were reviewed by the TES Auditor to determine conformance to a planned schedule, adequacy of audit checklist to the activity audited, identification of discrepancies, request for corrective action, corrective action taken & surveillance audits until satisfactory closeout of corrective actions.

Audit No.	Audit Date	Audit Requirement	Results
8103-1	3/13-17/81	criteria, interface control, design Reviews, Calcs. computer programs. Dwgs(Piping Analysis & stiffness calcs.)	3 findings-closeout 4/9/81
8103-2	5/12/81	Same	0 findings-accepted 5/12/81 (Note: The checklist doesn't always reference "not applicable" when audit checklist question does not address applicable activity

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TRIP REPORT 1473

Project 5599
Visit to Bechtel Power Corporation
San Francisco, CA
June 14-16, 1982

The purpose of this trip was to meet with Bechtel to determine what process was being used in taking design requirements and developing construction drawings. The methods of making revisions to the design and the interfaces between internal and external organizations were also being determined and reviewed.

Monday afternoon, June 14, 1982, Teledyne employees, R. A. Enos and W. J. McBrine arrived at Bechtel Power Corporation and were met by Dr. L. Memula. The agenda for the visit was discussed and the interviews with Bechtel personnel were set up.

A list of all of the Bechtel employees interviewed by TES on this visit is attached as Attachment 1.

A list of all of the Bechtel documents reviewed on this visit is attached as Attachment 2.

A list of documents TES received from Bechtel, to take with them for final review is attached as Attachment 3.

A writeup which summarizes each of the seven interviews between TES and Bechtel is included below. The documents listed in Attachment 2 were reviewed during these interviews to verify the implementation of the design process.

TES Interview No. 1 with the Plant Design Group

Bechtel, Raj Perekh, Plant Design Group Supervisor
Bechtel, Dr. L. Memula, Plant Design Deputy Group Supervisor

Bechtel had two external organizations, EES and URS/Blume, perform support design reviews and adequacy calculations under their supervision. The interfaces used between Bechtel and these two companies were as follows:

a. Bechtel would issue a Package/Instruction form to the external organization. This form would address the company as to what action was required and the quantity of work to be done under this technical contract. Attached would be all of the necessary documents, drawings and loadings to perform the work.

b. Bechtel procedures would be used to perform the work.

c. Bechtel did the actual support designs and the external organization would calculate the capacity and adequacy of the supports.

d. The external organization would issue a transmittal to Bechtel at the completion of the work under this contract. The transmittal would state the subject of the work; reference the Bechtel calc. no. and job no.; also reference its own calc. no. and job no.; and indicate what information was sent to them by Bechtel and that it was being returned with the work performed by the external organization.

e. These external organizations would not have any authority to make field change requests (FCR's) as they have no field involvement.

f. These external organizations would not have any authority to produce Engineering Changes Notices (ECN's); Bechtel controls all design changes.

g. External organizations use the standard reporting procedures for reporting non-conformances in design procedures and specifications, etc. to Bechtel and the NRC.

Bechtel keeps a log of where each calculation package is at all times.

The Pipe Support Group Leader at Bechtel reviews and approves all calculation packages done by EES or URS/Blume as if they were done at Bechtel.

TES Interview No. 2 with the Mechanical Group

Bechtel, Robert Karcher, Balance of Plant Group Leader

After all of the site characteristics and preliminary system studies have been completed, Bechtel puts together the PSAR. The Mechanical Group generates preliminary P&ID's for all of the systems. Susquehanna's systems are based on Limerick and Peach Bottom. All preliminary drawings are indicated by a letter revision, i.e., A, B, C, etc. The Mechanical Group performs preliminary sizing of system components based on heat balance and flow requirements. The Pipe Layout Group generates the preliminary system layout and then the Mechanical Group calculates the pressure drops, friction losses, etc. to size the piping for the system. Once the preliminary issue of the P&ID is approved by the client, the Mechanical Group issues Revision 0 to the Plant Design Group. Revisions to the P&ID are usually made at the request of the Pipe Layout Group or a FCN/FCR. An example: it may be required to change the P&ID because a tee with reduced branch line is not available and the field used a straight tee with a reducer on the branch. The changes are incorporated and Revision 1 issued after approval.

The Mechanical Group also generates the design specifications for the system pumps, heaters, heat exchangers, condensers, turbines, etc. for all major equipment. The specs. are generated in coordination with nozzle sizes and vendor requirements. The Mechanical Group does not generate the valve or piping design specifications.

Another item which the Mechanical Group generates is a functional description of each system in the plant. This is a short writeup which addresses where the system starts and ends, whether the system carries water steam or air, and when the system functions.

Eventually, as systems are finalized, the FSAR is put together by Bechtel.

TES Interview No. 3 with the Pipe Layout Group

Bechtel, Robert Foussat, Plant Design Pipe Layout Group Supervisor
Bechtel, Laszlo Sebian, Plant Design Pipe Layout Group Asstistant Supervisor

The Pipe Layout Group receives the preliminary P&ID from the Mechanical Group and they start designing the system. The Pipe Layout Group issues a preliminary stress isometric to the Mechanical Group to do the pipe sizing calculations and revise the P&ID.

With the revised P&ID the Pipe Layout Group performs the following task:

I. Prepare and issue a separate sketch (SK-M) piping isometrics for fabrication and for stress analysis.

II. Issue the fabrication isometric to ITT Grinnel to make spool detail drawings. The fabrication iso is also issued to the field. The field marks the field weld locations and installation requirements on the fabrication isometric. Grinnel issues spool detail drawings to Bechtel for approval. Once the spool details are approved, Grinnel fabricates the spool pieces and has them shipped to the field.

III. After receiving an FCN or other change authorizing document from the field, or any other group, the stress and fabrication isometrics are revised. A blueline of the isometric is issued for coordination of all the groups. Once the blueline is approved, a mylar of the isometric is sent around to be signed off by the groups.

IV. Issue the mylar to the Stress Group and Pipe Support Group.

V. A wash-off mylar of the stress isometric is issued to the field to be marked up with field dimensions. The field issues on Field Construction Instruction, FCI, isometric of the system. This FCI, after approval by all groups, becomes the original stress isometric and supersedes all previous stress isometrics.

VI. A sepia of the FCI isometric is issued to all groups. Eventually, when the system is constructed with all the supports in place, a sepia of the revised FCI isometric will become the As-Built document.

When the FCI isometric is issued for engineering purposes, it is indicated in the revision box. Example, 4E1, the first number is the field revision number and the E1 stands for engineering first issue for hanger guidance. Sheet 3 of 3 of the FCI isometric for the feedwater system is an engineering sheet used to transmit support loads and data point movements. All sheets which pertain to engineering are deleted when the field issues the As-Builts.

When the field issues support drawings, it is indicated in the revision box. Example, 5F1, the first number is the field revision number and the F1 stands for field first issue of this revision. Once the final field issue of as-built has been approved by all groups, then the revision number remains along with no E or F.

TES Interview No. 4 with the Piping Group

Bechtel, Clyde Nichols, Plant Design Piping Engineering Group Supervisor

The Piping Group receives the P&ID from the Mechanical Group and issues the following:

I. Piping Class Sheets, based on the ASME Boiler and Pressure Vessel Code, Section III, Classes 1, 2 and 3. The piping class sheets contain the primary ratings and design data for: pipe, fittings, flanges, bolting, gaskets, joints and valves.

II. Piping Index Sheets, based on the systems in the plant. These piping index sheets contain the piping class, service description, cross-reference to a P&ID, radiation or not, seismic class, design rating for pressure and temperature, normal rating for pressure and temperature, maximum rating for pressure and temperature, insulation class, hanger critical (whether seismic required or not), C class or not, Q class or not, and revision number.

III. Valve and Piping Design Specifications, in coordination with the vendors.

The Piping Group issues a letter revision, A, B, C, etc. of the above document for approval by all groups and by the client. After approved by all, the documents are issued as Revision 0. The Instrument Group or the Mechanical Group can issue a DCR, Design Change Request, or other CAD, Change Authorizing Document, to initiate a revision which once approved by all would be issued as Revision 1, etc. Once all groups are satisfied and only a few revision are expected, the Final Piping Class and Index Sheets are issued as a package for the whole plant.

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TES Interview No. 5 with the Stress Group

Bechtel, Ben Arya, Plant Design Stress Group Leader

The Stress Group receives the P&ID and component spec's from the Mechanical Group, the (SK-M) stress isometric from the Pipe Layout Group, the valve drawings, valve spec's, piping design data and piping spec's from the Piping Group.

The Stress Group does a Class 2 and 3 analysis of the piping system and prepares a stress calculation package using standard stiffnesses for supports. Punched cards which contain forces, moments and data point movements for all load cases are generated. These punched cards with all of the design documents are given to the Class 1 group with a request to perform a Class 1 analysis and prepare a Class 1 Stress Report.

The Stress Group also generates a restraint summary which goes to the Pipe Support Group as a hanger guidance sheet. This restraint summary includes a stress isometric which indicates data points, restraint locations and type of restraints on it. Also, a 8½" x 11" computer summary sheet which tabulates for each restrained data point the forces, moments and movements for each load case.

The Stress Group transfers information pertaining to support location and type of support to the Pipe Layout Group which issues a preliminary revised SK-M drawing to the Pipe Support Group. The Pipe Support Group assigns numbers to the supports and then the Pipe Layout Group issues a revised SK-M to the Pipe Support Group. The Pipe Support Group attaches the pipe support detail drawings to the SK-M and gets both approved by the Stress Group.

The supports were modeled as rigids at first for the feedwater system, then Phase III of the program stated that after a support was designed, the stiffnesses of the support would be calculated and used in the analysis. If a

support was revised as a result of an FCN to the Pipe Support Group, then a revised stiffness calculation for that support would be issued to the Stress Group.

All updates to the design specifications, etc. would be handled by Document Control distribution.

TES Interview No. 6 with the Pipe Support Group

Bechtel, Henry Cruz, Plant Design Pipe Support Group Leader

The Pipe Support Group would receive from the Stress Group, the stress isometric with the 8½" x 11" restraint summary sheets, with data points, type of restraints, along with forces, moment, deflections and locations referenced on stress isometric. All load cases would be addressed on the restraint summary sheets so the Pipe Support Group could design the supports. Coordination of the Stress Group, the Civil Group and the Pipe Support Group for support design details was obtained by circulating a coordination print of each support detail to the various groups for signoff. Once the support detail was approved the mylar would be signed off by the groups and issued.

The support reactions would go to the Civil Group for approval. The Civil Group does their own calculations for the structure and then signs off the support details.

The Stress Group performs the initial analysis with standard stiffnesses and forwards the design loads to the Pipe Support Group. The Pipe Support Group designs the support and calculates the support stiffness to compare with the stiffness analyzed. The new support stiffness will be used in future reanalysis of the system by the Stress Group. The pipe support details are drawn up by the Pipe Support Group and revisions made by Field Change Request, FCR's or memos from the field, Stress Group, or Civil Group. Revisions go through the coordination print signoff and then the mylar gets signed off before issue of the revision.

The final As-Built support details are marked up in the field and issued under the field revision number, field first issue, example: Rev. 5F1. The As-Built Review Package, ABR Package, contains comparisons of the revision analyzed and the field issue revision. Either the drawings are the same and the field revision accepted as As-Built, or the drawings differ and the field revision is issued As-Built and a reconciliation calculation required in the ABR Package. Once accepted or reconciled, the support details are signed off by all groups and issued As-Built, engineering approved.

TES Inteview No. 7 with the Civil Group

Bechtel, Morten Renslo, Civil Group Area Leader for Reactor Building

The Civil Group receives the pipe support details with the reaction loads on the supporting structure from the Pipe Support Group.

The Civil Group records the support reactions on their Accumulative Civil Structural Drawing which summarizes all of the loads on each structure.

The load summary for a structure is used to prepare an adequacy calculation package for the structural steel and for the embedment into the concrete.

An overload of a structural member is addressed by the Civil Group rejection of the support. The overload is resolved by one of the following: modify the structure, modify the support or modify the analysis.

Once a pipe support drawing is accepted by calculation or by inspection of the Civil Group, the coordinating print of the support is signed off by the Civil Group. Later, the original mylar is signed off by the Civil Group and other groups, and then issued.

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The Civil Group is also responsible for issuing the seismic response spectra for the different building at the site.

The TES review team concluded their interviews with Bechtel at approximately 4:00 PM, June 15, 1982. The TES review team returned to Boston the following day, June 16, 1982.

Richard A. Enos
Assistant Project Manager

William J. McBrine
Project Engineer

alt

attachments

cc: Trip Report File
D. F. Landers
D. Messinger
Document Control

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ATTACHMENT 1

List of Bechtel Employees Interviewed by TES

Raj Parekh, Plant Design Group Supervisor
Dr. L. Memula, Plant Design Deputy Group Supervisor
Robert Foussat, Plant Design Pipe Layout Group Supervisor
Laszlo Sebian, Plant Design Pipe Layout Group Assistant Supervisor
Clyde Nichols, Plant Design Piping Engineering Group Supervisor
Ben Arya, Plant Design Stress Group Leader
Henry Cruz, Plant Design Pipe Support Group Leader
Morten Renslo, Plant Civil Group Area Leader for Reactor Building
Robert Karcher, Plant Mechanical Group - BOP Group Leader

ATTACHMENT 2

Documents Reviewed by TES

1. Spec. 8856-M-209, Rev. 3 - Technical for Pipe Supports Hangers and Restraints.
2. Spec. 8856-M-205, Rev. 6 - Technical for Field Fabrication and Installation - Conventional Steam and Service Piping.
3. Spec. 8856-M-196, Rev. 1 - Guidelines for Access for In Service Inspection.
4. Spec. 8856-M-236, Rev. 3 - Piping System Erection Fitup Control Requirements.
5. Spec. 8856-C-84, Rev. 3 - Technical for Furnishing and Installation of Grouted In Anchors.
6. Spec. 8856-C-72, Rev. 7 - Technical for Furnishing and Installation of Expansion Anchors.
7. Spec. 8856-C-8, Rev. 10 - Placing Finishing, Forming and Curing of Concrete.
8. Spec. 8856-C-7, Rev. 11 - Furnishing and Delivering of Concrete.
9. Susquehanna Pipe Support Standard, Rev. 5 Job No. 8856.
10. Susquehanna Job 8856 As-Built Package ID ABR-876, Book 1 of 4.
11. Susquehanna Job 8856 As-Built Package ID ABR-876, Book 2 of 4.
12. Susquehanna Job 8856, As-Built Package ID ABR-876, Book 3 of 4.
13. Susquehanna Job 8856 As-Built Package ID ABR-876, Book 4 of 4.
14. Package/Instruction No. MB to Blume from Bechtel dated 7/28/81 (Review Pipe Supports for As-Built Loads).
15. Transmittal Letter Blume to Bechtel dated 8/18/81 (Return data sent by Bechtel and work done by Blume).
16. ME 101/H3 Restraint Load Summary, Feedwater, Problem 876 (Rev. 1).
17. Civil Coordination Prints DLA-102-H4, Rev. 5, Sheets 1 through 4.
18. Civil Coordination Prints DLA-102-H10, Rev. 3, Sheets 1 through 4.
19. Final As-Built Drawings DLA-102-H4, Rev. 5F1, Sheets 1 through 4.

ATTACHMENT 2 (CONTINUED)

20. Final As-Built Drawings DLA-102-H10, Rev. 3F1, Sheets 1 through 4.
21. Earlier Markup of Feedwater P&ID Dwg. M-106, Rev. 3.
22. Earlier Markup of Nuclear Boiler P&ID Dwg. M-141, Rev. 1.
23. Fabrication Iso Dwg. DBA-108-1, Rev. 4 with three spool (feedwater) piece drawings DBA-108-1-1, DBA-108-1-3, and DBA-108-1-4.
24. Piping Class Sheets for SSES, Unit 1, Computer Listing.
25. Piping Index Sheets for SSES, Unit 1, Computer Listing
26. Stress Isometric, SK-M876, Rev. K.

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ATTACHMENT 3

Documents Received from Bechtel

1. Final (Signed Off) Stress Report - ASME Section III, Class 1 Analysis of the Feedwater Lines for SSES, Unit 1, Job No. 8856, Doc. No. SR8856-1500 (Rev. 1).
2. Susquehanna Pipe Support Standard, 8856, Rev. 5.
3. Susquehanna Unit 1, 8856, Final As-Built Review Calc. No. ABR-876, 47 sheets.
4. Drawing No. FCI-P49-876, Rev. 13, 2 sheets.
5. Pipe Support Drawings Package:
   DLA-102-H3, Rev. 3F1, 2 sheets
   DLA-102-H10, Rev. 3F1, 4 sheets
   DLA-102-H11, Rev. 2/F3, 3 sheets
   DLA-102-H12, Rev. 3F1, 3 sheets
   DLA-102-H13, Rev. 3F1, 2 sheets
   DLA-102-H1, Rev. 7F1, 3 sheets
   DLA-102-H2, Rev. 2F2, 5 sheets
   DLA-102-H4, Rev. 5F1, 4 sheets
   DLA-102-H5, Rev. 4F2, 4 sheets
   DLA-102-H6, Rev. 3F1, 3 sheets
   DLA-102-H7, Rev. 6F1, 3 sheets
   DLA-102-H8, Rev. 2F2, 4 sheets
   DLA-102-H9, Rev. 3F2, 4 sheets
   DLA-102-H14, Rev. 2F1, 3 sheets
   DLA-102-H15, Rev. 3F1, 2 sheets
   DLA-101-H1, Rev. 5F2, 5 sheets
   DLA-101-H2, Rev. 5F2, 4 sheets
   DLA-101-H4, Rev. 6F1, 4 sheets

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. [illegible]
DATE Aug 13, 82

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES

TRIP REPORT 1475

PROJECT 5599

VISIT TO SUSQUEHANNA STEAM ELECTRIC STATION UNIT 1
BERWICK, PA

JUNE 24, 1982

Thursday afternoon, June 24, 1982, Teledyne employees, E. A. Solla and E. K. Woods arrived at the SSES site and were met by Bob Saccome of PP&L. The purpose of this trip was to verify open items which are still open and resulted from the previous field walkdown.

We inspected support DLA-101-H2 to see that the travel stops were removed and they were. We checked the dimension between Nodes 55 and 51 and came up with a new dimension of 9'-11 7/8". We also inspected five snubbers to determine the angle at which the snubber was installed. The results are shown in Attachment 1.

We left the site Thursday afternoon and flew back to Boston that evening.

Eric A. Solla
Project Engineer

Eric K. Woods
Assistant Engineer

alt

cc: Trip Report File
D. F. Landers
R. A. Enos
D. Messinger

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ATTACHMENT 1

SNUBBER LIST

Snubber Mark No.	New Angle Measured
DLA-102-H8	8.67^{o}
DLA-101-H1	23.99^{o}
DLA-102-H2	36.58^{o}
DLA-102-H9	45.1^{o}
DLA-102-H10	51.72^{o}

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

APPENDIX 2

PROJECT PROCEDURES

TELEDYNE
ENGINEERING SERVICES

PROJECT QA PROGRAM

Project No. 5599 Project Manager D. F. Landers
Initiated On 3/19/82 REV 2 Date 7/14/82
Client Pennsylvania Power and Light - Susquehanna

PROJECT SCOPE

Provide an Independent Design Review of the Main Feedwater Line from Penetration X-9A at elevation 753'-7" to reactor pressure vessel nozzles N4D, N4E, and N4F at elevation 773'-10½". This review shall encompass the structural and mechanical aspects of this system only.

Applicable Sections of the TES QA Manual dated 3/80 are: 1, 2, 3, 5, 6, 15, 16, 17, 18

REVISION LEGEND

Revision	Date	Changes in Section
0	3/22/82	Initial Issue
1	6/17/82	Attachment 1
2	7/14/82	1.1

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599 RAE
DATE 7.27.82

REVISION APPROVAL

Project Manager D.F. Landers Date 7/14/82
EA Manager [illegible] Date 7/20/82
QA Manager [illegible] Sprangus Date 7/20/82

NOTE: The following paragraphs are numbered to correspond to the TES QA Manual.

1.0 PROJECT ORGANIZATION

1.1 TES Organization

Project Manager: D.F. Landers
Assistant Project Manager: R.A. Enos
QA Engineer: D. Messinger

Project Review
Internal Committee: J.A. Flaherty, Chairman
10 CFR Part 21 Committee: R. Wray, Chairman

1.2 Client Organization

Project Manager: Dale Sattar
Contractual: James Kenney
Quality Assurance: R. Schuan

1.3 Interfaces

	TES	PP&L	Bechtel
Project Manager:	D.F. Landers/ R.A. Enos	Walter Rhodes/ Dale Sattar	Dr. L. Memula
Contractual:	W.S. Moonan	James Kenney	N/A
Quality Assurance:	D. Messinger	Richard Schuan	J. Bloomquist
Technical Data:	D.F. Landers/ R.A. Enos	Charles Dvorscak	

1.4 Project Document Distribution

Controlled Document Distribution: The following personnel at TES are authorized to withdraw RECORD COPY from Document Control. (This is an exception to SQAP-81-01, Section 3.3(d).)

D.F. Landers
R.A. Enos
D. Messinger

Report Distribution: D.F. Landers/R.A. Enos (TES)

2.0 PROGRAM

2.1 Client Requirements

No additional requirements to TES QA Manual.

[illegible]

2.2 TES Requirements

This Project QA Program, latest revision, constitutes the QA requirements for Susquehanna Steam Electric Station Independent Design Review Program for the Feedwater system.

2.3 TES Quality Assurance Manual Applicability

Quality Assurance activities 1, 2, 3, 5, 6, 15, 16, 17, and 18 apply as supplemented by this PQAP.

2.4 Implementation

TES Engineering Procedure EP-1-015, "TES Project Plan for Independent Design Review of Susquehanna Steam Electric Station Feedwater System", latest revision, defines the plan for implementation.

2.5 Indoctrination

Each TES employee assigned to this project shall complete and sign a copy of Attachment 1. These documents shall become QA Records.

3.0 DESIGN CONTROL

Any calculations or analysis performed by TES and used to substantiate a TES conclusion shall be subject to the checking, verification and design control requirements of the TES QA Manual. 1

5.0 PROCEDURES, INSTRUCTIONS AND DRAWINGS

5.1 General

No additional requirements to TES QA Manual.

5.2 Supplementary

In implementation of the requirements, the revision identified by EP-1-015 applies as do:

TEP-1-001, Revision 2	"Initiation, Approval, Implementation, Revision and Control of TES Procedures and Engineering Instructions"
TEP-1-002, Revision 2	"Guidelines for Writing TES Engineering Procedures"
EP-1-016, Revision 0	"Reporting of 10 CFR 21 Offenses"

EP-5-004, Revision 0 "Method of Determination of As-Built Configuration of Feedwater System Penetration X-9A to RPV Nozzle N4D, N4E, and N4F, Susquehanna Steam Electric Station"

6.0 DOCUMENT CONTROL

6.1 General

The requirements of the TES QA Manual apply except as modified by TES SQAP 81-01, Revision 0, and this PQAP.

6.2 Controlled Documents - TES Generated

Except for telecons, minutes of meetings, trip reports, and memoranda, all documents developed by TES shall be controlled documents.

6.3 Controlled Documents - Client Generated

PP&L documents shall be transmitted to:

Teledyne Engineering Services
Project 5599
130 Second Avenue
Waltham, MA 02254

Attention: Document Control

6.4 Personnel statements regarding potential or apparent conflicts of interest by TES employees shall be retained by the TES Personnel Relations Manager.

6.5 All PP&L documents received for the performance of the tasks and TES generated documents shall be returned to PP&L six months after submittal of final report.

15.0 NONCONFORMING MATERIAL OR ITEMS

15.1 TES Activities

No additional requirements to TES QA Manual.

15.2 External Activities

The reporting procedure of EP-1-015 apply.

16.0 CORRECTIVE ACTION

16.1 TES Activities

No additional requirements to TES QA Manual.

16.2 External Activities

The reporting procedures of EP-1-015 apply.

17.0 QUALITY ASSURANCE RECORDS

The requirements of the TES QA Manual apply and are implemented by the QA Records List (Attachment 2) which provides retention periods of no lesser extent than does ANSI/ASME NQA-1-1979. All QA Records will be returned to client six months after submittal of final report.

18.0 AUDITS

The requirements of the TES QA Manual apply as implemented by Attachment 3 of this PQAP.

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ATTACHMENT 1

TO: D.F. Landers, Project Manager
D. Messinger, QA Engineer

SUBJECT: Project 5599, Independent Design Review, Susquehanna Steam Electric Station: Project Indoctrination

I certify that I have read and understand, and that I will comply with, the following documents which control this project.

1. Project QA Program, Revision 1. △1

2. TES Engineering Procedure EP-1-015, "TES Project Plan for Independent Design Review of Susquehanna Steam Electric Station Feedwater System", Revision 2. △1

Signed: _____

Title: _____

Date: _____

[illegible]

TELEDYNE ENGINEERING SERVICES

ATTACHMENT 2

QA RECORDS REQUIREMENTS LIST

	TYPE			RETENTION PERIOD	
	CODE	CLIENT	PROJECT	BY OWNER	BY TES
I. CLIENT DOCUMENTS					
A. Specifications		X			6 months
B. Procedures		X			6 months
C. Drawings		X			6 months
D. Instructions		X			6 months
E. Other QA Manuals - PP&L/Bechtel		X			6 months
II. TES DESIGN DOCUMENTS					
A. Specifications					
B. Procedures			X		6 months
C. Drawings					
D. Instructions					
E. Analyses					
F. Design Reports			X		6 months
G. Reviews					
H. Other					
III. PERSONNEL QUALIFICATIONS					
A. Welders					
B. NDE					
C. QC Inspectors					
D. Other					
IV. EQUIPMENT QUALIFICATIONS					
A. Calibration					
B. Standards					
C. Other					
V. VENDOR REQUIREMENTS					
A. Personnel Qualifications					
B. Measurement/Test					
C. Procurement					
D. Other					
VI. TES DOCUMENTS					
A. Project QA Program			X		6 months
B. Special QA Procedures			X		6 months
C. Project Instructions					
D. NDE Reports					
E. Other					
VII. AUDITS					
A. Per Audit Plan			X		6 months
B. Vendor					
C. Other					

ATTACHMENT 3

1.0 INTERNAL AUDITS

1.1 On completion of Phase 1 (Preliminary Finding Report) the QA Engineer shall complete an appropriate Document Control Audit Checklist to verify that all TES requirements have been met.

1.2 During progress of Independent Design Review activity the QA Engineer shall perform an internal project audit of work in process. This audit shall be performed using a prepared checklist to cover the sign-off sheets, document control and requirements of the PQAP and TES Engineering Procedures.

1.3 Prior to project close-out the PQAE shall conduct a final project audit to assure the identification, accumulation and storage of Project QA Records and update of Project Personnel Training Records.

2.0 Upon completion of the QA Audit and documenting the results, the QA Engineer shall discuss his findings with the TES QA Manager and the Project Manager.

3.0 For this scope of work, all personnel performing QA auditing and assignments shall have been qualified per ANSI N45.2.23, 1978.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599 RAE
DATE 3.30.82

ENGINEERING PROCEDURE

EP-5-004

METHOD OF DETERMINATION OF AS-BUILT CONFIGURATION OF FEEDWATER SYSTEM (PENETRATION X-9A TO RPV NOZZLES N4D, N4E, AND N4F) AT SUSQUEHANNA STEAM ELECTRIC STATION

REVISION 0

PROJECT 5599

MARCH 22, 1982

Prepared by: D.F. Landers Date 3/30/82

Approved by: D.F. Landers Date 3/30/82
Project Manager

Reviewed by: Donald Messinger Date 3/30/82
Quality Assurance

TELEDYNE ENGINEERING SERVICES
130 SECOND AVENUE
WALTHAM, MASSACHUSETTS 02254
617-890-3350

TELEDYNE ENGINEERING SERVICES

ENGINEERING PROCEDURE

TITLE:	EP -5-004	PAGE 1
Method of Determination of As-Built Configuration of Feedwater System (Penetration X-9A to RPV Nozzle N4D N4E, and N4F) at Susquehanna Steam Electric Station	REV. 0 ORIG. DFL ENG. AS. [illegible] Q.A. [illegible] PROJ. MGR. DFL DATE 3-30-82	REV. ORIG. ENG. AS. Q.A. PROJ. MGR. DATE

SECTION	DESCRIPTION	REV.
1.0	SCOPE	
	This procedure describes the method to be used in determining the "as-built" configuration of Feedwater System Penetration X-9A to RPV Nozzles N4D, N4E, and N4F at Susquehanna Steam Electric Station. The purpose of this procedure is to obtain dimensional verification of portions of the Feedwater system to provide the independent reviewers (TES) sufficient data to verify that the design was properly implemented.	
2.0	APPLICATION	
2.1	References	
	a) TES Project QA Program, Project No. 5599.	
	b) TES EP-1-015, "TES Project Plan for Independent Design Review of Susquehanna Steam Electric Station Feedwater system.	
2.2	Equipment	
	For the equipment to be used in obtaining measurements required by this procedure, no formal calibration is required. However, only undamaged measuring tapes, scales, etc., shall be used.	
3.0	METHOD	
3.1	As-Built Data.	
3.1.1	The Lead Engineer shall obtain from Bechtel the as-built data package, following interface definitions described in Reference 2.1. All documents received shall be recorded on a document list, noting the revision and any applicable Engineering Changes Notices (ECN's) or other records of changes in	

TELEDYNE ENGINEERING SERVICES

ENGINEERING PROCEDURE

TITLE:	EP -5-004	PAGE 2
Method of Determination of As-Built Configuration of Feedwater System (Penetration X-9A to RPV Nozzle N4D N4E, and N4F) at Susquehanna Steam Electric Station	REV. 0 ORIG. DFL ENG. AS. MRR Q.A. DM. PROJ. MGR. DFL DATE 3-30-82	REV. ORIG. ENG. AS. Q.A. PROJ. MGR. DATE

SECTION	DESCRIPTION	REV.
	process. The data package shall contain any or all of the following: a) Piping isometric or physical drawings. b) Pipe support drawings. c) System flow diagrams (P.&I.D.). d) Equipment drawings (valves, pumps).	
3.1.2	Any documents denoting changes to the above items shall also be provided.	
3.1.3	The Lead Engineer shall request a representative selection of the above documents to begin the field verification.	
3.2	Field "As-Built" System Verification	
3.2.1	The Lead Engineer and other engineers performing the verification shall review the documents acquired under 3.1. The TES Project Manager shall review and approve the selection of personnel for the field verification.	
3.2.2	A general walk-down of the system shall be performed to familiarize TES personnel with the location, general layout, accessibility, and quantity of piping and pipe supports.	
3.2.3	The portion of the main Feedwater system outlined in 1.0 shall be verified. This implies that, as a minimum, the following shall be verified: a) Piping geometry 1) Type of fittings and location. 2) Location of valves and orientation. 3) Length and orientation of pipe.	

TELEDYNE ENGINEERING SERVICES

ENGINEERING PROCEDURE

TITLE:	EP -5-004	PAGE 3
Method of Determination of As-Built Configuration of Feedwater System (Penetration X-9A to RPV Nozzle N4D N4E, and N4F) at Susquehanna Steam Electric Station	REV. 0 ORIG. DEL ENG. AS. MR Q.A. SM. PROJ. MGR. DEL DATE 3-30-82	REV. ORIG. ENG. AS. Q.A. PROJ. MGR. DATE

SECTION	DESCRIPTION	REV.
	b) Support location and design. 1) Clearances 2) Support hardware - size of primary structural members, component standard part designations (part numbers), overall support configuration. c) Location and nature of pipe attachments, such as lugs, stanchions. d) Location and nature of any interferences which may inhibit pipe motion.	
3.2.4	Should some locations be inaccessable the Lead Engineer shall document this including reasons why and report this to the Project Manager.	
3.2.5	Photographs shall be taken where deemed necessary by TES personnel, to augment the field review, particularly in case of inaccessability.	
3.3	<u>Documentation</u>	
3.3.1	Each dimension and system characteristic checked shall be documented by TES personnel. A summary report shall be prepared and submitted to the TES Project Manager. The TES Project Manager, at his discretion, may request additional specific data.	
3.3.2	All data sheets shall be initialed and dated by the originator. All data shall be recorded in ink. Any errors/changes shall be lined-out and initialed.	
4.0	<u>RECORDS</u> The originals of all recorded data/photographs shall become project QA records.	

ENGINEERING PROCEDURE

EP-1-015

TELEDYNE ENGINEERING SERVICES PROJECT PLAN FOR INDEPENDENT DESIGN REVIEW OF SUSQUEHANNA STEAM ELECTRIC STATION FEEDWATER SYSTEM

REVISION 3

PROJECT 5599

JUNE 14, 1982

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599 RAE
DATE 72782

Prepared by: D.F. Landers Date 7/14/82

Approved by: D.F. Landers Date 7/14/82
Project Manager

Reviewed by: Donald Messinger Date 7/14/82
Quality Assurance

TELEDYNE ENGINEERING SERVICES

130 SECOND AVENUE
WALTHAM, MASSACHUSETTS 02254
617-890-3350

REVISION SUMMARY TABLE 1

Rev. No.	Section	Page	Description
1	3.4.2	2	Delete 2nd paragraph.
1	Enclosure (1) 3.11	8	Totally revise Task 10 - Reporting and the addition of the following four items: 1. Reviewer Reporting Form 2. Project Manager Resolution Form 3. Internal Committee Resolution Form 4. Review Log
1	Enclosure (1) 3.10	7	Delete 2nd paragraph.
2	EP-1-015 3.3.2	2	Added paragraph 2
2	EP-1-015 Enclosure (1)		Changed "Deficiency" to "Observation" where required.
2	" " 3.11.1		Changed definition (e) from Discrepancy to Observation.
3	Enclosure (1)	12	Personnel Change
		16	Personnel Change
		18	Personnel Change

TELEDYNE ENGINEERING SERVICES

ENGINEERING PROCEDURE

TITLE:	EP -1-015	PAGE 1
TES Project Plan for Independent Design Review of Susquehanna Steam Electric Station Feedwater System	REV. 0 ORIG. DFL ENG. AS. mwR Q.A. DM PROJ. MGR. DFL DATE 3-31-82	REV. ORIG. ENG. AS. Q.A. PROJ. MGR. DATE

SECTION	DESCRIPTION	REV.
1.0	SCOPE	
1.1	This Engineering Procedure provides the method to be used by Teledyne Engineering Services (TES) in performing the Susquehanna Steam Electric Station Feedwater System Independent Design Review Program under Project 5599.	
2.0	APPLICATION	
2.1	Enclosure (1) to this procedure contains the Project Plan for the Independent Review Program, including: a) Criteria b) Personnel responsibilities	
3.0	METHOD	
3.1	Independent Design Review Program	
3.1.1	Section 1.0 of Enclosure (1) describes the Independent Design Review Program Scope, including: a) Specific system to be reviewed. b) Exclusion of items and areas from review.	
3.1.2	The objective of the Independent Design Review Program conducted by TES is to determine the adequacy of the design process as it relates to service loadings of a specific system. That system is the Feedwater System, Penetration X-9A to RPV Nozzles N4D, N4E, and N4F. It is anticipated that this type of review would result in conclusions that are applicable to all work performed by the organizations subject to the review.	
3.1.3	The Independent Design Review Program includes ten tasks. Sec-tion 3.0 of Enclosure (1) describes the tasks in detail.	

TELEDYNE ENGINEERING SERVICES

ENGINEERING PROCEDURE

TITLE:	EP -1-015	PAGE 2
TES Project Plan for Indepedent Design Review of Susquehanna Steam Electric Station Feedwater System	REV. 0 ORIG. DFL ENG. AS. MAR Q.A. DM PROJ. MGR. DFL DATE 3/31/82	REV. 2 ORIG. DFL ENG. AS. MAR Q.A. SOL 6-15-82 PROJ. MGR DFL DATE 6/18/82

SECTION	DESCRIPTION	REV.
3.2	Project Organization	
	Section 4.0 of Enclosure (1) describes the TES project organization.	
3.3	TES Technical Efforts	
3.3.1	In general, TES will not perform any detailed analyses to arrive at conclusions. Review of existing analyses performed by the organizations involved will be sufficient and, further, will provide better insight as to the design of other plant systems for which they were responsible.	
3.3.2	Any calculations or analysis performed by TES and used to substantiate a TES conclusion shall be subject to the checking, verification and design control requirements of the TES QA Manual.	2
3.4	TES Reporting	
3.4.1	Section 3.11 of Enclosure (1) describes the TES reporting of the results of this project. This is Task 10 of the Project Plan.	
3.4.2	Task 9 of the Independent Design Review Program Plan of Enclosure (1) describes the Project Review Internal Committee. This committee will assess the impact of any potential findings on the overall design adequacy of the Feedwater System.	
4.0	RECORDS	
	All records shall be controlled in accordance with the PQAP.	

TELEDYNE ENGINEERING SERVICES

ENGINEERING PROCEDURE

TITLE:	EP -1-015	PAGE 3
TES Project Plan for Independent Design Review of Susquehanna Steam Electric Station Feedwater System	REV. 0 ORIG. DR ENG. AS. MAR Q.A. DM PROJ. MGR. DR DATE 3-31-82	REV. ORIG. ENG. AS. Q.A. PROJ. MGR. DATE

SECTION	DESCRIPTION	REV.
	Enclosure (1) to EP-1-015 TES Project Plan for the Susquehanna Steam Electric Station Feedwater System Independent Design Review	

1.0 INTRODUCTION

Pennsylvania Power and Light Company (PP&L) has been requested by the Nuclear Regulatory Commission (NRC) to obtain the services of an outside consultant to conduct an independent design review at the Susquehanna Steam Electric Station. The design review is limited to the Feedwater system for all applicable service levels excluding pipe break analysis and pipe whip restraint design. Electrical, instrumentation and equipment operational aspects which will be verified during preoperational and start-up testing are excluded, however the adequacy of these items to withstand specified seismic events is a part of this review.

The portion of the Feedwater system subject to the independent design review runs from penetration X-9A to RPV nozzles N4D, N4E, and N4F. Branch piping is excluded from the review, however the effects of any branch connection on the Feedwater line shall be considered.

2.0 PROGRAM PLAN OUTLINE

2.1 General

The final result of this independent review is to determine the adequacy of the design process as it relates to all applicable service levels of a specific system. It is anticipated that this type of review would result in conclusions that are applicable to all work performed by the organizations subject to the review. In general, the reviewer will not perform any detailed analyses to arrive at conclusions. Review of existing analyses performed by the organizations involved will be sufficient and further, will provide better insight as to the design of other plant systems for which they were responsible. This does not preclude the reviewer from performing any calculations and analyses that are deemed necessary.

The generation of dynamic spectra and the validation of computer programs utilized by the organizations involved is specifically excluded from review. The reviewer will accept dynamic spectra for the buildings involved as presented and will only assure that their application to the system is appropriate. It is assumed that any computer program used has already been subjected to proper validation and verification procedures.

2.2 Plan Outline

Essentially the reviewer will start with the final design package which is presented as being representative of the as-built system. From this point the reviewer will work back through the design process to the initial design assuring that interface control (internal and external) was applied.

The program is separated into 10 tasks as follows:

Task 1 - Design Process

Task 2 - Review Design Procedures

Task 3 - Review Interface Procedures

Task 4 - Review Implementation of Design and Interface Procedures

Task 5 - Determine As-Built Plant Configuration

Task 6 - Compare As-Built Documentation to Plant Configuration

Task 7 - Design Documents vs. FSAR Commitments

Task 8 - Review PP&L Audit Findings

Task 9 - Project Review Internal Committee

Task 10 - Reporting

3.0 PROGRAM PLAN IMPLEMENTATION

3.1 General

The following sections discuss the detailed implementation of each task outlined in Section 2.0 above. It is anticipated that some tasks will proceed in parallel while implementation of others will be dependent on completion of associated tasks. Terminology is used in the following task descriptions that may not be particular to Bechtel and/or PP&L. However, the intent is to define scope and method and terminology can be revised to suit the particular organizations involved.

3.2 Task 1 - Design Process and Control

The reviewer will meet with Bechtel to determine what process is used in taking design requirements and developing construction drawings. Further, the process of developing revisions to the design will be reviewed. Interfaces between internal organizations will be determined in following the process of:

a) specification of design requirements
b) development of preliminary design
c) piping analysis
d) support location and selection
e) support analysis
f) effect on building structure
g) equipment loading requirements
h) development of construction drawings
i) revisions to design

Interfaces between external organizations will be determined in following the process of:

a) transmittal of information to the external organization
b) review of procedures
c) review of design
d) transmittal of developed information to Bechtel organizations (i.e., loads on building structure, etc.)
e) dealing with Field Change Requests (FCR)
f) dealing with Engineering Change Notices (ECN)
g) dealing with nonconformance and associated corrective action.

The external organizations subject to review will include all design subcontractors to PP&L and Bechtel who performed work on the specific Feedwater system under consideration.

Based on the results of this discussion a design process flow chart indicating interfaces and required design procedures will be developed.

3.3 Task 2 - Review Design Procedures

Procedures, instructions and methods associated with developing the design of the Feedwater system will be made available to the reviewer. This will result in a list of procedures with associated descriptions which can be utilized with the results of Task 3 to develop a design process. The reviewer must become familiar with these procedures to assure that implementation was adhered to by the design organizations.

The compatibility of design procedures of all organizations (Bechtel and subcontractors) will be determined. If different procedures, instructions and methods were used by each organization to perform a similar task (i.e., support design) the review must ascertain that the results are acceptable using either technique.

The design procedures will be further reviewed to determine if they are representative of the design criteria established in the FSAR. A detailed review of the Design Specification will be performed to determine its acceptability with respect to the FSAR, the Code and other design requirements.

3.4 Task 3 - Review Interface Procedures

Using the design process determined in Task 1 and design procedures obtained in Task 2 the required interface procedures or instructions to implement those procedures will be determined. A review will then be made to determine if these interface procedures or instructions are available. The reviewer will become familiar with the interface or control procedures to assure that implementation was adhered to in the design process. The interface procedures in conjunction with the design procedures of Task 2 will allow the reviewer to develop a design process for comparison with that obtained in Task 1.

3.5 Task 4 - Review Implementation of Design and Interface Procedures

A detail review of the analyses, design and construction drawings and reports will be performed to determine if established procedures were adhered to. Information requiring transmittal to others will be reviewed to determine whether interface procedures were followed and whether the information was properly interpreted and applied. This will be particularly important in relation to communication of design requirements and information between all organizations involved.

All FCR's and ECN's applicable to the Feedwater system will be reviewed to determine if they were implemented properly in the design process including transmittal of changes in loading to all affected design groups.

All nonconformances and resulting corrective actions applicable to the Feedwater system will be reviewed to determine if they impacted design and were implemented properly in the design process.

3.6 Task 5 - Determine As-Built Plant Configuration

The reviewer will obtain the current data which represents the as-built plant configuration. Using this, a walkdown of the system will be made to develop a general feeling for the accuracy of the data. It is not intended that the reviewer perform a complete dimensional check of the system. However, dimensional checks of various portions of the system and some supports will be performed. Photographs, as deemed necessary, may be taken to provide documentation of significant areas or components of the system.

3.7 Task 6 - Compare As-Built Documentation to Plant Configuration

The reviewer will obtain from PP&L or Bechtel the as-built documentation which is specified to be representative of the plant configuration. Having developed sufficient confidence in the data obtained in Task 5, the reviewer will make a comparison of documentation and plant configuration. Any differences which are in areas of the system not subjected to dimensional check in the field by the reviewer will need to be checked by the reviewer in detail at the site.

The as-built documentation obtained in this task is the information that will be used in the detail review outlined in Task 4. This package should represent revisions resulting from ECN's, FCR's and any applicable corrective action for nonconformances and therefore will allow the reviewer to follow the process of the design back to initiation.

3.8 Task 7 - Design Documents vs. FSAR Commitments

The as-built documentation established in Task 6 will be used to determine if the FSAR commitments have been complied with. It is noted that a detailed review of the design specification will be performed in Task 2 since that document forms the basis for the design approach. This review will be limited to FSAR requirements associated with applicable modes of operation for the Feedwater system. The loads, load combinations and criteria will be taken from the design specification and the FSAR.

3.9 Task 8 - Review PP&L Audit Findings

The reviewer will obtain PP&L QA and technical audit findings related to design activities of Bechtel. The specific activities cited will be reviewed to determine if corrective action was taken and if PP&L audit personnel assured that this happened. This activity will be performed by the Project QA Engineer who will report directly to the Manager, Quality Assurance in his role as QA Engineer and as Task 8 auditor. The Manager, Quality Assurance will report any findings directly to the Project Review Internal Committee and these will be passed on to PP&L as part of the Interim and/or Final Report.

3.10 Task 9 - Project Review Internal Committee

The reviewer will form an internal committee whose responsibility will be to review all potential findings of the project review team. This review will include the definition and accuracy of the finding and assess the impact of the potential finding on the overall design adequacy of the Feedwater system.

Any potential findings that are not determined to have an impact on design adequacy will be returned to the project review team with accompanying discussion related to rejection by the committee. Should the individual reviewer or the project review team manager disagree with the review committee conclusions the potential finding may be forwarded to the 10 CFR Part 21 review committee for disposition.

3.11 Task 10 - Reporting

Reporting of TES review team members will comply with the following.

3.11.1 Definitions

The following definitions are to be used by TES review team members in preparing reports to the Project Manager on their review work.

a) Open Item - An item requiring further review or more information before a decision can be reached. An Open Item can become a Potential Finding, an Observation or a Closed Item but cannot remain an Open Item in the TES Final Report. 2

b) Closed Item - An Open Item which after further review can be closed.

c) Potential Finding - An item which the reviewer and TES Project Manager feel could have an impact on the adequacy of the design or QA process. All Potential

Findings will be submitted to the Project Review Internal Committee for disposition. A Potential Finding can become a Finding or an Observation but cannot remain a Potential Finding in the TES Final Report.

d) Finding - An item which the Project Review Internal Committee has reviewed and has determined impacts the adequacy of the design or QA process.

e) Observation - An item that does not impact the adequacy of the design or QA process but has significance relative to conservatism, design practice or applicable procedures. 2

3.11.2 Reporting Process

The following process of reporting will be adhered to by the TES review team members.

a) Items will be submitted to the Project Manager in writing using the Reviewer Report Form (RRF). The definitions of Section 3.11.1 will be used in classifying the item by the reviewer. The original of this form will be forwarded to the TES Project Manager.

b) The Project Manager will review the RRF and complete a Project Manager Resolution Form (PMR). The PMR must be signed by the TES reviewer who initiated the RRF to indicate his agreement with the resolution. The original RRF and PMR will be maintained as QA records. If the item is classified as a Potential

Finding, or if resolution of the item cannot be reached by the Project Manager, or if the TES reviewer does not agree with the resolution the RRF and PMR will be forwarded to the Project Review Internal Committee for resolution.

c) The Project Review Internal Committee will review the RRF and PMR and develop a position on the consequence of the item as it relates to the adequacy of the design or QA process. The Internal Committee will present this position by completing an Internal Committee Resolution (ICR) form, a copy of which requires signature by two of the three members of the committee. The ICR will be submitted to the Project Manager and the TES reviewer. The original ICR will be attached to the original RRF and PMR and will be maintained as QA records. ⚠

d) The Project Manager shall review the ICR, and may return this report to the committee if their conclusions do not meet established review criteria. If agreement between the Project Manager and the Internal Committee cannot be reached the Project Manager will, in writing, request the TES 10CFR Part 21 Committee to review the issue. Findings of the Internal Committee accepted by the Project Manager will be reported to PP&L. PP&L may propose a plan for remedial action for the Finding. In this case the TES Project Manager and the Internal Committee will review the remedial action plan to assess its adequacy.

e) The TES Part 21 Committee will review any items forwarded to it in writing by the Project Manager in accordance with Section 3.3 of TEP-1-004. Reporting will be to PP&L and the NRC rather than to TES management in accordance with EP-1-016. The findings of the Part 21 Committee will be final. Any remedial action plan proposed by PP&L will be reviewed as in Item d) above.

3.11.3 Report Submittal

The reviewer will provide reports concurrently to the NRC, Bechtel Power Corporation and PP&L on the following schedule:

Findings - within three working days of determination by TES

Initial Status Report - May 7, 1982 ⚠

Final Report - June 1, 1982 or two weeks after receipt of final as-built documentation, whichever is later.

a) Findings will be transmitted to PP&L in letter form with copies of the RRF, PMR, and ICR corresponding to that Finding.

b) The Initial Status Report will outline the progress to that date of the review. Any Findings which have been submitted by letter report to PP&L will be included in this report. Reported Findings which PP&L has responded to with a remedial action plan for review and assessment by TES will be so noted. Areas which have been reviewed and are still under discussion by the review team or Internal Committee will be noted.

c) The Final Report will contain all Findings, including an assessment of extent, evaluation of safety impact and appropriate recommendations. Discrepancies and Observations will be reported including an assessment of why they are not Findings. Closed Items will not be included in the Final Report.

d) TES will maintain as Project QA records all items reported by TES reviewers with associated resolutions. These will be available for review by PP&L or the NRC.

4.0 PROJECT STAFFING

4.1 Project Review Team

The Project Manager for TES will be Mr. Donald F. Landers. The assistant Project Manager will be R.A. Enos. TES will provide staffing to this project as required to complete the effort outlined. Further, the program will also require the use of some personnel familiar with documentation control and record retention as well as personnel with field experience to obtain as-built information.

This committee approach is currently used by TES for projects that involve state-of-the-art engineering. TES forms a committee in such cases composed of senior level personnel who have the necessary expertise to resolve technical issues presented by the particular project under review. In this case the committee will consist of three senior level engineers who together have a broad background in technical management, analysis, design, regulatory and Code criteria, and utility experience. James A. Flaherty , Manager, Engineering Design and Testing will chair this committee. The organization is shown in Figures 4.1, 4.2 and 4.3.

4.3 TES 10CFR Part 21 Committee

TES has a standing company policy with respect to Part 21 issues. This policy is implemented by the use of a Technical Engineering Procedure (TEP-1-004). Although the findings which appear in the final TES report may not be of a Part 21 nature we will use our Part 21 approach in establishing these findings. The two major reasons for this are:

(1) The independence of the TES Part 21 Committee

(2) The opportunity for a reviewer to appeal the Project Manager or the Project Review Internal Committee conclusions on his potential findings.

This standing committee is chaired by Mr. Ron Wray, Manager, Engineering Analysis. He has the authority to assemble a committee of his choosing based on the potential finding presented to him. In the case of this project he will be requested to review the plan presented here and establish this committee in the near future and to revise the current TEP with respect to the time allotted therein for his review. This will be done to expedite matters so that the date can be met. Since the findings being considered may not be Part 21 issues it is felt that this can be accomplished.

5.0 INDEPENDENCE

TES has not been under contract to PP&L to peform any work associated with the Feedwater system at Susquehanna Steam Electric Station.

In order to qualify as an independent reviewer for the design verification program at SSES, all personnel assigned to the project will comply with the following:

(1) Key project personnel shall have no present or past work experience in design of the Susquehanna Steam Electric Station in the areas to be reviewed.

(2) Project personnel shall not be active on any other active Susquehanna Steam Electric Station projects.

(3) No project personnel shall have members of their immediate family (parents, spouse, children and grandchildren) who are employed by PP&L.

(4) During the term of the project no project personnel and their immediate family shall have cumulative ownership interest in PP&L which exceeds five percent of their gross family annual income.

The most important factor in completing this design verification program is competence. This competence must be based on knowledge and experience in the matters under review. The company and individuals involved should also be independent. Independence means that the individuals and company involved must be able to provide an objective, dispassionate technical judgement, provided solely on the basis of technical merit. Independence also means that the verification program must be conducted by individuals and a company not previously involved with the design activities at the Susquehanna Steam Electric Station. Their integrity must be such that they are regarded as a reputable company or individuals.

6.0 COMPANY QUALIFICATIONS

TES has been actively engaged in the nuclear power industry since the early 1960's. Services have been provided to the industry in the areas of

mechanical, structural, civil, electrical engineering, testing and instrumentation. Our engineering activities range from stress analysis to design and material procurement and include fracture mechanics, design reviews, ASME Code consulting and training activities. In the areas of testing and instrumentation we provide material testing, nondestructive examination, failure analysis and mechanical testing services. TES staff are heavily involved in ASME Code activities, the Pressure Vessel Research Committee, ANSI Standards Committees, ASTM and SESA.

TES has a staff of approximately 240 people of which 205 are involved in engineering activities. Most of the senior staff are Registered Professional Engineers who have authored numerous papers.

J. A. Flaherty - Chairman

N. S. Celia - Member

J. W. Hanson - Member

P. R. Kommineni (Alternate)

Figure 4.1 Project Review Internal Committee

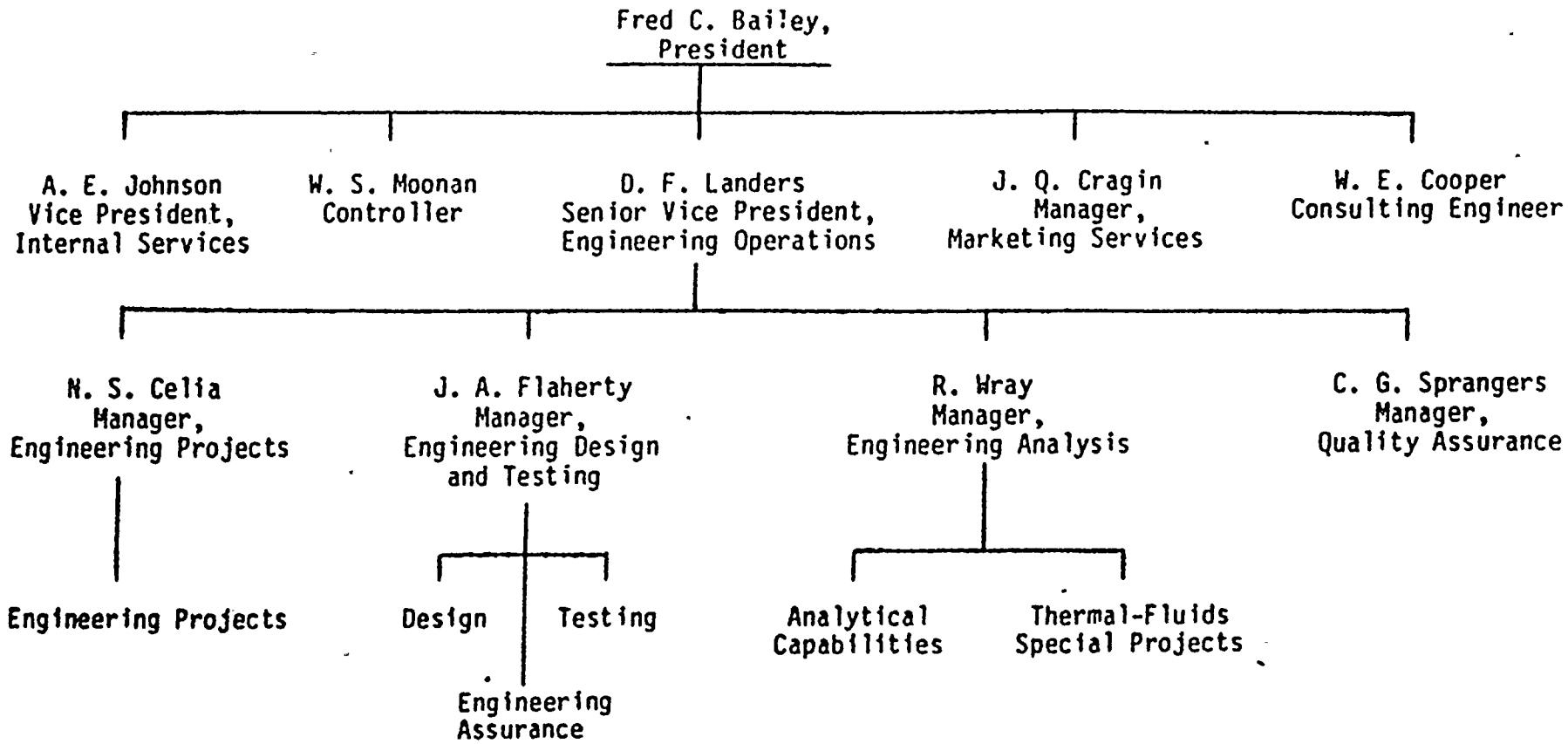

Figure 4.2 TES Organization

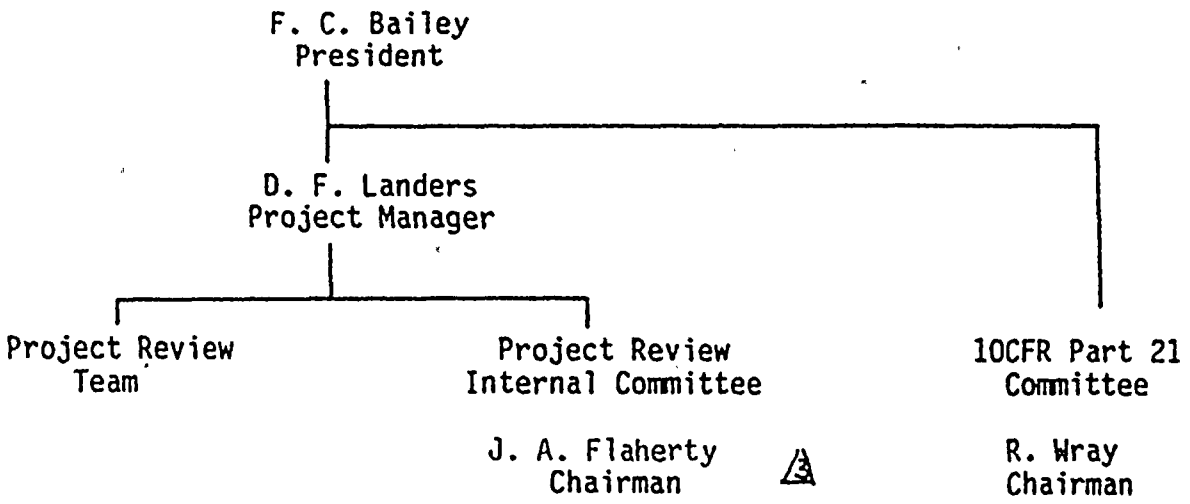

Figure 4.3 Susquehanna Steam Electric Station Project Organization

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-____

Reviewer Name: Date:

Classification of Item:

Reference Documents:

Description of Item:

_____
Reviewer Signature

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-____

Reference RRF No. 5599-____ Date:

Description of Resolution:

Classification of Item after Resolution:

_____

Reviewer Signature

_____

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-____

Reference: RRF No. 5599-____

Date:

PMR No. 5599-____

Internal Committee Resolution of Potential Finding:

Classification of Item after Committee Resolution:

Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Committee Member Signature

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1 - Feedwater System

Review Log ⚠

Item No.	Description	RRF No.	Reviewer Category	PMR No.	Proj. Mgr. Category	ICR No.	Review Comm. Category	Final Resolution

TELEDYNE ENGINEERING SERVICES

ENGINEERING PROCEDURE

TITLE:	EP -1-016	PAGE 1
REPORTING OF 10CFR21 OFFENSES	REV. 0 ORIG. RAE ENG. AS. [illegible] Q.A. DM 5/-5/82 PROJ. MGR. DFC DATE 5-5-82	REV. ORIG. ENG. AS. Q.A. PROJ. MGR. DATE

SECTION	DESCRIPTION	REV.
1.0	SCOPE This procedure provides the specific method of reporting 10CFR21 offenses for TES Project 5599, Independent Design Review of Susquehanna Steam Electric Station Unit 1, Feedwater System.	
2.0	APPLICATION This procedure modifies the method of reporting to the NRC as detailed in TEP-1-004.	
3.0	METHOD In lieu of the forty-eight (48) hour verbal requirement and the five (5) day written requirement of Section 3.4.2 of TEP-1-004, a written report shall be made to both the NRC and PP&L within twenty-four (24) hours.	
4.0	RECORDS The requirements of TEP-1-004 apply.	

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 5.7.82

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

APPENDIX 3

PHASE 1

FINDING DETAILS

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-1

Reference: RRF No. 5599-49, Rev. 0 and Rev. 1. Date: July 14, 1982

PMR No. 5599-49

Internal Committee Resolution of Potential Finding:

The Internal Committee agrees with the Reviewer statements. The "Loss of FW Pumps, MSIV Closed" should be Classified as an Upset Condition in accordance with NB-3113.3. There is ~~an~~ also an inconsistency between the Bechtel Design Spec. (which also references the GE Spec) and the Bechtel Drawing 8856-M1-B11-89(2). However, either document would result in more than 25 cycles of stress exceeding S_a at 10^6. The governing Document, the Design Specification references the GE Spec. ~~and~~ The use of the Design Spec would result in approximately 80 stress cycles.

Classification of Item after Committee Resolution:
Finding

RECORD COPY
PROJ. NO. 5599

James A. Flaherty
Committee Chairman Signature

D. F. Landers
Project Manager Signature

J W Hanson
Committee Member Signature

Leonard R. Kornium
Committee Member Signature

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TES PROJ. NO. 5599
DATE 7-14-82

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Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-49, REV. 1
PG 1 OF 3

Reviewer Name: DF LANDERS

Date: 7/9/82

Classification of Item: POTENTIAL FINDING

Reference Documents: 1. SPECIFICATION 8856-M-175, REV. 5
2. GE SPECIFICATION 22A2925, REV. 6
3. BECHTEL RESPONSE TO RRF NO. 5599-49, DATED 7/6/82, REC'D BY TES 7/8/82
4. RRF NO. 5599-49

Description of Item:

THE BECHTEL RESPONSE (REF. 3) IS NOT ACCEPTABLE. A DETAILED REVIEW OF THE GE SPEC. (REF. 2) INDICATES THE FOLLOWING FOR THIS TRANSIENT

INITIAL TMP	FINAL TMP	TIME
420	546	STEP
546	40	STEP
40	546	23 MIN
546	40	STEP
40	546	61 MIN
546	40	STEP
40	300	5 MIN
300	546	100F/HR STEP
546	100	
100	250	STEP
	420	20 MIN

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TES PROJ. NO. 5599
DATE 7.11.82

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PROJ. NO. 5599

DF Landers
Reviewer Signature

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Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-49, REV. 1

PG 2 OF 3

Reviewer Name: DF LANDERS

Date: 7/9/82

Classification of Item:

Reference Documents:

Description of Item:

REFERENCE 4. NOTED THAT A POTENTIAL FOR 8 STRESS CYCLES PER OPERATING CONDITION EXISTS. THIS IS VERIFIED BY GE SPEC. (REF. 2). THE PREPARER OF THE BECHTEL SPEC. USED A GE HISTOGRAM (GE DWG 761E579, "REACTOR VESSEL THERMAL CYCLES" WHICH IS NOT REFERENCED IN THE GE SPEC. REGARDLESS, THE PREPARER OF THE DESIGN SPEC. FOR A GIVEN SYSTEM IS RESPONSIBLE FOR DETERMINING THE CLASSIFICATION OF A PLANT OPERATING CONDITION ON HIS SYSTEM. THE FACT THAT SO MANY STRESS CYCLES (>25) WHICH EXCEED S_a AT 10^6 CYCLES RESULT FROM

DF Landers

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-49, REV 1

PG 3 OF 3

Reviewer Name: DF LANDERS

Date: 7/9/82

Classification of Item:

Reference Documents:

Description of Item: THIS TRANSIENT PLACES IT IN THE UPSET OPERATING CONDITION CATEGORY. THE GE. SPEC. DOES NOT DEFINE OPERATING CONDITION CATEGORIES FOR ANY TRANSIENTS LISTED IN TABLE A-2. GE DWG 761E579 IS FOR THE REACTOR PRESS. VESSEL ONLY. FOR THIS SPECIFIC CONDITION, "LOSS OF FEEDWATER PUMPS, ISOLATION VALVES CLOSE" THE GE DWG ONLY LISTS 5 CYCLES (OCCURENCES) AND DOES NOT DEFINE TEMPERATURE EXCURSIONS WHICH AGREE WITH REF. 2

D.F. Landers

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 49

Bechtel Response

The classification of the "Loss of FW pumps MSIV closed" as emergency condition is based on GE dwg. 761E579 "Reactor Vessel Thermal Cycles". (Bechtel dwg. No 8856-M1-B11-8902-2. The dwg attached

TELEDYNE ENGINEERING SERVICES
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DOCUMENT
TES PROJ. NO. 5599
DATE 8382

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Response by Tien Pei Lee
Date 7-8-82 7/6/82
Approved by L. Memula
Date 7-6-82

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-49

Reference RRF No. 5599-49

Date: 6-4-82

Description of Resolution:

Agreed that an additional thermal transient exist which should be addressed.

Bechtel shall address the discussed thermal condition and justify the classification of the "loss of FW Pumps MSIV Closed" as emergency condition.

Classification of Item after Resolution: Potential Finding

RECORD COPY
PROJ. NO. 5599

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TES PROJ. NO. 5599
DATE 6-7-82

DF Landers
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

RECORD COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
ES PROJ. NO. 5599
DATE 6.4.82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-49

Reviewer Name: D.F. LANDERS

Date: 6/2/82
SHT 1 OF 2

Classification of Item: POTENTIAL FINDING

Reference Documents: SPECIFICATION 8856-M-175, REV. 4

Description of Item: HISTOGRAM, PG. 1, APP. A

"LOSS OF FW PUMPS, MSIV CLOSE" SHOULD NOT BE CLASSIFIED AS AN EMERGENCY CONDITION. NB-3113.3 STATES THAT "THE TOTAL NO. OF POSTULATED OCCURRENCES... SHALL NOT CAUSE MORE THAN 25 STRESS CYCLES HAVING AN S_a VALUE GREATER THAN THAT FOR 10^6 CYCLES FROM THE APPROPRIATE FATIGUE DESIGN CURVES..."

FOR THE PIPING SYSTEM NEAR THE REACTOR PRESSURE VESSEL THERE IS A POTENTIAL FOR 8 STRESS CYCLES PER OPERATING CONDITION

D.F. Landers
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6.4.82.

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form

RRF No. 5599-49
SHT 2 OF 2

Reviewer Name: D.F. LANDERS

Date: 6/2/82

Classification of Item:

Reference Documents:

Description of Item:

RESULTING IN 80 STRESS CYCLES. THE FLUID IN THE PIPE CAN REACH TEMPERATURES CLOSE TO RPV TEMP. (546F) FOLLOWED BY 40F WTR BEING PUMPED INTO RPV. THIS COULD BE DEFINED AS A STEP CHANGE FROM 546F TO 40F, 3 TIMES - FOLLOWED BY A RAMP TO 546 - THEN A STEP FROM 546F TO 40F, 1 TIME - FOLLOWED A STEP TO 250F AND RAMP TO 420F. THESE KINDS OF TEMP. EXCURSIONS SHOULD RESULT IN S_a VALUES GREATER THAN 15,000 PSI.

D.F. Landers
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-2

Reference: RRF No. 5599-35, Rev. 0 and Rev. 1 Date: July 14, 1982

PMR No. 5599-35

Internal Committee Resolution of Potential Finding:

The Internal Committee has reviewed the Reviewer comment and the Bechtel Response. The Bechtel Response is incorrect in that it references Operational Cycles not stress cycles. The Loss of FW Pumps, MSIV Close should be defined as an Upset Condition.

The Stress Report should have accounted For this event in the Fatigue evaluations in accordance with NB-3113.3

TELEDYNE ENGINEERING SERVICES
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TES PROJ. NO. 5599
DATE 7/16/82

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

D F Landers
Project Manager Signature

J W Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-35, REV 1

Reference RRF No. 5599-35, REV 1

Date: 7/14/82

Description of Resolution:

DATA HAS BEEN REVIEWED. BECHTEL RESPONSE IS UNACCEPTABLE. THIS RRF IS ASSOCIATED WITH RRF NO. 5599-49

Classification of Item after Resolution:

Reviewer Signature

DF Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-35 REV1

Reviewer Name: Stanley Wharton Date: 7-14-82

Classification of Item: POTENTIAL FINDING

Reference Documents:
SR 8856-1500 R1

Description of Item:

Design is to NB-3000 - with piping covered by NB-3650 - NB-3113 under design says any events over 25 cycles need Fatigue evaluation. Low oF F.W Pumps has 8 stress cycles per event - this equals 80 stress cycles (10 events)

TELEDYNE ENGINEERING SERVICES
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DOCUMENT
TES PROJ. 5599
DATE 7/16/82

RECORD COPY
PROJ. NO 5599

Stanley R. Wharton
Reviewer Signature

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne RRF. No. 5599 - 35

Bechtel's Response

The Feedwater lines have been analyzed in accordance with ASME Section III, NB3650. According to NB3650, it is not required to have fatigue calculation for emergency and faulted conditions. 10 cycles of F. W. Pump event are specified in Specification as emergency condition. Therefore, it is not necessary to be included in fatigue evaluation. Also, we do not have 8 stress cycles for each event, the total no of cycles for emergency condition specified in the Spec. is 10+1+8+1+1 = 21 which is less than 25.

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TES PROJ. NO. 5599
DATE 8382

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Responded By Chi Chern Date 7/6/82

Approved By L. Memula Date 7/7/82

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-35

Reference RRF No. 5599-35

Date: 6/2/82

Description of Resolution:

TES REVIEWER TO REVIEW FINAL STRESS REPORT. THIS TRANSIENT COULD BE THE MOST SEVERE CONDITION WITH RESPECT TO FATIGUE ON THE FEEDWATER SYSTEM. WITH RESPECT TO FEEDWATER SYSTEM THIS TRANSIENT IS ONE OF THE MOST SEVERE. BECHTEL TO PROVIDE JUSTIFICATION FOR EXCLUSION FROM FATIGUE CONSIDERATION AND FAILURE TO COMPLY WITH NB-3113.3 OF SECTION III

Classification of Item after Resolution: POTENTIAL FINDING

Reviewer Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6·3·82

RECORD COPY
PROJ. NO. 5599

DF Landers
Project Manager Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RECORD COPY
PROJ. NO. 5899

RRF No. 5599-35

Reviewer Name: Stanley Wharton

Date: 5-24-82

Classification of Item: OPEN

Reference Documents:

SR8856-1500 R1

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5899
DATE 6.1.82

Description of Item:

HISTOGRAM SHOWS 10 CYCLES FOR emergency condition - Loss of F.W. Pumps event This event actually has 8 stress cycles For For each occurrance. This gives a total of 80 Stress cycles. - Should be evaluated per NB-3113.3. This section states that 25 stress cycles can be excluded. We are above the 25 stress cycle limit

Stanley J. Wharton
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-7

Reference: RRF No. 5599-91

PMR No. 5599-91

Date: July 14, 1982

Internal Committee Resolution of Potential Finding:

Tolerances should be placed on "As Built" stiffness versus "As Analyzed". The Bechtel Procedure only requires that "As Built" supports shall not result in a stiffness less than that used in the analysis. Increasing the stiffness of the actual support can result in redistribution of loading and can be unconservative in the actual loads and stresses which the pipe and support are subjected too because of thermal expansion. This is also true for the case where small bore piping is analyzed with large bore piping since seismic end effects (strain controlled) can be significant.

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

D.F. Landers
Project Manager Signature

J.W. Hanson
Committee Member Signature

Prasad R. Hommineni
Committee Member Signature

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PROJ. NO. 5599
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CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-91

Reference RRF No. 5599-91

Date: 7/14/82

Description of Resolution:

THIS RRF IS RELATED TO RRF NO. 5599-55 WHICH INDICATED THAT SUCH A CONDITION CAN EXIST. A NEW REVIEWER WAS DIRECTED TO REVIEW BECHTEL SPECIFICATIONS AND PROCEDURES TO DETERMINE IF THIS WAS AN ISOLATED CASE OR WHETHER IT WAS ALLOWED. FROM THE RESULTS OF THAT SPEC./PROC. REVIEW IT APPEARS THAT THIS IS ALLOWED. TES REQUIRES JUSTIFICATION FROM BECHTEL FOR THIS APPROACH.

Classification of Item after Resolution: OPEN

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

RECORD COPY

TES PROJ. NO. 5599

PROJ. NO. 5599

DATE 7-15-82

Reviewer Signature

D.F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

RECORD COPY

PROJ. NO. 5599

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT

TES PROJ. NO. 5599

DATE 7.15.82

RRF No. 5599-91

Reviewer Name: William McBrine

Date: 7/2/82

Classification of Item: open

Reference Documents: Spec. 285-M-243 Rev 0
Spec. 285-M-291 Rev 1
ABR-876 package.

Description of Item: Section 4.3.4 of specification 285-M-243 Rev 0 and section 7.1.2 of spec 285-M-291 Rev 1 permits as built supports to be much stiffer than that considered in design. Also, sheet 9 of the Bechtel ABR-876 package accepts an as-built stiffness for support DLA-104-H2000 of 55 K/in as compared to 5 K/in used in the pipe stress analysis. A difference in support stiffness of this magnitude may be unconservative in regards to pipe stress and support loads in the piping thermal expansion analysis. Please clarify the proceedure in reconciliating support stiffnesses and justify this approach.

W. J. McBrine
Reviewer Signature

RESTRAINT LINE OF ACTION, SPRING RATE BASED ON PHASE III INPUT, AS BUILT FCI & AS BUILT SUPPORTS

PROJECT SUSQUEHANNA UNIT NO. 1 JOB NO. 8856
SYSTEM FW ISO NO. FCI-P49-876 REV. 12
PREPARED BY G.P. Jones / H. Tsang CHECKED BY [illegible]
CAL. NO. 876 REV. NO. 0 SHEET 9 OF
NOTES: Coordinate system to be the same as the ISO.

BASED ON	PIPE SUPPORT MARK NO.	REV.	RESTRAINT LINE OF ACTION ΔX (in)	ΔY (in)	ΔZ (in)	SPRING RATE TRANSLATION KIPS/IN	ROTATION IN-KIP/RAD	REMARKS, SPRING SETTING
PH III INPUT	DLA-102-H10	2F3	-0.347	0.72	0.60	672		
AS BUILT FCI			-.347	0.72	0.62			
AS BUILT SUPP. DWG		3F1	-0.347	0.72	0.60	672		
PH III INPUT	DLA-102-H11	1F3	-0.2868	0.8192	0.4967	605		
AS BUILT FCI			-.286	.8192	.496			
AS BUILT SUPP. DWG		2F3	-0.2868	0.8192	0.4967	605		
PH III INPUT	DLA-102-H12	1F3	-0.8773	-0.3584	-0.3193	276		
AS BUILT FCI			-.877	-.358	-.319			
AS BUILT SUPP DWG		3F1	-0.8773	-0.3584	-0.3193	628		
PH III INPUT	DLA-102-H13	2F3	0.58	0.0	-0.82	695		
AS BUILT FCI			0.58		-.82			
AS BUILT SUPP DWG		3F1	0.58	0.0	-0.82	695		
PH III INPUT	DLA-102-H14	1F3	1.0	0.0	0.0	614		
AS BUILT FCI			1.0					
AS BUILT SUPP. DWG		2F1	1.0	0.0	0.0	614		
PH III INPUT	DLA-102-H15	2F3	0.0	-0.259	-0.966	901		
AS BUILT FCI				-0.259	-0.966			
AS BUILT SUPP. DWG		3F1	0.0	-0.259	-0.966	901		
PH III INPUT	DLA-104-H2000	0F3	0.0	0.0	1.0	5.0		
AS BUILT FCI			0.0	0.0	1.0			
AS BUILT SUPP DWG		0F3	0.0	0.0	1.0	55		

7.1.1 ASME Section III Nuclear Class I Piping: Deviations in excess of those in par. 3.0 will require FCR submittal.

7.1.2 ASME Section III Nuclear Class 2 & 3 Piping Systems: Discrepancies in as-built drawings within the following bounds will not require as-built drawing revisions.

(a) Locations of valves or other concentrated loads and of lateral supports or restraints six inches or less in either direction along the pipe axis from the location shown, provided that this does not result in a change in the direction of the restraint action line.

(b) Locations of axial restraints one foot or less in either direction along the pipe axis from the location shown, provided that this does not result in a change in the direction of the restraint action line.

(c) Direction of restraint orientation within 10° in any one plane from the orientation shown.

(d) Direction of valve stem orientation within 10° in any one plane from the orientation shown.

(e) Dimension of any length of pipe between changes in direction which is within a range from six inches less to six inches more than the corresponding dimension shown, provided that no changes in direction are thereby eliminated and that no dimensio individual or cumulative, changes by more than six inches.

(f) Any change to pipe support shall not result in stiffness less than the stiffness corresponding to design condition.

7.1.3 Deviations in excess of those noted in Sections 7.1.1 and 7.1.2 and all changes to whip restraint gap measurements shall be documented on an FCR and be evaluated by Project Engineering for acceptability. Project Engineering shall evaluate the FCR's submitted for detailed and simplified analysis. Acceptability may be determined by Project Engineering by either reanalysis or judgement. In either case, documentation will be required.

4.3.4 Any revisions, changes, or modifications to pipe support drawings shall be justified, documented, signed, and dated. Revised drawings shall be reviewed by the Stress Engineer for stress analyzed piping and when a calculation review is required, except for those where the pipe support components having greater strength are substituted in place of those indicated on the support detail. The greater strength is understood to mean as follows:

a) Larger structural beam (i.e. larger moment of inertia)

b) Thicker plates

c) Heavier hanger rods or hanger rod components

d) Larger or additional anchor bolts

e) Larger or longer welds

4.3.5 Pipe support detail drawings for rigid hangers, restraints, snubbers & spring hangers need not be revised for load variations per SFPSM 3.18.1, Sect. 5.

4.4 Loadings

4.4.1 Design loads for various operating conditions shall be as per SFPSM 13.8.1.

4.4.2 Based on the design limits from SFPSM 13.10.1, each pipe support and supporting structure shall be designed to withstand the maximum load or combination of loads.

4.4.3 For large loads, the pipe support engineer must interface with the civil group as per SFPSM 3.20.2.

4.4.4 If expansion joints without tie rods are used in the system, pressure loads shall be considered in the design of pipe supports.

4.4.5 Cantilevered loads shall not be offset from the beam centerline by more than the width of the beam. Gussetts or stiffeners may be used where necessary.

TELEDYNE ENGINEERING SERVICE

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-9

Reference: RRF No. 5599-20, Revision 1 Date: July 15, 1982

PMR No. 5599-20, Rev. 1

Internal Committee Resolution of Potential Finding:

Items A, and B should be classified as Observations since they do not impact the adequacy of design

Item D has been covered and reviewed under ICR No. 2 and need not be reviewed with this ICR.

Item C- The ~~ICR of this item and~~ Internal Committee (JAF) agrees with the reviewer. Both the Loss of F.W. Pumps, MSIV closed and Start up conditions should be included in the fatigue evaluation. Therefore this item impacts the adequacy of the Design.

Classification of Item after Committee Resolution: Items A & B - Observation
Item C - Finding : Item D - redundant addressed in ICR No. 2

James A. Blaherty
Committee Chairman Signature

DF Landers
Project Manager Signature

RECORD COPY
PROJ. NO. 5599

J. W. Hanson
Committee Member Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
ICR NO. 5599
DATE 7-21-82

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-20, REV. 1

Reference RRF No. 5599-20, REV. 1

Date: 7/14/82

Description of Resolution:

MAJOR CONCERN IS ASSOCIATED WITH ITEM C. OF RRF. SINCE POINT 120 U = 0.6521 INCLUSION OF PROPER START UP CONDITIONS COMBINED WITH LOSS OF F.W. PUMPS - MSIV CLOSED* COULD REQUIRE REVISIONS TO APPROACH, (i.e. NB-3200 ANALYSIS) TO COMPLY WITH ASME III. FOR THIS REASON THE PROJ. MGR. IS UPGRADING THE RRF FROM THE OBSERVATION CATEGORY.

RECORD COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT

TES PROJ. NO. 5599

DATE 7.21.82

* SEE RRF 5599-35 AND 5599-49

Classification of Item after Resolution: POTENTIAL FINDING

Reviewer Signature

D.F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-20 REV 1

Reviewer Name: Stanley Wharton

Date: 7-13-82

Classification of Item: ~~OPEN ITEM~~ OBSERVATION

RECORD COPY

Reference Documents:

ME 913 SEQ 01999
CALC PKG 1503

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7 21 82

Description of Item:

A. Calculation package 1503 not provided. in Appendix E Rev. 1 - Information provided by Bechtel resoonse does not show how ΔT_1 and ΔT_2 were determined - TES needs ME-912 OR Calculations that show ΔT_1 & ΔT_2 determination.

B. Branch reinforcement calculations should be included in stress report

C. This connections for points 44, 83 and 120

See page 2 of 2

~~Reviewer Signature~~

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-20 REV 1

Reviewer Name: Stanley Wharton

Date: 7-13-82

Classification of Item: ~~OPEN ITEM~~ OBSERVATION

Reference Documents: Page 2 of 2

Description of Item:

are in heat affected zone - the ΔT's for start-up and shutdown seem low for a step 546° to 90°. ΔT for straight pipe in this area is 191° vs 32° for weldolet

D. Usage factors for connections to 12" pipe are greater than those in the stress report i.e. SEQ 01999 RUN POINT 120 U=.6521 SR88856-1500 (REV.1) page 13 POINT 125 U=.5463 (same problem on DLA-101 24" pipe)

Stanley P. Wharton

Reviewer Signature

5DU)

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM ....

Teledyne RRF. No. 5599 - 20

Bechtel's Response

This was an incomplete branch connection calculation. The final branch connection has been calculated by including $T_A - T_B$ effect for the branch connections. T_A and T_B were calculated based on the wall thickness of run pipe and average wall thickness of the fitting. The calculations were dated 4/28/82 and included in calculation No. 1503 of Appendix E, Rev. 1. A copy of typical branch connection calculations is attached

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Responded By Chii Chern Date 7/6/82

Approved By L. Memula Date 7/7/82

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

SEE TES QA RECORDS

FOR DETAIL BECHTEL RESPONSES

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-20

Reference RRF No. 5599-20

Date: 6/2/82

Description of Resolution:

BECHTEL MUST PROVIDE JUSTIFICATION FOR NOT CALCULATING $T_A - T_B$ EFFECTS FOR 1" BRANCH CONNECTIONS.

Classification of Item after Resolution: OPEN

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6·3·82

RECORD COPY

PROJ. NO. 5599

Reviewer Signature

D F Landers

Project Manager Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-20

Reviewer Name: Stanley Wharton Date: 5-24-82

Classification of Item: OPEN

Reference Documents:

ME-912 (ΔT's) Runs

Description of Item:

Small branch connections (i.e. 1" connections & plugs) where not analyzed for T_A-T_B effects
Detail of small branch lines required

MASTER COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-1-82

Stanley P. Wharton
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-12

Reference: RRF No. 5599-82, Rev. 1 Date: July 15, 1982

PMR No. 5599-82, Rev. 1

Internal Committee Resolution of Potential Finding:

The internal Committee agrees with the reviewer. The specification specifically states that the valve shall be tested using the Operating pressure and any deviation from the specification/procedure must be approved. Bechtel did not supply objective evidence that an alternate procedure was submitted and approved. If the valve WAS subjected to a ΔP then an alternate method should have been developed. This item impacts both the adequacy of design and the QA process.

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

D. F. Landers
Project Manager Signature

J W Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

RECORD COPY

TELEDYNE ENGINEERING SERVICES
CONTROLLED
PROCUREMENT
DOC. NO. 5599
DATE 7/21/82

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-82, Rev 1

Reference RRF No. 5599-82, Rev. 1

Date: 7/13/82

Description of Resolution:

A REVIEW OF THE REFERENCED DOCUMENTATION INDICATES THAT THE DESIGN SPECIFICATION FOR NUCLEAR VALVES # 8856-P-11 REQUIRES VALVE OPERATION TESTING WITH THE VALVE PRESSURIZED TO THE MAXIMUM OPERATING PRESSURE. THIS CONFLICTS WITH THE VALVE FUNCTIONALITY TEST THAT WAS PERFORMED WITH 800 PSI ACROSS THE DISC. THE VALVE DATA LIST SPECIFIES 800 PSI AS THE DISC ΔP CONDITION BUT THE SPEC. IS SPECIFIC WITH RESPECT TO FUNCTIONALITY TESTING REQUIREMENTS AND AN ALTERNATIVE REQUIREMENT MUST BE APPROVED BY THE OWNER.

Classification of Item after Resolution: POTENTIAL FINDING

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

RECORD COPY

PROJ. NO. 5599 TES PROJ. NO. 5599
DATE 7/13/82

J. C. Tsaczyanos
Reviewer Signature

D. F. Landers

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-82 Rev. 1

Date: 7-9-82

Reviewer Name: J. C. Tsacoyeanes

Classification of Item: Potential Finding

Reference Documents:
(1) TES RRF 5599-82, Rev. 0
(2) Bechtel Response to RRF 5599-82, Rev. 0 (7-6-82)
(3) Bechtel Design Specification for Nuclear Service Valves, No 8856-P-11, Rev

Description of Item: Valve No. 24-DLA-GT-MO-F011, A & B

Ref. (1) identifies a possible deficiency in the functional qualification test on valve F015 ~~(secondarily~~ (data used to qualify valve F011).

Ref (2) states that differential pressure across the disc should be applied in the functional test. This is not in compliance with Ref (3) paragraph 11.3.

Ref. (3) paragraph 11.4 permits alternative procedures for functional testing subject to Buyers approval. Unless such a procedure exists, the specification requirement is not satisfied.

J. C. Tsacoyeanes
Reviewer Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT

RECORD COPY

TES PROJ. NO. 5599
DATE 7-21-82

PROJ. NO. 5599

JCT

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 81, 82, 83

Bechtel Response

ITEMS 81, 82 & 83 ARE All related and ARE Answered together.

81) The load used for functional TEST was 8g based on the original calculation for F015 A, B. This was conservative because in actuality, the limiting factor for the assembly was the motor operator which was limited to 7g.

82) The pressure to be used in functional testing of valves is the differential pressure across the disc. This is specified as 800 psi for F015 A, B. (F011 A, B has a differential specified of 35 psi)

~~(cont on pg 2)~~

Response by L B Pulley

Date 7-6-82

Approved by L. Memula

Date 7-6-82

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

SHEET #7

ORIGINAL

APPENDIX B

IN PLACE FUNCTIONAL TEST RECORD.

P.O. 8856-P 17A Item No. 102 MARK No. BV- 2F015B

WE5855-B5-1

1. Static Load

(MIN)		
	Required	Actual
100%	26,000	26,500

2. Power Source

(MAX)	
Required	Actual
368 VAC	368 VAC

3. Internal Pressure

(MIN)	
Required	Actual
800 PSIG	800 PSIG

GAUGES USED

WATER
CT 1777 OFFICIAL
EXP. DATE 8-8-81
CT 1780 BACKUP
EXP. DATE 8-8-81

DYNO
CT 993
EXP. DATE 1-12-82

VOLT METER
EMO-85
EXP. DATE 8-10-81

4. Performance Requirements (MIN)

Required closing time 24 SEC Actual Closing Time 22 SEC

Required open time 24 SEC Actual Open Time 21.8 SEC

5. Seat Test

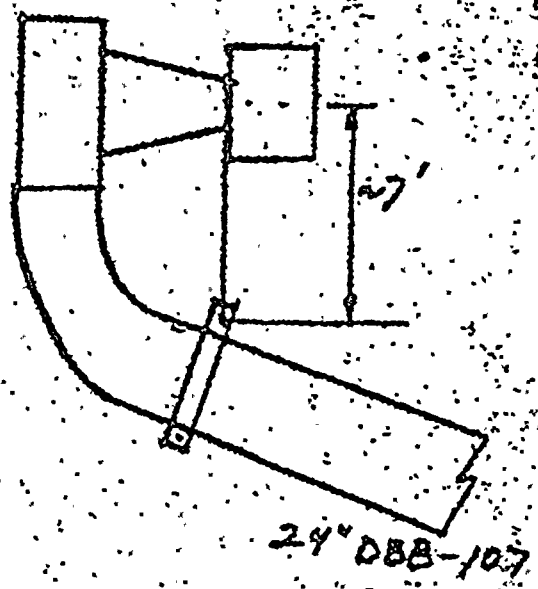
(MIN) Pressure		(MIN) Duration		(MAX) Leakage	
Required	Actual	Required	Actual	Allowable	Actual
800 PSIG	800 PSIG	4 MIN	7½ MIN	18 CC/HR	0 CC/7½ MIN

Performed by [signature] Date 5/9/81

SPECIFICATION DEVIATION
DEVIATION 4

TORCH GRAP AROUND
HVAC HEAT GENERATOR

INSTALL PIPE CLAMP
SUCH THAT THE
DIRECTION OF LOAD
IS PERPENDICULAR
TO THE VALVE STEM.



PLAN AT EL. 711'

VALVE ID: 1F015 B

P.O. 8856-P-MA ITEM 1.1

DESCRIPTION: 24-DCA-GT-MO

ISO #: DCA-110-1

LINE PRESSURE: 800 PSI

LOCATION: AREA 28 EL 683
RHR PENET

"G" Load: 8
.3250

VOLTAGE: 368 VAC, 3Ø, 60HZ

LOAD, LBS: 26,000

OPENING TIME: 24 SECONDS

SEAT LEAKAGE: 48 cc/HR

CLOSING TIME: 24 SECONDS

1. F015A IS AN ACCEPTABLE ALTERNATE

FORM 8856

EXCEPTIONS

On P.O. 8856-P-11AC test connections shall be welded to a half-coupling which is attached to valve body by a full penetration weld.

11.0 FUNCTIONAL TESTING REQUIREMENTS FOR ACTIVE VALVES

11.1 Operability of Active valves, during a postulated seismic occurrence, shall be verified by testing.

Test data acquired for qualified valve may be used to qualify valves of the same type which fall within the range of sizes permitted by Table-1 provided geometric, construction, and material similarity is maintained and supporting stress calculations are provided. If the qualified valve is larger than 36-inch nominal diameter, extrapolation may be made to valves whose nominal size does not vary more than 25% from that of the qualified valve.

11.2 Valves without topworks do not require functional testing.

11.3 Except when an alternative testing procedure has been approved in accordance with paragraph 11.4 valves with topworks shall be tested as follows:

a. The valve shall be placed in a suitable test stand with pipe lengths attached to each end of the valve identical to the actual installation, i.e. welded for weld end valves, flanged for flanged end valves, etc. The actuator and all other appurtenances shall be mounted as in a normal plant installation. The valve shall be oriented such that the loads applied per paragraph 2.3.3 of Technical Specification 8856-M-221 impose the most adverse conditions for valve actuation.

b. The valve shall be internally pressurized to the maximum operating pressure, as specified in the Valve Data Sheets, Attachment to the procurement documents, and concurrently a static resultant load, shall be applied to the center of mass of the valve topworks.

c. The valve shall then be actuated using the proposed valve actuator plant minimum actuation supply as defined in the Data Sheets. The valve must cycle open and closed within its specified operating time limits as defined on the Data Sheets. The valve stroke shall commence from the identical position (i.e. open or

VALVE NO.	24"-DLA-GT-MD-F011A-P A&10 24"-DLA-GT-MD-F011B-P		
SERVICE	FEEDWATER		
TYPE	GATE		
LINE OR EQUIPMENT REF.	DLA-101 AND DLA-103		
MOTOR TYPE	A.C.		
SIZE	24"		
COMMODITY	FEEDWATER		
DESIGN/MAX. PRESS. (PSIG)	1275 / 1250 △		
DESIGN/MAX. TEMP. (°F)	326 / 556		
FLOW NORMAL / MAX. (G.P.M)	16,200 / 17,850		
VALVE RATING	900# ASME		
TYPE ENDS/RATING	B.W. / SCH. 100		
BODY MATERIAL	SEE APPENDIX 3		
TRIM MATERIAL	SEE APPENDIX 3		
SEAT FACINGS	STELLITE		
PACKING	CRANE 187-I		
TYPE BONNET	PRESSURE SEAL		
TYPE OF SEATS	SEE APPENDIX 3		
TYPE OF DISC	FLEXIBLE (NOT SPLIT)		
BYPASS SIZE & TYPE			
HANDWHEEL PULL-BREAKAWAY			
ACT. DP. DIFF. PRESS. (MAX)	35 PSI		
PORT DIAMETER			
PRESS. DROP (PSI)			
VELOCITY (FPS)			
VALVE WEIGHT LBS			
MOTOR OPER (TYPE/SIZE/RPD)			
OPER. SPEED FT/MIN.	STANDARD		
TIME TO OPEN	120		
TIME TO CLOSE	120		
FULL LOAD CURRENT (440V, 30, 60C)			
STALLED ROTOR CURRENT			
MOTOR OPERATOR WEIGHT			
COST - EACH VALVE			
BYPASS			
FURN & INSTALL LIMIT SWS.			
TESTS - MAGNAFLUX			
TESTS - X-RAY			
NO. REQUIRED	SEE MAT. REQUISITION		
TOTAL COST			
MANUFACTURER			
MODEL OR FIG. NO.			
VENDOR			
P/O (& ITEM) NO. 8856-P-11	(1.1 + 1.2)		
FOREIGN PRINT NO.			
WELD END DWG. REFERENCE 8856-	M-199 SHTS. 307 + 400		
P & I DIAGRAM REF. 8856-M-	141		
LOCATION DWG. REF.			
SEISMIC CLASS I (YES / NO)	YES		
△ ACTIVE VALVE (YES / NO)	YES		

REV.	DATE	APPROVED	CHKD	DRN	DESCRIPTION
6	10/29/74				

BECHTEL CORPORATION
POWER DIVISION ENGINEERING

VALVE DATA SHEET
MOTOR OPERATED

SUSQUEHANNA STEAM ELECTRIC STATION
UNITS 1 & 2
PENNSYLVANIA POWER & LIGHT COMPANY

MAS No 8856

Attachment No. 2
8856-P-11

SHEET 2 OF 3

REV. 6

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-82

Reference RRF No. 5599-82

Date: 6-18-82

Description of Resolution:

Requires a response from Bechtel to clarify whether or not the 24"-900# C.S. Gate Valve was tested to a maximum pressure of 1950 psi as required.

RECORD COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 62982

Classification of Item after Resolution: Potential Finding

J C Tokarczewes
Reviewer Signature

R A Enos

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
P-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-82

Reviewer Name: J. C. Tsacoyeanes

Date: 6-17-82

Classification of Item: Potential Finding

Reference Documents:
(1) Bechtel Design Specification for Nuclear Service Valves, No. 8856-P-11, Rev. 10
(2) Valve Data Sheets, Rev. 6, Attachment 2 to 8856-P-11
(3) "In Place Functional Test Record" Transmitted from Bechtel Corp. by Telex, Sent by Shu, 6/9/82

Description of Item: Valve No. 24-DLA-GT-MO-F011, A & B

Paragraph 11.3 b of Ref (1), Appendix 3 requires the valve to be pressurized to the maximum operating pressure specified in the Valve Data Sheet during functional testing. Ref (2) specifies maximum pressure at 1950 psi. Ref (3) reports internal test pressure of 800 psi. Therefore, the specified requirement has not been satisfied.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-18-82

RECORD COPY
PROJ. NO. 5599

J C Tsacoyeanes
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-13

Reference: RRF No. 5599-24 and 29, Rev.1 Date: July 15, 1982

PMR No. 5599-24 and 29 Rev.1.

Internal Committee Resolution of Potential Finding:

The internal Committee agrees with the reviewer. The Bechtel analysis is not consistent with the Design Specification. Bechtel's response that the cycles do not exist is not supported by objective evidence.

Both the Design Specification and the stress report need to be revised and justification given for choice of cycles used.

Both RRF 24 and RRF-29 deal with the same subject (item) and have been combined in this ICR.

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

D. F. Landers
Project Manager Signature

J M Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
TES PROJ. NO.
DATE

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-24, REV. 1

Reference RRF No. 5599-24, REV. 1

Date: 7/14/82

Description of Resolution:

THE CONDITION LISTED IN BECHTEL SPEC AS "SRV" HAS THE THERMAL & PRESSURE CHARACTERISTICS DEFINED IN GE SPEC 22A2925 AS "SRV DISCHARGE". THE NUMBER OF CYCLES OF 7650 IS IN THE BECHTEL DESIGN SPEC. AND IS ALSO AN ATTACHMENT TO THE STRESS REPORT. THE BECHTEL RESPONSE THAT THE 7000 CYCLES DON'T EXIST IS UNACCEPTABLE. REVISION TO THE DESIGN SPECIFICATION WOULD BE REQUIRED TO ELIMINATE THESE CYCLES OR TO DEFINE THEM AS ANOTHER EVENT FOR WHICH FEEDWATER TEMP. & PRESS. CHANGES DO NOT OCCUR.

Classification of Item after Resolution: POTENTIAL FINDING

RECORD COPY

PRC 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
NO. 65
7/15/82

Reviewer Signature

D. F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
P-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form △1

RRF No. 5599-24 REV 1

Reviewer Name: Stanley Wharton Date: 7-13-82

Classification of Item: Potential Finding

Reference Documents:

ME-913 Run Seq 00992

SR-8856-1500 REV. 1

Description of Item:

A. G.E. SPEC 22A2925 REV. 6 show that SRV discharge causes the transient listed in stress report as △17 & △18. Bechtel response says that 7650 cycles for transients △17 and △18 do not exist with the transient shown in the stress report. TES needs explaination IF 7650 cycles does not exist with thermal ~~tra~~transient it should be eliminated from stress report and design spec. IF SRV discharge causes thermal transient as indicated in G.E. Spec the event should be in the stress report with the correct amount of cycles

Stanley P. Wharton
Reviewer Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-24

Reference RRF No. 5599-24

Date: 6/2/82

Description of Resolution:

TES REVIEWER TO REVIEW FINAL STRESS REPORT. BECHTEL MUST PROVIDE JUSTIFICATION FOR APPROACH USED. ON THE SURFACE BECHTEL APPROACH MAY APPEAR CONSERVATIVE BUT BASED ON SHT #2 OF RRF THIS MAY NOT BE TRUE. # OF CYCLES FOR 15 & 16 LOAD SET IS REDUCED BUT RANGES OF ΔT'S ARE INCREASED FOR 15-16 AND 17-18. SINCE THIS ITEM COULD HAVE GENERIC IMPLICATIONS THE BECHTEL RESPONSE SHOULD BE GENERIC IN NATURE.

Classification of Item after Resolution: POTENTIAL FINDING

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT

TES PROJ. NO. 5599
DATE 6·3·82

RECORD COPY

PROJ. NO. 5599

Reviewer Signature

DF Landers
Project Manager Signature

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne RRF No. 5599 - 24

Bechtel's Response

Teledyne's approach in calculating thermal transient and pressure ranges for load cases 15, 16, 17 and 18 is extremely conservative. Bechtel's methods of calculations were established based on the time history study of T. G. Trip event, OBE and SRV events. They are described as follows:

1) The load cases 15, 16, 17 and 18 are specified due to the reason that OBE may cause a T. G. Trip and SRV shall be combined with OBE load in accordance with the requirement of Mark II loading combination. Actually, SRV is not required to be combined with thermal transient stress due to T. G. Trip.

2) The duration of each OBE is 10 sec and 10 stress cycles per each OBE. The lowest frequency of the Feedwater piping system is 14.6 cps. Therefore, we can conclude that for OBE moment load to reverse its sign takes less than $\frac{1}{10}$ sec. According to the load histogram (as shown in Figure 1), For T. G. Trip, it takes 16 min to change temp from 420 °F to 100 °F and reach

(CONTINUED)

Responded By Chi Chern Date 7/6/82

Approved By L. memula Date 7/7/82

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne RRF. No. 5599 - 24

Bechtel's Response

steady state at 100°F, then takes another 30 min. to return to 420°F. The whole cycle take much longer time than those for SRV and OBE and also it is separated by a steady state. Therefore, it is impossible for max. OBE moment and min. OBE moment (revise sign) to combine with max ΔT's and min ΔT's precisely. As shown in Figure 1, the actual thermal transient stress range required to combine with OBE is much less than the values suggested by Teledyne. Based on our study, we believe that by combining OBE + with the larger of +ΔT's or -ΔT's is sufficient to cover the thermal transient stress range during the OBE event.

3) The full range of thermal transient stress for T.G. Trip required by Specification were considered separately for 180 cycles. The 7700 cycles of T.G. Trip for load cases 13, 16, 17, 18 are the additional cycles which were created to combine with OBE & SRV. Actually they do not exist.

(CONTINUED)

Responded By Chii Chern Date 7/6/82

Approved By L. Memula Date 7/7/82

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne RFF. No. 5599 - 24

Bechtel's Response

4) The nature of SRV (inertia loads) is similar to OBE, both are occasional loads and exist only in a very short duration. It is very unlikely that max SRV load (or min SRV-load) will occur exactly at the same time as max OBE (or min. OBE) during 40 years of plant life. It is even more unlikely that each of 7700 cycles of SRV will combine with the max. and min thermal transient stresses due to T. G. Trip, we believe that 50 cycles of T. G. Trip + OBE + SRV is conservative enough to cover the consideration of T. G. Trip caused by OBE. For the rest of 7650 SRV cycles, actually, they need not combine with thermal transient stress because they do not cause T. G Trip.

5) The ΔT_1, ΔT_2, T_a-T_b used in the load cases 15, 16, 17 & 18 are the max. values, they do not occur at the same time. This is another additional conservatism.

6) If the duration of T. G. Trip is also very short, we will combine ΔT_1 with OBE as those proposed by Teledyne.

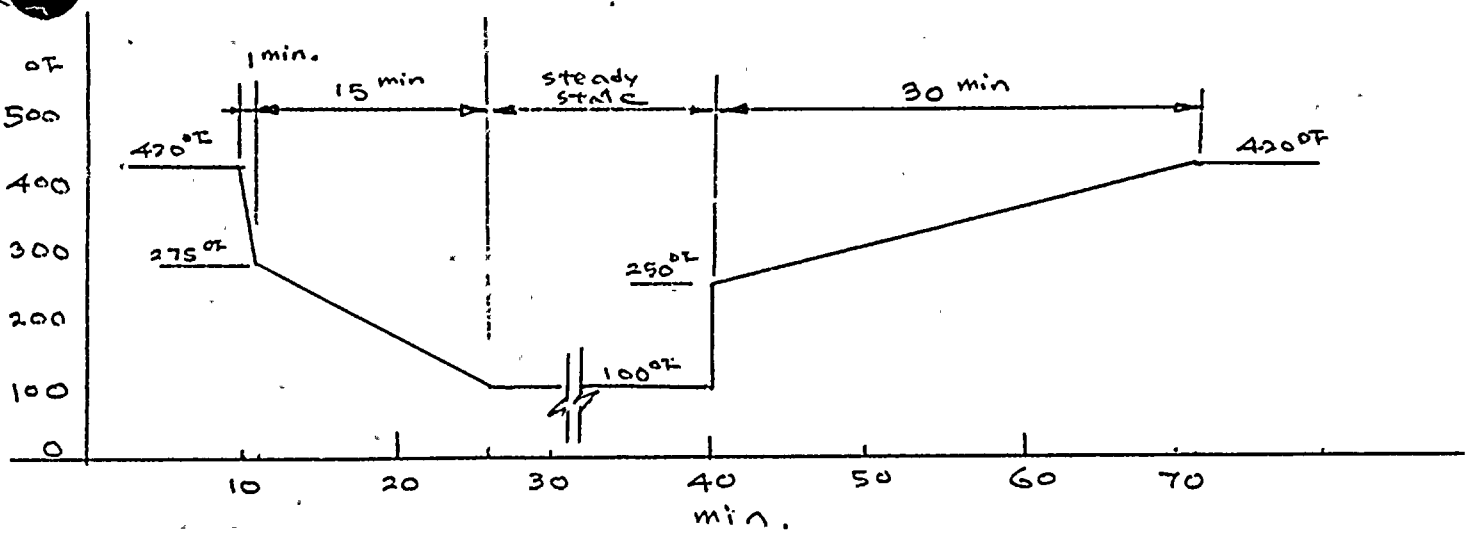
Responded By Chi Chen Date 7/6/82

Approved By L. Memula Date 7/7/82

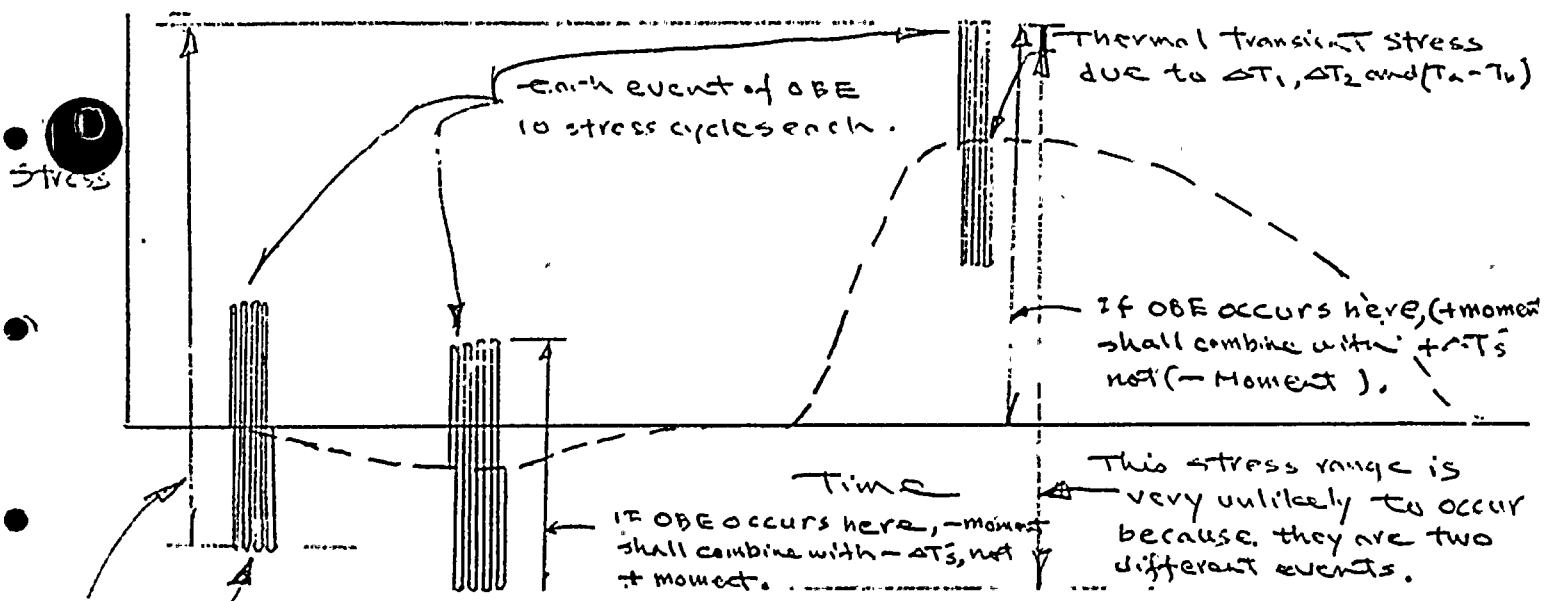
RESPONSE TO TELEDYNE RRF No. 5599 – 24 4 of 6

FIG. 1

Chichern



T. G. Trip Thermal transient



① Most OBE occurs here because it causes T. G. Trip and they complete their cycles within 10 sec. before max ΔT's stress could develop.

② This stress range also unlikely happens. However, we consider these as the stress range for T. G. Trip + OBE + SSI

③. Also, note that ΔT1, ΔT2, Ta – Tb values used in the stress calculations are the maximum values. They do not occur at the same time. This is conservative.

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-24

Reference RRF No. 5599-24

Date: 6/2/82

Description of Resolution:

TES REVIEWER TO REVIEW FINAL STRESS REPORT. BECHTEL MUST PROVIDE JUSTIFICATION FOR APPROACH USED. ON THE SURFACE BECHTEL APPROACH MAY APPEAR CONSERVATIVE BUT BASED ON SHT #2 OF RRF THIS MAY NOT BE TRUE. # OF CYCLES FOR 15 & 16 LOAD SET IS REDUCED BUT RANGES OF ΔT'S ARE INCREASED FOR 15-16 AND 17-18. SINCE THIS ITEM COULD HAVE GENERIC IMPLICATIONS THE BECHTEL RESPONSE SHOULD BE GENERIC IN NATURE.

Classification of Item after Resolution: POTENTIAL FINDING

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6.3.82

Reviewer Signature

DF Landers
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6-1-82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form △1

RRF No. 5599-24
PAGE 1 OF 3

Reviewer Name: Stanley Wharton

Date: 5-27-82

Classification of Item: OPEN

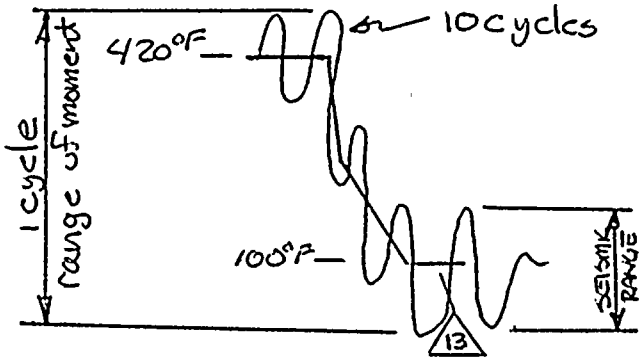
RECORD COPY
PROJ. NO. 5599

Reference Documents:

ME-913 RUN SEQ 00992
SR-08856-1500 REV Pg 19

Description of Item:

Load sets 15 16 17 18 should be better labeled on histogram and input differently. There should be delta T's for load sets 16 and 18 and the thermal case for load set 18 should be at 100°F. There should only be 5 cycles of OBE+SRV not 50 as shown below



EVEN THOUGH there are 10 cycles per event there is only one full cycle per event thus 5 cycles of OBE+SRV

SEE PAGE 2

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

TELEDYNE ENGINEERING SERVICES
DOCUMENT
TESI No. 5599
DATE 6.1.82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

5599
RRF No. 5599-24 (CONT.)
PAGE 2 OF 3

Description of Item: OPEN

ME-913 RUN SEQ 00992 (CONT.)

LOAD SET 15, 16, 17, 18 AS INPUT TO ME-913

LD SET	MOMENTS		ΔT_1	ΔT_2	cycles	pressure
13 T.G. TRIP -	TH@100		-29	-5	180	240
14 T.G. TRIP +	TH@420		56	15	180	1000
15 T.G. (SRV+OBE)+	TH@420	OBE+SRV SAM	56	15	50	1000
16 T.G. (SRV+OBE)-	TH@100	-OBE+SRV -SAM	0	0	50	240
17 T.G. SRV +	TH@420	SRV	56	15	7650	1150
18 T.G. SRV -	90% TH@420	-SRV	0	0	7650	1000

To include all cycles should be

LOAD SET	MOMENTS		ΔT_1	ΔT_2	CYCLES	PRESSURE
13 T.G. TRIP -	TH@100		-29	-5	175	240
14 T.G. TRIP +	TH@420		56	15	175	1000
15 T.G. (SRV+OBE)-	TH@100	(OBE+SRV SAM)x2	-29	-5	5	240
16 T.G. (SRV+OBE)+	TH@420	~~[illegible]~~	56	15	5	1000
17 T.G. SRV -	TH@100	(SRV x20)	-29	-5	7650	240
18 T.G.	TH@420		56	15	7650	1000

The above modification includes the

CONT NEXT PAGE

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-24 (CONT.)

PAGE 3 of 3

Description of Item: OPEN ITEM

the delta T's due to a OBE & SRV event. The OBE will cause a T.G. Trip and result in a the transient from 420 down too 100°F. The SYSTEM will return to 420 but will do not include OBE or SRV MOMENTS during this return. The load sets 12 thru 18 as modified will include all ΔT, moment, and pressure ranges described on the histogram

5599
6/1/86

RECORD COPY

PROJ. NO. 5599

Reviewer Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-29, REV. 1

Reference RRF No. 5599-29, REV. 1

Date: 7/14/82

Description of Resolution:

THIS RRF IS ESSENTIALLY A DUPLICATION OF A PORTION OF RRF-24. THIS WILL CONTINUE TO BE CARRIED AS A SEPARATE ITEM UNTIL RESOLVED

RECORD COPY
PROJ. NO. 5599

Classification of Item after Resolution: POTENTIAL FINDING

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7/21/82

Reviewer Signature

DF Landers
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-29 Rev. 1

Reviewer Name: Stanley Wharton Date: 7-14-82

Classification of Item: Potential Finding

Reference Documents:

ME-913 Run Seq 01581

Description of Item:

ΔT's removed for reasons explained in Bechtels response to RRF-24. See RRF-24 Rev. 1 for explaination of potential Finding.

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DATE 7/14/82

Stanley R. Wharton
Reviewer Signature

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM ....

Teledyne REF. No. 5599 - 29

Bechtel's Response LOAD CASES 17 & 18 ARE FOR SRV LOADS ONLY, BASED ON THE SAME REASON STATED IN OUR RESPONSE TO RRF No. 24 IT NEED NOT BE COMBINED WITH ΔT'S.

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DATE 7-8-82

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PROJ. NO. 5599

Responded By Chii Chern Date 7/6/82

Approved By L. Memule Date 7/7/82

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-29

Reference RRF No. 5599-29

Date: 6/2/82

Description of Resolution:

BECHTEL TO PROVIDE JUSTIFICATION FOR REMOVAL OF ΔT'S. COMMENTS ON RRF NO. 5599-24 ARE APPLICABLE HERE. CURRENT USAGE FACTOR IS > 0.8 AND INCLUSION OF ΔT'S COULD BE CRITICAL. TES REVIEWER TO REVIEW FINAL STRESS REPORT.

Classification of Item after Resolution: OPEN

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-3-82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

D. F. Landers

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-29

Reviewer Name: Stanley Wharton

Date: 5-24-82

Classification of Item: OPEN

Reference Documents:

ME-913 Run Seq 01581

Description of Item:

Why are ΔT's removed from case 17 & 18 for seam welded tee (Point 35)

RECORD COPY
PROJ NO. 5599
TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6.1.82

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-14

Reference: RRF No. 5599-93

Date: July 15, 1982

PMR No. 5599-93

Internal Committee Resolution of Potential Finding:

The internal committee agrees with the reviewer. Based on the information supplied to date by Bechtel there is no objective Evidence that the "As Built" versus "As Analyzed" discrepancy was reviewed.

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad K. Commineni
Committee Member Signature

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TELEDYNE ENGINEERING SERVICES
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DATE

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-93

Reference RRF No. 5599-93

Date: 7/15/82
PG 1 OF 2

Description of Resolution:

THIS ITEM COULD BE INDICATIVE OF A BREAKDOWN IN THE INTERFACE REQUIREMENTS ASSOCIATED WITH TRANSFERRING OF INFORMATION BETWEEN GROUPS WITHIN BECHTEL. THE REVIEWER IS DIRECTED TO DETERMINE IF ANY OTHER SUPPORTS ARE NOT LOCATED PROPERLY ON CIVIL/STRUCTURAL CALCULATIONS.

PG. 2 OF THIS PMR GIVES AN INDICATION OF THE DISCREPANCY. NOTE THAT ANALYSIS OF PLATE ATTACHED TO BOX BEAM IS SUPPOSED TO BE PERFORMED BY CIVIL/STRUCTURAL.

Classification of Item after Resolution: POTENTIAL FINDING

RECORD COPY
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TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7/21/82

W. J. McBrien
Reviewer Signature

D.F. Landers
Project Manager Signature

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

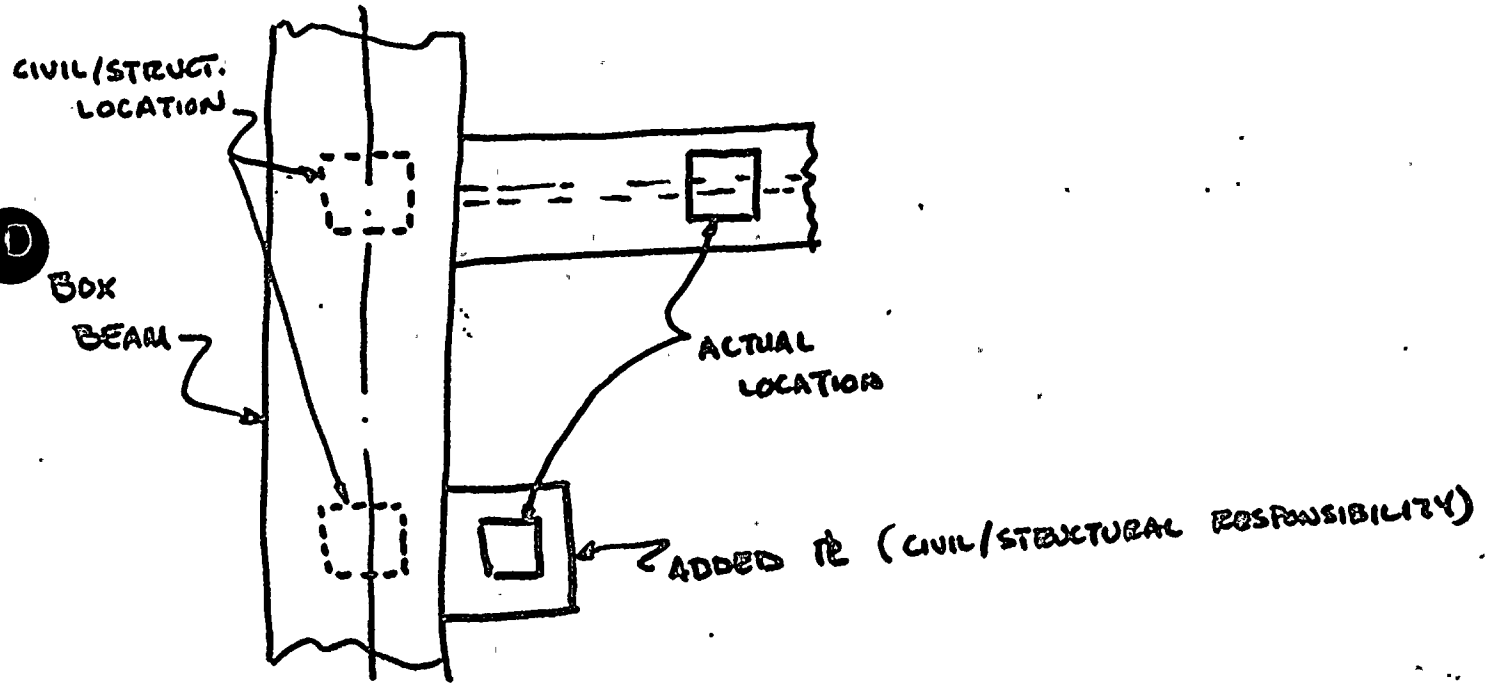
PMR No. 5599-93

Pg. 2 OF 2

Reference RRF No. 5599-93

Date: 7/15/82

Description of Resolution:



Classification of Item after Resolution: POTENTIAL FINDING

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CONTROLLED
DOCUMENT
PROJ. NO. 5599
DATE [illegible]

W. J. [illegible]
Reviewer Signature

D F Landers
Project Manager Signature

Enclosure (1)
EP-1-015

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DATE [illegible]
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PROJ. NO. [illegible]

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-93

Reviewer Name: William McBrine

Date: 7/13/82

Classification of Item: open

Reference Documents:
Support Drawing DLA-102-H5 Rev 4F2
Bechtel Civil Calc 91-F for DLA-102-H5 Job 8856 sheet 4 of 4

Description of Item:

The civil structural calculation considers support DLA-102-H5 to be in the center of Existing Box Beam No. 48. The as-built support drawing shows the support spanning between an existing W18×105 and 1"×13½"×15" plate.

There is no indication that this discrepancy has been reconciled.

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-16

Reference: RRF No. 5599-89, Rev. 1
PMR No. 5599-89, Rev. 1

Date: July 23, 1982

Internal Committee Resolution of Potential Finding:

The committee agrees with the reviewer and Project Manager. The response By Bechtel does not justify their statement of "conservatism".

Therefore this item does impact the adequacy of Design

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DATE 72782

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PROJ. NO. 0599

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

R. A. Enzo
Project Manager Signature

Committee Member Signature

Prasad R. Vommiuni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-89 REV. 1

Reference RRF No. 5599-89 REV. 1 Date: 7/22/82

Description of Resolution:

THE RESPONSE BY BECHTEL (ITEM 3) IS NOT APPROPRIATE SINCE THE REVIEWER CALCULATION INDICATES THE WELD IS OVERLOADED. THE PROBLEM WAS GREATER THAN ANALYZING THE WELD IN THE WRONG DIRECTION AS INITIALLY INDICATED. THIS KIND OF "WRITE-OFF" ON SUPPORTS IS A GENERAL CONCERN AS INDICATED ON OTHER RRF'S.

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TES PROJ. NO. 5599
DATE 72782

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PROJ. NO. 5599

Classification of Item after Resolution: POTENTIAL FINDING

Reviewer Signature

DF Landers

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-89 Rev 1
Sheet 1/2

Reviewer Name: William McBrine

Date: 7/17/82

Classification of Item: potential finding

Reference Documents:
RRF 5599 89 Rev 0
Bechtel Response
calc ABR-876 sheet 33
drwg SP-DBA-104-H2000 Rev 0F4

Description of Item: The fist two items listed in Rev 0 of this RRF have been resolved by verifying Bechtel's responses.

3) Using the incorrect weld moment of inertia in the calculations for SP-DBA-104-H2000 has yielded unconservative results. The calcs below indicate that an overstressed situation exists.

PROJ. NO. 5599

(Continued)

TELEDYNE ENGINEERING SERVICES
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TES PROJ. NO. 5599
DATE 7/27/82

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

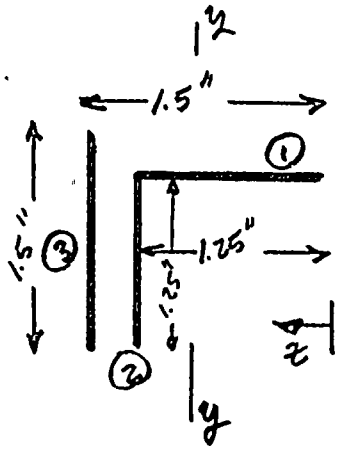
RRF No. 5599-89 rev 1
sheet 2/2

Reviewer Name: William McBrine

Date: 7/17/82

Classification of Item:

~~Reference Documents~~:



CHK: EBS 7-22-82

~~Description of Item~~:

$$\bar{z} = \frac{1.25\left(\frac{1.25}{2}\right) + 1.25(1.25) + 1.5(1.5)}{4} = 1.148$$

$$I_{yy} = \frac{(1.25)^3}{12} + 1.25(.523)^2 + 1.25(.102)^2 + 1.5(.352)^2 = .704$$

$$S_{right} = \frac{.704}{1.148} = .613 \qquad f_w = \sqrt{\left(\frac{681}{4}\right)^2 + \left(\frac{3320}{.613}\right)^2} = 5419 \text{ \#/in} > 4900 \text{ \#/in}$$

Per SPSS-2
N.G

$$\frac{5419 \text{ \#/in}}{.707(5/16)} = 24527 \text{ psi}$$

Reviewer Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-89

Reference RRF No. 5599-89

Date: 6-25-82

Description of Resolution:

Requires a response from Bechtel which 1. clarifies the weld label as ③ and where this weld is in drawing SP-DBA-H2000 Rev. 0F3
2. address the differences between the design loads used in the calc's and the loads listed on dwg. SP-DBA-H2000 Rev. 0F3
3. clarify which axis of the weld the moment of inertia was calculated and that it was the correct direction.

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DATE 62982

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PROJ. NO. 5599

Classification of Item after Resolution: OPEN ITEM

W. J. McBe
Reviewer Signature

R K Emo
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

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Independent Design Review

Susquehanna Steam Electric Station Unit 1

TES PROJ. NO. 5599
DATE 6.29.82

Reviewer Report Form ⚠

RRF No. 5599-89

Reviewer Name: William McBrine

Date: 6/18/82

Classification of Item: open

Reference Documents:

Calc. ABR-876 sheet 33
drwg SP-DBA-H2000 Rev 0 of 3

RECORD COPY
PROJ. NO. 5599

Description of Item:

1) The portion of weld labeled as (3) on p. 33 of calc ABR-876 is not shown on the reference drawing.

2) The design loads used in the calcs are different than those on the drawing.

3) No axes are shown on the weld calc sketch but it appears that the weld moment of inertia (I) may have been calculated in the wrong direction

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-23

Reference: RRF No. 5599-68 Rev 2

Date: July 23, 1982

PMR No. 5599-68 Rev 2

Internal Committee Resolution of Potential Finding:

The ICR agrees with the reviewer and Project Manager. There is no objective evidence that all supports were considered when analyzing the structural steel.

This item ~~imp~~ can impact the adequacy of Design although for this specific case it does not.

TELEDYNE ENGINEERING SERVICES
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TES PROJ. NO. 5599
DATE 7278c

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PROJ. NO. 5599

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad L. Tommiuni
Committee Member Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-68, REV.2

Reference RRF No. 5599-68, REV.2

Date: 7/15/82

Description of Resolution:

THIS ITEM RELATED TO 2 SUPPORTS.
* DLA-101-H2 WAS CONSIDERED IN THE RECONCILIATION CALCS SUPPLIED BY BECHTEL AND IS ACCEPTABLE. DLA-101-H1 WAS NOT. BASED ON BECHTEL RESPONSE, DLA-101-H1 IS ACCEPTABLE WITH NEW LOADS. HOWEVER, DLA-101-H2 HAD ONE OTHER SUPPORT ATTACHED WHICH APPLIED AND ADD'L 200-300#, DLA-101-H1 HAS TWO OTHER SUPPORTS ATTACHED WHICH APPLY AN ADDITIONAL 2000# (PER BECHTEL). IN BOTH CASES THE ADDITIONAL LOADS ARE ACCEPTABLE BUT THERE IS NO STANDARD CONCERNING WHEN TO CONSIDER THESE EFFECTS (I.E. LOAD, SIZE, NO. OF ATTACHMENTS). TES IS CONCERNED WITH CONTROL OF THE DESIGN PROCESS.

Classification of Item after Resolution: POTENTIAL FINDING

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TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

W. J. McBrien
Reviewer Signature

D.F. Landers
Project Manager Signature

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES

TELEDYNE ENGINEERING SERVICES
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TES PROJ. NO. 5599
DATE

Independent Design Review

Susquehanna Steam Electric Station Unit I

Reviewer Report Form ⚠

RECORD COPY
PROJ. NO. 5599

RRF No. 5599-68 Rev 2

Reviewer Name: William McBrine Date: 7/15/82

Classification of Item: potential finding

Reference Documents:
Support Drawings PLA-101-141 Rev 5F2

Bechtel Calc 876 (PS)

Description of Item:

The reviewer agrees that the attachment of the small pipe hangers to the feedwater support in question will not effect the support adequacy. There is no indication, however, that the impact of these attached supports was determined in the design process. The practice of attaching small pipe hangers to existing supports without reevaluating the existing structure could result in an overstressed situation

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-68 Rev. 1

Reference RRF No. 5599-68 Rev. 1

Date: 6-24-82

Description of Resolution:

Requires a response from Bechtel addressing the method used to include attached support reactions of supports SP HCC-137-2-H18 and SP-HCC-137-3-H2013 in the evaluation of support DLA-101-H1 adequacy. A copy of the backup calculation should be provided.

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PROJ. NO. 5599

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TES PROJ. NO. 5599
DATE 6-29-82

Classification of Item after Resolution: OPEN ITEM

Reviewer Signature

Project Manager Signature

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES

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TES PROJ. NO. 5599
DATE 62982

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-68 Rev 1

Reviewer Name: William McBrine

Date: 6/18/82

Classification of Item: open

RECORD COPY
PROJ. NO. 5599

Reference Documents:

Support drawing DLA-101-H1 Rev 5 F2
Bechtel Calc 876(PS) and ABR-876

Description of Item:

The structural adequacy calculation for support DLA-101-H1 does not include the influence of two supports which are attached, SP-HCC-137-2-H18 and SP-HCC-137-3-H2013.

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 68

Bechtel Response

THE LOADS FOR THE TWO SMALL PIPE HANGERS IN QUESTION WAS NOT INCLUDED IN THE ANALYSIS FOR HGR DLA-101-H1 DUE TO THE RELATIVELY SMALL IMPACT SUCH AN INCLUSION WOULD HAVE ON EXISTING CALCULATIONS.

PER CALC 876 (PS), THE STRESSES OF THE CRITICAL ITEM OF THE HGR DETAIL (ITEM #2) ALONG WITH IT'S RESPECTIVE ALLOWABLE STRESSES ARE;

LOAD CONDITION	EXIST. STRESSES	ALLOW STRESSES
NORMAL/UPSET	2470 psi	19100 psi
EMERG/FAULT	4460 psi	25400 psi

SEE PAGE 32 OF STRUDL OUTPUT, (ATTACHED)

BASED ON ABOVE TABLE, THE ADDITION OF APPROX. 2K (DUE TO THE SMALL PIPE ATTACHMENT) TO 38K L.P. LOAD WILL HAVE A NEGLIGIBLE EFFECT ON EXIST STRUCTURE.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 0599
DATE 7.1.82

Response by H. Cruz
Date 7/9/82
Approved by L. Memuli
Date 7/10/82

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PROJ NO. 0599

LOCATION: ASSEMBLY FRAME SHOW

MEMBER: (W12 X 190 BOXED WITH 1/2" PLATE) ITEM #2 & 3 R/4

LOADING	MAX NORMAL	AT SECTION		MIN NORMAL	AT SECTION	
1	0090.0	.0000	PA	0100.0	.0000	PA
2	0000.0	1.0000		0180.0	1.0000	
3	0489.0	.0000		0800.0	.0000	

MEMBER: (12" Φ SCH 160 PIPE) ITEM #8 R/4

LOADING	MAX NORMAL	AT SECTION		MIN NORMAL	AT SECTION	
1	0000.0	.0000	PA	0200.0	.0000	PA
2	0098.1	.0000		0300.1	.0000	
3	0979.0	.0000		0979.0	.0000	

MEMBER: (BUILT-UP BOX SECN) R/4

LOADING	MAX NORMAL	AT SECTION		MIN NORMAL	AT SECTION	
1	900.0	.0000	PA	002.0	.0000	PA
2	070.1	.0000		1202.0	.0000	
3	070.1	.0000		1202.0	.0000	

MEMBER: (BUILT-UP BOX SECN) R/4

LOADING	MAX NORMAL	AT SECTION		MIN NORMAL	AT SECTION	
1	900.0	.0000	PA	008.0	.0000	PA
2	065.0	.0000		902.0	.0000	
3	1000.0	.0000		1007.0	.0000	

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-68

Reference RRF No. 5599-68

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel addressing how loads and reactions from other supports, which are attached to the F.W. systems support, are incorporated into the final design calculations.

Classification of Item after Resolution: Open Item

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TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6.8.82

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-68

Reviewer Name: William McBrine

Date: 6/4/82

Classification of Item: open

Reference Documents:

Support Drwgs DLA-101-H1 Rev 5 F_1
DLA-101-H2 Rev 5 F_2
Bechtel Calc 876(PS) "final"

Description of Item:

The structural adequacy calculation for support DLA-101-H1 does not include the influence of two supports which are attached, SP HCC-137-2-H18 and SP HCC-137-3-H2013.

The calc. for DLA-101-H2 also does not mention an existing support shown on the drawing which is attached.

Reviewer Signature

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PROJ. NO. 5599 TES PROJ. NO. 5599

DATE 6.8.82

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-24

Reference: RRF No. 5599-39, Rev. 2

Date: July 23, 1982

PMR No. 5599-39, Rev. 2

Internal Committee Resolution of Potential Finding:

The committee agrees with the reviewer and Project Manager. The items listed impact the adequacy of the design.

TELEDYNE ENGINEERING SERVICES
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TES PROJ. NO. 5599
DATE 7 27 82

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PROJ. NO. 5599

Classification of Item after Committee Resolution: Finding

James G. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-39 Rev. 2

Reference RRF No. 5599-39 Rev. 2

Date: 7-21-82

Description of Resolution:

The As-built drawing DLA-102-48 Rev. 2/F2 does not show the four sided weld fix between item's ① and ③. Also the As-built still shows a 3/8" fillet weld which was shown to fail in the adequacy calc. Therefore the support has two welds which are not adequate.

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DATE 72782

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PROJ. NO. 0899

Classification of Item after Resolution: Potential Finding

Reviewer Signature

Project Manager Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-39 Rev 2

Reviewer Name: William McBrine

Date: 7/16/82

Classification of Item: potential finding

Reference Documents:

Calculation 876 (PS)
Calc RE-DLA-102-H&C
Dwg. DLA-102-H8 Rev 2/F2

Description of Item: On sheet 82 of calc 876 (PS) a two sided fillet weld between items (1) and (3) is shown to be inadequate. Bechtel reconciliation calc calls out a four sided weld as a fix. This redesign is not shown on drawing DLA-102-H8 Rev 2/F2.

Also, a 3/8" fillet weld between item (3) and the shield wall proves inadequate in calc 876 (PS). No redesign is called out in the reconciliation calc or the support drawing.

TELEDYNE ENGINEERING SERVICES
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DOCUMENT
TES PROJ. NO. 5599
DATE 7/27/82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-39 Rev. 1

Reference RRF No. 5599-39 Rev 1

Date: 6-25-82

Description of Resolution:

Requires a response from Bechtel addressing the design adequacy of support DLA-102-H8. Support calc's show the weld to be overstressed and the support was installed without increasing the weld size.

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TELEDYNE ENGINEERING SERVICES
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DOCUMENT

TES PROJ. NO. 5599.

DATE 6.29.82

Classification of Item after Resolution: Potential Finding

W. J. McBrien
Reviewer Signature

R. A. Esser
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 62982

RRF No. 5599-39 Rev 1

Reviewer Name: William McBrine

Date: 6/21/82

Classification of Item: open

Reference Documents:

Calculation 876(PS)
Pipe Support Adequacy Calc.
drwg DLA-102-H8 Rev 2/F2

RECORD COPY
PROJ. NO. 5599

Description of Item:

The URS/BLUME Calc for Support Mark No. DLA-102-H8 indicates several over stressed welds. No Modification calculation or weld change on the as-built support drawing is apparent.

Discussion with TES reviewers as suggested by PMR 5599-39 rev 0 have not closed this item

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-39

Reference RRF No. 5599-39

Date: 6/2/82

Description of Resolution:

TES REVIEWER TO DISCUSS WITH TES ANALYSIS REVIEWER TO ATTEMPT TO RECONCILE.

TES REVIEWER TO REVISE RRF TO INDICATE RESULTS OF THIS DISCUSSION

Classification of Item after Resolution: OPEN

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6·3·82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

DF Landers
Project Manager Signature

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES

RECORD COPY
PROJ. NO. 5599
TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6.1.82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-39

Reviewer Name: William McBrine

Date: 5/24/82

Classification of Item: open item

Reference Documents: Calculation 876 (PS)
Pipe Support Adequacy Calc
drwg DLA-102-H8 Rev 2/F2

Description of Item:
The URS/BLUME calc for Support Mark No. DLA-102-H8 indicates several over stressed welds. No modification caculation or weld change on the AS built Support drawing is apparent

W. J. McBrine
Reviewer Signature

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

APPENDIX 4

PHASE 1

OBSERVATION DETAILS

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-10

Reference: RRF No. 5599-33, Rev. 1 Date: July 15, 1982

PMR No. 5599-33, Rev. 1

Internal Committee Resolution of Potential Finding:

The Internal Committee agrees with the reviewer. The Code allows the use of various Editions and Addenda to be used in the Design, if all applicable provisions are met. However, this should be detailed and called out in the Design Specification; Therefore, Specification 8856-M-419 must be referenced in the Design Spec.

This item does not impact the adequacy of the design but has significance relative to the design process and practice.

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

DF Landers
Project Manager Signature

JM Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

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TELEDYNE ENGINEERING SERVICES
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NO. [illegible] TES PROJ. NO. [illegible]
DATE [illegible]

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-33, REV. 1

Reference RRF No. 5599-33, REV. 1

Date: 7/14/82

Description of Resolution:

AGREE W/ REVIEWER. ALSO THE USE OF VARIOUS EDITIONS AND ADDENDA OF THE CODE FOR A GIVEN PIPING SYSTEM CAN BE A PROBLEM UNLESS ALL ASSOCIATED REVISIONS OF THE APPLICABLE ADDENDA ARE REVIEWED FOR THEIR EFFECT.

FOR EXAMPLE, 3 DIFFERENT EDITIONS AND 6 DIFFERENT ADDENDA ARE USED IN THE STRESS REPORT FOR CLASS 1 FEEDWATER PIPING. ADDITIONALLY, ONLY CERTAIN PARAGRAPHS ARE USED IN EACH CASE.

Classification of Item after Resolution: OBSERVATION

RECORD COPY

Reviewer Signature

DF Landers

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-33 Rev. 1

Reviewer Name: Stanley Wharton Date: 7-13-82

Classification of Item: [redacted] Observation

Reference Documents: SR 8856-1500 R.1
SPEC 8856-M-419

Description of Item:

SPEC 8856-M-149 included in response lists exclusion of 1" lines. This spec, 8856-M-419, must be referenced in the design spec 8856-M-

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TELEDYNE ENGINEERING SERVICES
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TES P[illegible]
DATE [illegible]

Reviewer Signature

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne PRF. No. 5599 - 33

Bechtel's Response

1-inch Line have been analyzed in accordance with ASME SECTION III Class 2 rule based on 1975 summer addenda. The branch connection has been analyzed in accordance with Class 1 rules and included in calculation No. 1503 in Appendix E. Rev. 1. See the attachment to the response to KKF No 5599-20.

See attached specification for exclusion

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DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

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PROJ. NO. 5599

Responded By Chi Chavn Date 7/6/82

Approved By L. Memula Date 7/7/82

Specification 8856-M-419
Revision 1

TECHNICAL SPECIFICATION

FOR

ASME CODE EFFECTIVE DATES

FOR CONSTRUCTION OF NUCLEAR PIPING SYSTEMS

INCLUDING PIPING SUPPORTS

FOR

SUSQUEHANNA STEAM ELECTRIC STATION

UNITS 1 AND 2

PENNSYLVANIA POWER & LIGHT COMPANY

ALLENTOWN, PENNSYLVANIA

BECHTEL POWER CORPORATION.
San Francisco, California

No.	DATE	REVISIONS	BY	CH'K	DESIGN SUPV	ENG'R	PROJ ENGR	APPV
3						n/a		
2	5/20/82	REVISED AS SHOWN				n/a		
1	1-15-82	Issued for USE				n/a		

SCALE	DESIGNED	DRAWN	CHIEF ENGR	
			JOB No. 8856	
PF27/2-1	SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 & 2 PENNSYLVANIA POWER & LIGHT COMPANY		SPEC/DES GUIDE NO. 8856-M-419	REV. 1

TABLE OF CONTENTS

TECHNICAL SPECIFICATION

FOR

ASME CODE EFFECTIVE DATES

FOR THE CONSTRUCTION OF NUCLEAR

PIPING SYSTEMS, INCLUDING PIPING SUPPORTS

1.0 SCOPE

This specification delineates the Code edition and addenda of ASME Section III, Division I that apply to the construction of ASME Section III, piping systems, including piping supports, by Bechtel. Construction is an all inclusive term comprising of materials, design, fabrication, examination, testing, inspection and certification required in the manufacture and installation of items included in these piping systems.

This specification also states the Code edition and addenda applicable to construction of certain piping system items designed and supplied by others for installation by Bechtel.

2.0 APPROVAL

Prior to implementation of this specification, including each revision, the concurrence of the Client (Pennsylvania Power & Light) and the jurisdictional authority (Commonwealth of Pennsylvania) shall be obtained. (See Appendix A).

3.0 PIPING SYSTEMS (INCLUDING PIPING SUPPORTS)

3.1 Bechtel Designed Systems

ASME Section III piping and piping supports are constructed in accordance with ASME Section III, 1971 Edition with Addenda through Winter 1972, except as permitted below. Note that per this code, Nuclear Class 1 pipe supports are designed per ANSI B31.7-1969 and Nuclear Class 2 and 3 pipe supports are designed per ANSI B31.1-1967.

3.1.1 Use of Later Code Editions and Addenda

In accordance with NA 1140(f) of ASME III, the provisions of the following Code Editions and Addenda shall apply:

a) Attachment to pressure retaining material shall be in accordance with paragraphs NB-4433, NC-4433 and ND-4433 of the 1977 Edition, with Addenda through Summer 1979.

b) For installation of attachments to piping systems after pressure testing, paragraphs NB-4436, NC-4436 and ND-4436 of ASME Section III, 1974 Edition, Summer 1976 Addenda is used.

c) Code Nameplates, Stamping and Data Reports shall be in accordance with ASME Section III, 1977 Edition, with Addenda through Winter 1977, paragraphs NCA-8210, NCA-8220, NCA-8230, NCA-8300, NCA-8414, NCA-8415, NCA-8416, NCA-8417, NCA-8418 and NCA-8420.

d) Postweld heat treatment shall be in accordance with ASME Section III, 1974 Edition, with Addenda through Summer 1976, paragraphs NB-4600, NC-4600 and ND-4600, as applicable.

e) 1" and smaller Nuclear Class 1 piping is designed in accordance with the rules for Nuclear Class 2 piping per ASME Section III 1974 Edition, Summer 1975 Addenda, Paragraph NB3630.

f) Allowable stresses for pipe supports for Nuclear Class 1,2+3 piping shall be in accordance with ANSI Power Piping Code B31.1, 1973.

g) For the design of Nuclear Class 1 flanges, ASME Section III, 1977 Edition with Addenda through Summer 1979 is used.

h) For the design of Nuclear Class 1, 1" Branch Connections, ASME Section III, 1977 Edition with Addenda through Summer 1979 is used.

3.1.2 Material

Piping materials shall conform to ASME Section III, 1971 Edition, with Addenda through Winter 1972 or any later Edition or Addenda.

3.1.3 Code Cases

Code Cases 1481-1, 1606, N-46, N-237, N-240 and N-316 shall apply.

3.2 Control Rod Drive Piping and Supports

Control Rod Drive Hydraulic System (CRD) piping and supports are constructed in accordance with ASME Section III, 1974 Edition with Addenda through Winter 1975, except as permitted below.

3.2.1 Use of Later Code Editions and Addenda

In accordance with NA 1140(f) of ASME III, the provisions of the following Code Editions and Addenda shall apply:

a) Material

1) Materials conform with ASME Section III, 1974 Edition, with Addenda through Winter 1975, or any later Edition or Addenda.

2) ASME Section III, 1977 Edition, with Addenda through Winter 1977, Subsection NF, paragraph NF-2610, shall apply to piping system suppprt.

3.2.2 Code Cases

a) For the construction of piping supports, Code Case 1644-8 shall apply.

b) Code case N-316 shall apply for piping.

4.0 QUALITY ASSURANCE PROGRAM

The Quality Assurance Program (BQAM-ASME III, Division I) in effect for the construction activities performed by Bechtel shall conform to ASME Section III, 1971 Edition with Addenda through Winter 1972 or to later Code editions and addenda. The current BQAM applicable to the Susquehanna Project is project Revision 2 to the corporate BQAM-ASME III, Division 1, 1974 Edition, Revision 3.

The Quality Assurance Programs in effect for field construction activities not performed by Bechtel shall conform to the requirements of the applicable Code editions and addenda which are identified in the pertinent subcontractor's documents approved by Bechtel.

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SPECIFICATION REVISION AUTHORIZATION

TECHNICAL SPECIFICATION

FOR

CODE EFFECTIVE DATES

FOR THE CONSTRUCTION OF

NUCLEAR PIPING SYSTEMS, INCLUDING

PIPING SUPPORTS

FOR

SUSQUEHANNA STEAM ELECTRIC STATION

UNITS 1 AND 2

PENNSYVANIA POWER & LIGHT COMPANY

ALLENTOWN, PENNSYLVANIA

C B Poser	5/20/82
Bechtel	Date
W J Rhoades	6/10/82
Pennsylvania Power & Light	Date
J. E. Blair	6/16/82
Commonwealth of Pennsylvania	Date

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form △1

PMR No. 5599-33

Reference RRF No. 5599-33

Date:

Description of Resolution:

BECHTEL MUST PROVIDE JUSTIFICATION FOR NOT PERFORMING ANALYSIS OF 1" PIPING. CODE OF RECORD (SC III, 1971 THRU W1972 ADDENDA) DOES NOT PROVIDE EXEMPTION FOR 1" PIPING.

Classification of Item after Resolution: OPEN

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6·3·82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

DF Landers
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-33

Reviewer Name: Stanley Wharton

Date: 5-24-82

Classification of Item: OPEN

Reference Documents:

SR8856-1500 R1

Description of Item:

1" lines not analyzed. Analysis required unless exclusion is specified. Where is exclusion listed if at all.

RECORD COPY

PROJ. NO. 5599 DATE 6/1/82 5599

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-15

Reference: RRF No. 5599-17

Date: July 23, 1982

PMR No. 5599-17

Internal Committee Resolution of Potential Finding:

This item does not impact the adequacy of the design of the F.W. System reviewed by TES.

However, for cases where $t_{Branch} > t_{run}$ this ~~process~~ item could have signifance relative to conservatism and design practice

TELEDYNE ENGINEERING SERVICES
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DOCUMENT
TES PROJ. NO. 5899
DATE 72782

RECORD COPY
PROJ. NO. 5599

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

R. F. Gero
Project Manager Signature

J. M. Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-17

Reference RRF No. 5599-17

Date: 6/2/82

Description of Resolution:

WITH RESPECT TO PORTION OF FEEDWATER SYSTEM REVIEWED (EXCLUSIVE OF SMALL BRANCH CONN.) THE BECHTEL APPROACH IS CONSERVATIVE SINCE BRANCH WALL THICKNESS & RUN WALL THICKNESS ARE EQUAL. HOWEVER THE APPROACH USED HERE COULD BE UNCONSERVATIVE FOR CASES WHERE BRANCH t > RUN t (WELDOLET, ETC.)

Classification of Item after Resolution: OBSERVATION

Reviewer Signature

TELEDYNE ENGINEERING SERVICES
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RECORD COPY

TES PROJ. NO. 5599

DATE 6.3.82

PROJ. NO. 5599

D. F. Landers

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form 1

RRF No. 5599-17

Reviewer Name: Stanley Wharton Date: 5-24-82

Classification of Item: OPEN

RECORD COPY

Reference Documents:

Final ME-912 runs (Delta T's) PROJ NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6.1.82

Description of Item:

Tee's: film coefficient for the run and the branch are the same, Film coefficient for 24"x12" tee should use 1/3 the run flow rate for determination of branch film coefficient

example: transient 3

RUN	4193 GPM	h = 446 BTU/hr-ft²-°F
BRANCH	4193 GPM	h = 1411 BTU/hr-ft²-°F
BRANCH SHOULD BE	1397.5 GPM	h = 586 BTU/hr-ft²-°F

If branch thicker than run - equall flow rates for run and branch unconservative

Stanley D. Wharton
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-17

Reference: RRF No. 5599-71, Rev.1
PMR No. 5599-71, Rev.1

Date: July 23, 1982

Internal Committee Resolution of Potential Finding:

The ICR agrees with the comments of the reviewer and project Manager. The resolution of "As Built" differences versus design should be detailed in the revised calculations.

However, this item does not impact the adequacy of the Design but has significance relative to the design process.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 0599
DATE 72782

RECORD COPY
PROJ. NO. 0599

Classification of Item after Committee Resolution: Observation.

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 72782

RECORD COPY
PROJ. NO. 5599

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-71, REV. 1

Reference RRF No. 5599-71, REV. 1

Date: 7/22/82

Description of Resolution: ~~[illegible]~~

THE USE OF A SINGLE STATEMENT TO RECONCILE A NUMBER OF DIFFERENCES BETWEEN AS-BUILT GEOMETRY AND AS ANALYZED IS DIFFICULT TO PASS JUDGEMENT ON. IT WOULD BE MORE APPROPRIATE TO LIST THE DISCREPANCIES THAT HAVE BEEN RECONCILED BY INSPECTION TO ASSURE EACH DIFFERENCE WAS ADDRESSED

Classification of Item after Resolution: OBSERVATION

Reviewer Signature

DP Saunders

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form

TES PROJ. NO. 5899
DATE 72782

RECORD COPY
PROJ. NO. 5599

RRF No. 5599-71 Rev 1

Reviewer Name: William McBrine

Date: 7/20/82

Classification of Item: Observation

Reference Documents: RRF 5599-71 Rev 0 & Bechtel Response
Dwg DCA-102-1410 Rev 3/F1
Calc 876 (PS)
Calc ABR-876 Sheet 24

Description of Item: The discrepancies between the as-built drawing and the support calculations do not effect the design adequacy. As the Bechtel response indicates, the support design has been reconciled and approved. In this case the reconciliation does not mention the welds in question but only indicate that the calcs in general have been reviewed and approved. The reconciliation process does not guarantee the existence of objective evidence that each discrepancy has been in fact reviewed and approved by comparison or any other reason.

W. J. McBrine
Reviewer Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-71

Reference RRF No. 5599-71

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel addressing the smaller welds used on the support, DLA-102-H10, As-Built and show that the welds are still ok.

Classification of Item after Resolution: Open Item

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
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DOCUMENT
TES PROJ. NO. 5599
DATE 6.8.82

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-21

Reviewer Name: William McBrine

Date: 6/7/82

Classification of Item: open

Reference Documents:

Bechtel Calc 876(PS) "final"
Drawing DLA-102-H10 Rev 3/F1

Description of Item:

Welds between items 1 & 4 and 3 & 4 are larger in the analysis than they are on the drawing. There is no evidence that this change has been reviewed and approved

TELEDYNE ENGINEERING SERVICES
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DOCUMENT

RECORD COPY

PROJ. NO. 5599

TES PROJ. NO. 5599

DATE 6.8.82

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-18

Reference: RRF No. 5599-66, Rev. 1 Date: July 23, 1982

PMR No. 5599-66, Rev. 1

Internal Committee Resolution of Potential Finding:

The committee agrees with the reviewer and project Manager

This item has significance relative to the design ~~process~~ practice and applicable procedures but does not impact the design

TELEDYNE ENGINEERING SERVICES
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DOCUMENT
TES PROJ. NO. 5599
DATE 72782

PROJ. NO. 5899

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

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TES PROJ. NO. 0899
DATE 12782

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PROJ. NO. 0899

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-66 Rev. 1

Reference RRF No. 5599-66 Rev. 1

Date: 7-21-82

Description of Resolution:

Agreed that the T.S. 6x6x½ is adequate for the design of this item and the calculations should show the actual member used in the as-built. In this case the subsituting of the T.S. 6x6x½ for the W8x31 does not affect the adequacy of the design but it does have a significance relative to the applicable design procedures.

Classification of Item after Resolution: Observation

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Susquehanna Steam Electric Station Unit 1

TES PROJ. NO. 5599
DATE 7/7/82

Reviewer Report Form ⚠

RECORD COPY

RRF No. 5599-66 rev 1

PROJ. NO. 0899

Reviewer Name: William McBride

Date: 7/17/82

Classification of Item: observation

Reference Documents:

Calc 876 (PS)
Calc RE-DLA-102-H12C
drwg DLA-102-H12 Rev 3/F2

Description of Item: Reconciliation Calculation RE-DLA-102-H12C calls out a W8x31 for member 3. The corresponding member on drawing DLA-102-H12 Rev 3/F2 is a T.S 6x6x1/2. The tube steel is not stronger than a W8x31 in the direction of highest loading and the calcs available for review do not justify this change.

This item does not effect the adequacy of design.

W. J. McBride
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-66

Reference RRF No. 5599-66

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel in the form of reconciliation calculations showing the new larger members are not overstressed. for support DLA-102-H12.

Classification of Item after Resolution: Open Item

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

RECORD COPY

PROJ. NO. 5599

TES PROJ. NO. 5599

DATE 6.8.82

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-66

Reviewer Name: William McBrine

Date: 6/7/82

Classification of Item: open

Reference Documents:

Bechtel Calc 876 (PS) "final"
Drawing DLA-102-H12 Rev 3/F1

Description of Item:

Adequacy calc for DLA-102-H12 indicates the members 2 and 3 are overstressed. Larger members are used on the as-built but no calcs which demonstrate the adequacy of these members are included

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

RECORD COPY

PROJ. NO. 5599 TES PROJ. NO. 5599

DATE 6·8·82

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-19

Reference: RRF No. 5599-73, Rev. 1 Date: July 23, 1982

PMR No. 5599-73, Rev. 1

Internal Committee Resolution of Potential Finding:

The committee agrees with the reviewer and project Manager.
This item does not impact the design but does have significance relative to the design practice

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5899
DATE 72782

RECORD COPY
PROJ. NO. 5899

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-73, REV. 1

Reference RRF No. 5599-73, REV. 1

Date: 7/22/82

Description of Resolution:

THE PROJ. MGR. AGREES THAT THE INSTALLED SUPPORT IS ADEQUATE FOR THE SPECIFIED LOADING. HOWEVER, THE DIFFERENCES BETWEEN CALCS, DWGS & INSTALLATION INDICATE THAT RECORDS NEED TO BE UPDATED. THE DIFFERENCES ARE AS FOLLOWS:

CALCULATION	DRAWING	AS-BUILT
W8X20	W10X49	W8X28

CONCERNED WITH THE FACT THAT BECHTEL RESPONSE HAD TO BE REVISED SINCE THEIR INITIAL RESPONSE CALLED OUT DIFFERENT SIZES. THIS SITUATION INDICATES FAILURE TO COMPLY WITH PROCEDURES.

Classification of Item after Resolution: OBSERVATION

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7/27/82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

D. F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-73 Rev 1

Reviewer Name: William McBrine

Date: 7/17/82

Classification of Item: Observation

Reference Documents:

RRF 5599-73 Rev 0
Drwg DLA-102-H8 Rev 2/F2
Calc 876 (PS)
Bechtel Response to RRF-5599-73 Rev 0

Description of Item:

Item 5 on drwg DLA-102-H8 Rev. 2F2 is mistakenly called out as a W6x49. The adequacy calcs consider this item to be a W8x20. The existing installation is a W8x28.

These discrepencies do not effect the design adequacy.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5699
DATE 72782

WORK COPY
PROJ. NO. 5699

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-73

Reference RRF No. 5599-73

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel showing that the item (5) on Support Dwg DLA-102-H8 Rev. 2/F2, which was addressed in the adequacy calculations as a W8X28, is still ok.

Classification of Item after Resolution: Open Item

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6-8-82

Reviewer Signature

Project Manager Signature

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-73

Reviewer Name: William McBrine

Date: 6-4-82

Classification of Item: open

Reference Documents:

Bechtel Calc 876(PS) "final"

Drawing DLA-102-H8

Description of Item:

Item 5 in adequacy calculation is a W8x28. In the as-built it is a W6x49.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Reviewer Signature

RECORD COPY

PROJ. NO. 5599

TES PROJ. NO. 5599

DATE 6.8.82

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-20

Reference: RRF No. 5599-79

Date: July 23, 1982

PMR No. 5599-79

Internal Committee Resolution of Potential Finding:

The ~~reviewed~~ Committee agrees with the reviewer and Project Manager. This item does not impact the design but has significance relative to the design practice.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 72782

RECORD COPY
PROJ. NO. 5599

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

J M Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-79

Reference RRF No. 5599-79

Date: 6-18-82

Description of Resolution:

Bechtel should develop the practice of recording all judgements of adequacy whether by comparison or by inspection. Not recording the method used to determine the adequacy prolongs the review and usually requires a request for more information from Bechtel to resolve the question. This does not impact the adequacy of the design.

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PROJ. NO. 5599

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DOCUMENT
TES PROJ. NO. 5599
DATE 6-29-82

Classification of Item after Resolution: Observation

W. J. McBride
Reviewer Signature

R. K. Ewer

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-79

Reviewer Name: William McBrine

Date: 6/4/82

Classification of Item: Observation

Reference Documents:

Bechtel Calculation 816(PS) "Final"

Description of Item:

In the structral adequacy calculations support structural members and welds are often not mentioned. It appears that these elements are passed by inspection or comparison. They should be noted so in the calcs.

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TES PROJ. NO. 5599
DATE 6.10.82

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PROJ. NO. 5599

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form △1

ICR No. 5599-21

Reference: RRF No. 5599-87, Rev. 1 Date: July 23, 1982

PMR No. 5599-87, Rev. 1

Internal Committee Resolution of Potential Finding:

The ICR agrees with the reviewer and Project Manager. This item (2) does not impact the adequacy of design but has signifance relative to design practice

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 72782

RECORD COPY
PROJ NO. 5599

Classification of Item after Committee Resolution: Observation

James R. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Independent Design Review

Susquehanna Steam Electric Station Unit 1

TES PROJ. NO. 5599

DATE 7/23/82

Project Manager Resolution Form ⚠

RECORD COPY

PROJ. NO. 5599

PMR No. 5599-87, REV. 1

Reference RRF No. 5599-87, REV. 1

Date: 7/22/82

Description of Resolution:

ITEM 1. – PROJ. MGR. AGREES THIS ITEM IS CLOSED

ITEM 2. – PROJ. MGR. AGREES THAT A SINGLE WELD CALCULATION IS NOT ADEQUATE TO VALIDATE SUPPORT DESIGN. THE TES REVIEWER PERFORMED A NUMBER OF CALCULATIONS TO DETERMINE SUPPORT ADEQUACY. THE CALCULATION AS A MINIMUM SHOULD LIST ALL ITEMS PASSED BY COMPARISON WITH ITEM ANALYZED.

ITEM 3. – THIS ITEM IS BEING CARRIED UNDER RRF 93

Classification of Item after Resolution: OBSERVATION

W. J. McBa

Reviewer Signature

D F Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Independent Design Review

TES PROJ. NO. 6899 Susquehanna Steam Electric Station Unit 1

DATE 7/27/82

Reviewer Report Form ⚠

RECORD COPY

PROJ. NO. 6899

RRF No. 5599-87 Rev 1

Reviewer Name: William McBrine

Date: 7/20/82

Classification of Item: observation

Reference Documents:
Calc 876 (PS) ABR-876
RRF-5599-87 Rev 0 & Bechtel Response
RRF 5599-93

Description of Item:

1) The analysis in question for support DLA-102-H1 is included with the civil calcs which were included with Bechtel's response. This item on the RRF is closed.

2) Upon further investigation the reviewer agrees that the support in question is adequate. However, the calculation done is an over simplification of the problem and the support adequacy is not apparent based on the calcs performed. (observation)

3) The item in question regarding the attachment of DLA-102-H5 to existing steel is resolved in RRF 5599-93 (closed)

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-87

Reference RRF No. 5599-87

Date: 6-24-82

Description of Resolution:

Bechtel to provide the methods used for evaluating the items addressed in RRF 87 for supports DLA-102-H1
DLA-102-H2
DLA-102-H5

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 62982

RECORD COPY
PROJ. NO. 5599

Classification of Item after Resolution: OPEN ITEM

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

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Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

TES PROJ. NO. 5399
DATE 6 29 82

RRF No. 5599-87

Reviewer Name: William McBrine

Date: 6/21/82

Classification of Item: open

Reference Documents:

Calc 876(PS) "final" RECORD COPY
Pipe Support Adequacy Calc. PROJ. NO. 5399
ABR-876

Description of Item:

The following items are not evaluated in the calculation package and they are not adequate by inspection.

Support DLA-102-H1 Reinforcing @ attachment to PR #604
" DLA-102-H2 Several welds & members not evaluated.
" DLA-102-H5 existing plates @ support base.

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599- 22

Reference: RRF No. 5599- 80, Rev 1

Date: July 23, 1982

PMR No. 5599- 80, Rev 1

Internal Committee Resolution of Potential Finding:

The Committee agrees with the reviewer and Project Manager. There is currenty no Industry Standard or NRC requirements.

This item does not impact the adequacy of the design of the F.W. system reviewed By TES. It may have significance relative to Design practices

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 72382

RECORD COPY
PROJ NO. 5599

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

R. A. Esro
Project Manager Signature

J. W. Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-80, REV. 1

Reference RRF No. 5599-80, REV. 1

Date: 7/15/82

Description of Resolution:

THE PROJECT MANAGER AGREES WITH THE REVIEWER. FAILURE TO INCLUDE BUILDING STRUCTURE (WHICH ARE NOT SOLEY DESIGNED FOR PIPE SUPPORT PURPOSES) IS NOT A PROBLEM USUALLY SINCE MOST OF THIS STRUCTURE IS LARGE AND THEREFORE STIFF. HOWEVER, THERE ARE SITUATIONS IN WHICH THE STIFFNESS OF THE STRUCTURE IS NOT LARGE AND, AS COMPARED TO SOME SUPPORTS, SIGNIFICANTLY REDUCES THE TOTAL SPRING CONSTANT. THERE SHOULD BE A STANDARD WHICH DEFINES A CUTOFF POINT FOR "BUILDING STRUCTURE", OR A MINIMUM ALLOWABLE STIFFNESS VALUE FOR BUILDING STRUCTURE. PROJ. MGR. FEELS THAT THE OVERALL SEISMIC DESIGN UTILIZED TODAY IS CONSERVATIVE AND THE IMPACT OF THIS RRF IS NOT SIGNIFICANT

Classification of Item after Resolution: OBSERVATION

TELEDYNE ENGINEERING SERVICES
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DOCUMENT

RECORD COPY

PROJ. NO. [illegible]

TES PROJ. NO. [illegible]

DATE [illegible]

W. J. McBr[illegible]
Reviewer Signature

D. F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RECORD COPY
PROJ. NO. 5599

RRF No. 5599-80 Rev 1

Reviewer Name: William McBrine

Date: 7/15/82

Classification of Item: observation

Reference Documents:
Bechtel Calc 876(PS)

Description of Item: The reviewer agrees with the Bechtel response to RRF 5599-80. However, this raises the question as to how realistic this approach is when the inclusion of the effects of building steel could significantly change the calculated support stiffness. As there is no definitive "right or wrong" to this problem, the Bechtel method is acceptable as compared to the practice of using "rigid" restraints in the piping analysis.

W. J. McBrine
Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW (WJM)

OPEN ITEMS:

Teledyne RRF No. 5599 - 80

Bechtel Response

In calculation of pipe support stiffness for use in piping analysis flexibilities of pipe support components and supporting structure are considered. However, building structures (main beams, floors, walls etc) which are not solely designed for pipe support purpose are not considered in pipe support stiffness calculations.
This approach is consistant with the industry practice and provides sufficient representation of pipe supports in determining piping response.

TELEDYNE ENGINEERING SERVICES
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TES PROJ. NO. 5599
DATE 7-14-82

RECORD COPY
PROJ. NO. 5599

Response by L. Memula
Date 7-10-82
Approved by [illegible]
Date 7-12-82

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-80

Reference RRF No. 5599-80

Date: 6-18-82

Description of Resolution:

Requires a response from Bechtel to clarify the method used to include the flexibility of the existing structural steel in the stiffness calc's for feedwater line supports.

RECORD COPY
PROJ NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 62982

Classification of Item after Resolution: OPEN ITEM

W. J. McBrom
Reviewer Signature

R. M. Ross

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-80

Reviewer Name: William McBrine

Date: 6/8/82

Classification of Item: open

Reference Documents:

Bechtel Calc. 876(PS) "final"

Description of Item:

In the Bechtel Support stiffness calculations it appears that the "existing" structural steel flexibility is not included. In some cases the effect of the existing steel would significantly reduce the calculated stiffness and possibly have an impact on the piping analysis.

TELEDYNE ENGINEERING SERVICES
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DOCUMENT

TES PROJ. NO. 5599

DATE 6-10-82

RECORD COPY

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-~~#~~25 JAF

Reference: RRF No. 5599-88

Date: July 23, 1982

PMR No. 5599-88

Internal Committee Resolution of Potential Finding:

This item does not impact the adequacy of the results, but has significance relative to design practice and applicable procedure.

TELEDYNE ENGINEERING SERVICES
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DOCUMENT
TES PROJ. NO. 5599
DATE 72782

RECORD COPY
PROJ. NO. 5599

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

J M Hanson
Committee Member Signature

Prasad R. Kammingmi
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-88

Reference RRF No. 5599-88

Date: 6-24-82

Description of Resolution:

Calculations should be performed in such a manner that an independent reviewer can easily follow it and verify the completeness of it. This has no impact on the design adequacy but has a significance relative to the applicable procedure in the EPM.

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
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TES PROJ. NO. 5599
DATE 6-29-82

Classification of Item after Resolution: Observation

W. J. McBurn
Reviewer Signature

R H Eaves

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6.29.87

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-88

Reviewer Name: William McBrine

Date: 6/18/87

Classification of Item: observation

Reference Documents:

Bechtel Pipe Support Calc. 876 (PS)

RECORD COPY
PROJ. NO. 5599

Description of Item:

In many cases the structural adequacy calculations are not clear. Assumptions used in the analysis are not stated and the calcs can not easily be followed.

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-26

Reference: RRF No. 5599-92

Date: July 23, 1982

PMR No. 5599-92

Internal Committee Resolution of Potential Finding:

The committee does not agree with the reviewer. The use of special clamps or standard clamps weights should not normally affect the frequency and stress which a piping system experiences.

~~The~~ This item should be classified as an Observation since it does not impact the design but does affect the design process.

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PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 6899
DATE 72382

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

R. F. Enos
Project Manager Signature

J. W. Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-92

Reference RRF No. 5599-92

Date: 7/14/82

Description of Resolution:

THE RRF GIVES WEIGHTS, TAKEN FROM A MANUFACTURER'S CATALOGUE. IN TWO CASES SPECIAL CLAMPS ARE USED WHICH APPEAR TO BE SIGNIFICANTLY HEAVIER THAN A CATALOGUE STANDARD. THESE SPECIAL CLAMPS ARE LOCATED CLOSE TO THE PENETRATION SO THEIR EFFECT WILL BE MINIMAL.

.. THE ADDITION OF THIS ADDED MASS WILL INCREASE LOADS AND COULD EFFECT FREQUENCIES. TES HAS NOT CALCULATED THE WEIGHT OF THE SPECIAL CLAMPS.

FOR THE FEEDWATER SYSTEM REVIEWED THIS EFFECT SHOULD NOT CHANGE THE CONCLUSIONS, HOWEVER FOR OTHER SYSTEMS, NO EXTRAPOLATION OF CONCLUSIONS CAN BE MADE.

Classification of Item after Resolution: POTENTIAL FINDING

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

RECORD COPY

TES PROJ. NO. 5599

DATE 72782

PROJ. NO. 5599

V. M. Chauhan
Reviewer Signature

D F Landers
Project Manager Si

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-92

Date: 7-2-82

Reviewer Name: V.M. Chauhan

Classification of Item: open Item

Reference Documents: ME101 Calc. 876
Snubber pipe Calc. 876
AP Anchor Movement Calc. 876
Pacific Scientific - snubber Manual.

Description of Item: the weight of the snubber-clamp is not considered in analysis. the snubber-clamp weight is as following.

PIPE DIA.	12"	20"	24"
PSA-10	98 lbs.		157 lbs.
PSA-35	298 lbs	393 lbs	506 lbs
PSA-100	~~1132 lbs~~	1132 lbs	1185 lbs

this weight is free to move in unrestraint direction, which can affect the pipe stress and pipe support.

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TES PROJ. NO. 5599
DATE 72782

V.M. Chauhan
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-27

Reference: RRF No. 5599-86, Rev. 1 Date: July 23, 1982

PMR No. 5599-86, Rev. 1

Internal Committee Resolution of Potential Finding:

The Committee does not agree with the reviewer. This item should be classified as an Observation. The committee feels that this item has significance relative to Conservatism. The reason for this is. (1) It is TES' understanding that the Bolts are not preloaded to the Design Load (or not preloaded at all). ~~Th~~

(2) Due to preload Not being used, the effect of the elastic foundation can not be considered.

There is also signifance relative to Design Practice & For this specific case shear does not exists but this is not generally True

MASTER COPY
PROJ. NO. 5599

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

J. W. Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 0899
DATE 72782

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form △1

PMR No. 5599-86, REV. 1

Reference RRF No. 5599-86, REV. 1

Date: 7/14/82

Description of Resolution:

THE REVIEWER HAS INDICATED A PROBLEM WITH THE BECHTEL APPROACH TO SPECIAL CLAMP DESIGN BY INCLUDING THE EFFECT OF BOLT BENDING. THIS APPROACH USES REACTIONS CALCULATED FROM A BECHTEL ANALYSIS.

SINCE THE BOLT BENDING STRESS IS SIGNIFICANT (19,500 PSI) THIS CREATES CONCERN WITH ALL SPECIAL CLAMPS.

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TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
PROJ. NO. 5599
DATE 72782

Classification of Item after Resolution: POTENTIAL FINDING

Reviewer Signature

D.F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Independent Design Review

TES PROJ. NO. 5599 Susquehanna Steam Electric Station Unit 1

DATE 72782

Reviewer Report Form ⚠

RECORD COPY

PROJ. NO. 5599

RRF No. 5599-86 Rev 1
sheet 1/2

Reviewer Name: William McBrine

Date: 7/14/82

Classification of Item: Potential Finding

Reference Documents:
Bechtel Calc 876 (PS) clamp qualification calcs.
Drawing DLA-101-H4 Rev 6-F,

Description of Item: The Bechtel Response to RRF 5599-86 dated 7/7/82 indicates that the EDS methodology for clamp qualification does not require shear to be transmitted through the clamp bolts. This is true for the load cases considered in the EDS methodology. However, the referenced Bechtel Calculation derives a bolt reaction do to skewed attachments to the clamp, a case not considered in the EDS methodology. The bolts are analyzed for the direct shear but bolt bending is not considered. Example:

(continued)

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

TELEDYNE ENGINEERING SERVICES CONTROLLED DOCUMENT

Susquehanna Steam Electric Station Unit 1

TES PROJ. NO. 5599
DATE 7/27/82

Reviewer Report Form ⚠

RECORD COPY
PROJ. NO. 5599

RRF No. 5599-86 rev 1
sheet 2/2

Reviewer Name:

Date: 7/14/82

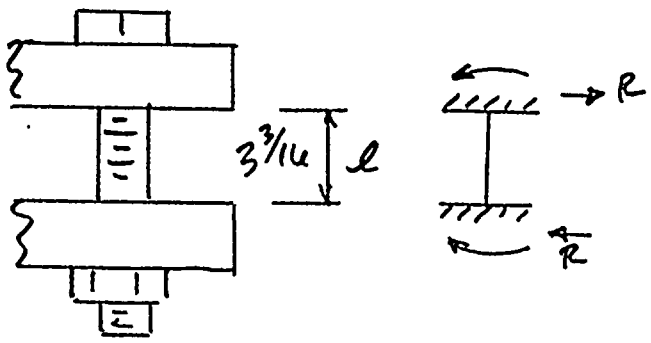
Classification of Item:

~~Reference Documents:~~

Evaluating bolt bending stress for DCA-101-141 & 144 using the bolt shear reaction from sheet 8 of the Bechtel clamp calc for this clamp.

~~Description of Item:~~

chk'd AJM 7/14/82



$R = 3987\ ^{lb}/_{Bolt}$

$M = \frac{R\ell}{2} = \frac{3987^{lb}(3\frac{3}{16})}{2} = 6354^{\text{"-lb}}$

for $1\frac{3}{4}$ ø Bolt Root r = 1.49"

$S = \frac{1}{4}\pi r^3 = \frac{1}{4}\pi\left(\frac{1.49}{2}\right)^3 = .325\ in^3$

$f_b = M/S = \frac{6354^{\text{"-lb}}}{.325\ in^3} = 19{,}551$ psi due to bolt bending

This stress may be higher in other cases where the loads are higher or the attachment is skewed more than 23° from vertical

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 86

Bechtel Response

FOR RESPONSE TO THIS ITEM, PLEASE REFER TO ATTACHED MEMO FROM EDS - NUCLEAR INC.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Response by H. Guy
Date 7/7/82
Approved by L. Memula
Date 7-7-82

eids nuclear

EDS Nuclear Inc.
220 Montgomery Street
San Francisco, California 94104
(415) 544-8000

July 7, 1982
0020-866-001

Bechtel Power Corporation
Post Office Box 3965
San Francisco, California 94623

ATTENTION: Mr. Chuck Chakravartula

SUBJECT: Susquehanna Pipe Clamp
Methodology, Design Review Comments

Gentlemen:

Enclosed please find the summary of our response to the Design Review comments on the methodology developed for evaluation of nonstandard clamps for the Susquehanna Steam Electric Station.

Should you have any questions or comments, please do not hesitate to contact Mr. Sohrab Esfandiari or the undersigned.

Very truly yours,

R. M. Polivka

for/ D. M. Witt
Manager
Structural Design Division

DMW/SE/acr
Enclosure

Summary of Response to Design Review Comments

EDS Nuclear

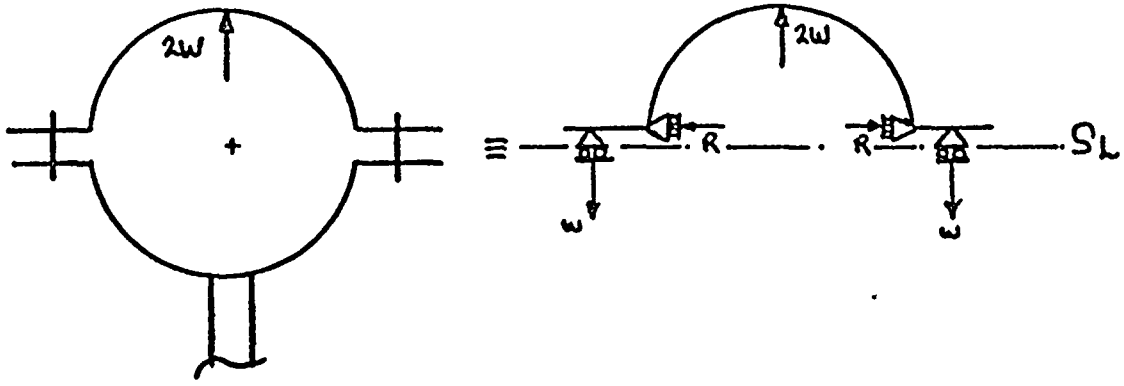
July 7, 1982

Reference : Design review comment on Bechtel calc. 876 (PS) and clamp qualification calc. for hanger DLA-101-H1 & H4, dated 6-23-82.

Response : In developing the methodology for nonstandard pipe clamp evaluation for the Susquehanna Steam Electric Station, it was consistently assumed that bolts connecting the two halves of clamp do not transmit shear. This is based on assuming that the bolt-clamp joint resembles a pin condition.

The structural models and corresponding load transfer mechanisms for different Load cases, as utilized for the Susquehanna pipe clamp methodology, are summarized overleaf.

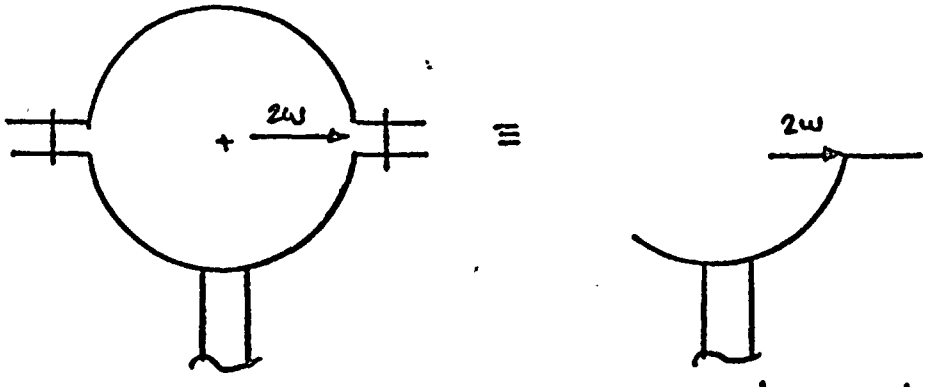
Case (a) : <u>Vertical load with vertical support</u>



Support Configuration Structural Model

Note that R is the reaction between clamp and pipe. Bolts transmit tension only.

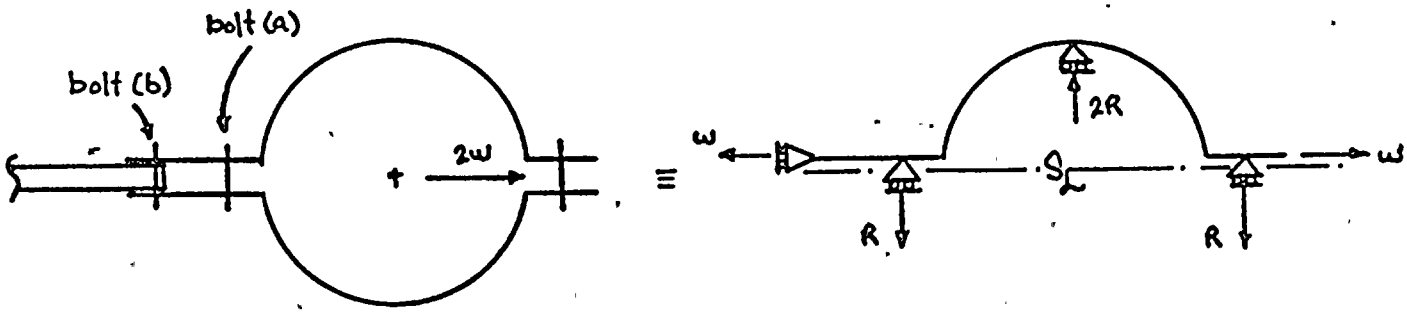
Case (b) : <u>Horizontal load with vertical support</u>



Support Configuration structural model

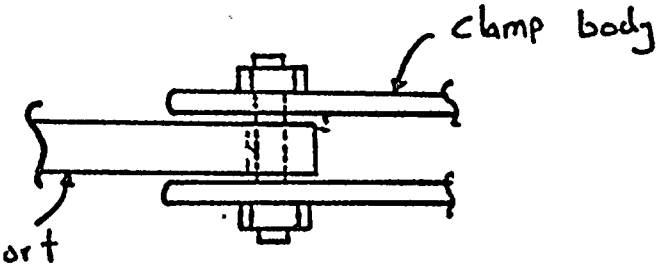
Load is transmitted solely via clamp body to the stanchion. The upper half and the bolts do not carry any load.

Case (c): <u>Horizontal load with horizontal support</u>



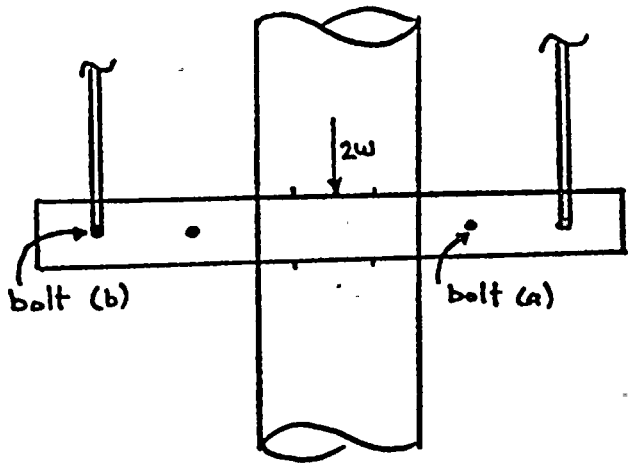
Support Configuration Structural Model

Note: Bolt (a) is modelled as a roller and transmits tension only. The load is transmitted via clamp body & bolt (b) into the horizontal support. Bolt (b) although transfers shear, w, but is prevented from bending by the relatively rigid support. Hence no local bending stresses are induced. Figure below shows this connection in more detail:

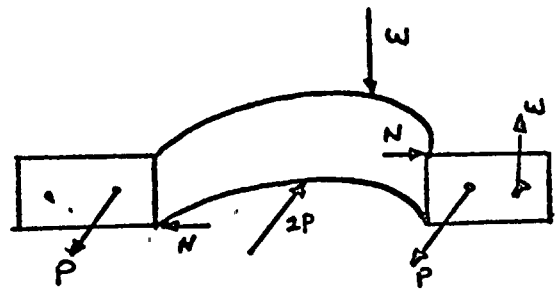


(rigid rod or strut assembly)

Case (d) : <u>Riser clamps</u>



Support Configuration



Structural Model

Note: Bolt (a) transmits tension only. The load is transmitted via the clamp body & bolt (b) into the support. Bolt (b) does transfer the load, w, to the support via shear, however this case is analogous to that of case (c), and no local stresses are induced.

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-86

Reference RRF No. 5599-86

Date: 6-24-82

Description of Resolution:

Requires a response from Bechtel addressing the bending in the bolt of the clamp and the local stresses in the clamp itself.

RECORD COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-29-82

Classification of Item after Resolution: OPEN ITEM

W. J. McBrame
Reviewer Signature

R. W. Egus
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

TELEDYNE ENGINEERING SERVICES CONTROLLED DOCUMENT

TES PROJ. NO. 5599
DATE 6/29/82

RRF No. 5599-86

Reviewer Name: William McBride

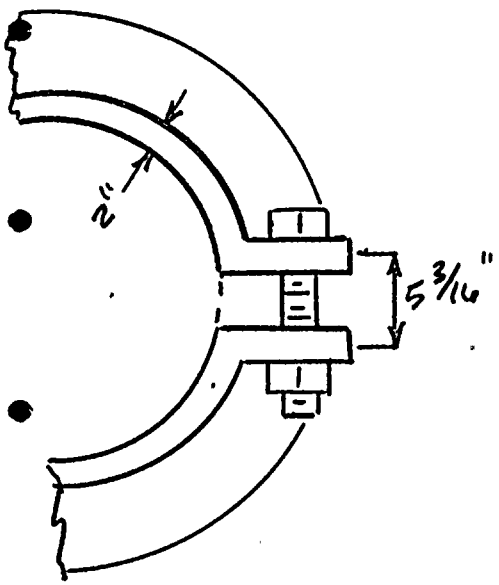
Date: 6/23/82

Classification of Item: open

RECORD COPY
PROJ. NO. 5599

Reference Documents:
Bechtel Calc 876 (PS)
Clamp Qualification Calc for DCA-101-H1 & H4

Description of Item:



The methodology used for the evaluation of special pipe clamps is based on the assumption that the bolts transmit both shear and tension between clamp halves. The clamp ears for DCA-101-H1/H4 have a center to center spacing of 5 3/16". Shear loads transmitted through the bolts would induce a significant moment in the bolts because of this gap. Bolt bending stress and local stresses in the clamp have not been evaluated for this moment.

W. J. McBr
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-3

Reference: RRF No. 5599-50, Rev. 0 and Rev. 1 Date: July 14, 1982

PMR No. 5599-50

Internal Committee Resolution of Potential Finding:

Based on the data supplied by the reviewer and Bechtel, the Internal Committee has determined that this item does not impact the adequacy of design but does have significance relative to the design practice and applicable procedures

RECORD
PROJ. NO. [illegible]

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

D. F. Landers
Project Manager Signature

J. W. Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

[illegible]

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-50, REV. 1

Reviewer Name: D.F. LANDERS

Date: 7/9/82

Classification of Item: POTENTIAL FINDING

Reference Documents:
1. SPEC. 8856-M-175, REV. 5
2. BECHTEL RESPONSE TO RRF 5599-50, DTD 7/6/82, REC'D BY TES 7/8/82
3. RRF NO. 5599-50

Description of Item:

REFERENCE 2 INDICATES THAT "PROJECT PROCEDURES PROVIDE FOR COORDINATION BETWEEN AFFECTED DISCIPLINES IN THE PREPARATION AND CERTIFICATON OF THESE DOCUMENTS AND THE REVISIONS." DOES THE CERTIFIER OF THE DESIGN SPEC. REVIEW AND ACCEPT REVISIONS TO REFERENCED DOCUMENTS? IS THERE EVIDENCE OF HIS ACCEPTANCE (SIGN-OFF)? TES HAS NOT FOUND THIS LEVEL OF DETAIL IN THE PROJECT PROCEDURES TO DATE.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7/9/82

RECORD COPY
PROJ. NO. 5599

DF Landers
Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 -50

Bechtel Response: THIS ISSUE HAS ALREADY BEEN BROUGHT UP BY ASME DURING RECENT SURVEY. CERTIFICATION STATEMENT HAS BEEN MODIFIED IN CURRENT REVISION OF SPECIFICATION 8856-M-175 (REVISION 5, DATED 6-24-82). ALL REFERENCED DOCUMENTS THAT ARE DEVELOPED BY BECHTEL HAVE BEEN STAMPED BY A QUALIFIED REGISTERED PROFESSIONAL ENGINEER. REFERENCED DOCUMENTS DEVELOPED BY GENERAL ELECTRIC COMPANY (THE NSSS SUPPLIER), TO THE BEST OF BECHTEL'S KNOWLEDGE, CONFORM TO ASME SECTION III. CERTIFICATION STATEMENT HAS BEEN CHANGED TO STATE THIS ABOUT G.E. SUPPLIED INFORMATION. REVISION OF REFERENCED DOCUMENTS ARE CONTROLLED BY PROJECT PROCEDURES THROUGH THE USE OF DRAWING AND SPECIFICATION REGISTERS. PROJECT PROCEDURES PROVIDE FOR COORDINATION BETWEEN THE AFFECTED DISCIPLINES IN THE PREPARATION AND CERTIFICATION OF THESE DOCUMENTS AND THE REVISIONS. (SEE ATTACHED LETTER FROM BECHTEL TO ASME DATED 6/11/82)

Response by A.J. Dasty

Date 7-6-82 7/6/82

Approved by L. Menzel

Date 7-6-82

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Bechtel Group, Inc.

Fifty Beale Street
San Francisco, California
Mail Address: P.O. Box 3965, San Francisco, CA 94119

June 11, 1982

Mr. Manuel Gutierrez
Director, Accreditation
ASME
345 E. 47th St.
New York, NY 10017

Subject: Site Renewal Audit at the Susquehanna Steam Electric Station Units 1&2, Berwick, PA

Ref: 1) Letter, J. A. Russo (ASME) to W. R. Smith, Sr. re: same subject dated May 7, 1982

Dear Mr. Gutierrez:

Reference 1) advised Bechtel that a nonconformance was reported during the Susquehanna site renewal audit relating to the Owner's Design Specification as prepared by Bechtel when functioning as the Owner's designee. Specifically, the ASME Audit Team Leader reported that there was no objective evidence that the documents required for conformance to Paragraph NA 3250 of ASME B&PV Code, Section III and referenced in the Design Specification were certified by a Registered Professional Engineer as required by Paragraph NA 3255 of Section III.

To resolve this nonconformance, Bechtel was requested by the ASME to take the appropriate corrective action to assure that Design Specifications prepared by Bechtel meet Code requirements. This corrective action was required to be implemented and verified by Bechtel's jobsite Authorized Inspection Agency by June 14, 1982.

The Code edition and addenda of ASME Section III that applies for the piping systems that are constructed by Bechtel at the Susquehanna jobsite is the 1971 Edition, Winter 1972 Addenda.

The following corrective action and implementation schedule is offered in response to reference 1) and represents action to be taken on the Design Specifications prepared by Bechtel for Pennsylvania Power & Light (PP&L) on the Susquehanna project. Although the nonconformance identified by the ASME Survey Team and the corrective actions to be taken involve primarily the thirteen (13) piping system Design Specifications that are prepared by Bechtel for the Owner, the Design Specifications for other components, such as pumps, valves, vessels and tanks, will be reviewed and the following corrective actions will be taken, as necessary.

1) Piping & Instrumentation Diagrams, technical specifications, seismic response spectra and other documents referenced in the Design Specification and required for conformance to Paragraph NA 3250 of ASME Section III shall be certified by a Registered Professional Engineer by June 21, 1982.

2) The documents that are referenced in the Design Specifications and required for conformance to NA 3250 of ASME Section III will not be identified by revision number in the Design Specifications. Instead, each of these documents will be certified by a Registered Professional as described in 1) above, and will continue to be controlled by the Susquehanna Project through the use of document control registers, i.e. drawing and specification control registers. Project procedures provide for coordination between the affected groups in the preparation and certification of these documents.

3) The piping system Design Specifications shall be reviewed and recertified by a Registered Professional Engineer by June 30, 1982. The Design Specifications for other components shall be reviewed and recertified, as necessary, by a Registered Professional Engineer by July 23, 1982.

4) Bechtel's jobsite Authorized Inspection Agency (Lumbermens Mutual Casualty) shall verify implementation of Bechtel's corrective action by August 6, 1982.

5) The ASME shall be notified by the jobsite Authorized Inspection Agency of the successful implementation of corrective action by August 13, 1982.

The above action refers to the documents prepared by Bechtel. In addition, the piping system Design Specifications include NSSS Supplier furnished design and operating criteria (temperatures, pressures, flow rates, etc.) that are required by NA 3250 of ASME Section III. Bechtel is certifying that this data supplied by the NSSS Supplier is the criteria used by Bechtel for the design of the ASME Section III piping systems.

If you have any questions with regard to Bechtel's corrective actions or require additional information, please contact J. R. Barbee at 415/930-2452.

Very truly yours,

WRS/JRB/sla

W. R. Smith, Sr.

W. R. Smith, Sr.

cc: M. N. Bressler
E. J. Hemzy
R. E. Muise
R. D. Norris
J. Russo

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-50

Reference RRF No. 5599-50

Date: 6-4-82

Description of Resolution:

Requires a response from Bechtel addressing how revisions to referenced spec's are incorporated into design spec and controlled as to not change the adequacy of the FW design.

Classification of Item after Resolution: Potential Finding

RECORD COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6.7.82

DF Landers
Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

RECORD COPY

PROJ. NO. 5599

Independent Design Review

TELEDYNE ENGINEERING SERVICES CONTROLLED DOCUMENT

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

TES PROJ. NO. 5599
DATE 6.4.82

RRF No. 5599-50

Reviewer Name: D.F. LANDERS

Date: 6/2/82

Classification of Item: POTENTIAL FINDING

Reference Documents: SPECIFICATION 8856-M-175, REV. 4

Description of Item:

SPEC. REFERS TO 33 OTHER DOCUMENTS WHICH PROVIDE REQUIREMENTS NECESSARY TO SATISFY CODE. THERE IS NO INDICATION THAT CERTIFIER OF DESIGN SPEC. HAS ANY CONTROL OVER THESE OTHER DOCUMENTS AND THEREFORE CANNOT DETERMINE THEIR ACCEPTABILITY WITH RESPECT TO HIS CERTIFICATION. THE DOCUMENTS DO NOT EVEN LIST APPROPRIATE REVISIONS AND/OR DATES. IF CONFLICTS OCCUR BETWEEN SPEC. & REF. DOCUMENTS NO DIRECTION IS GIVEN AS TO WHICH CONTROLS. (EX. ¶ 3.2 LISTS A MIN. SERV. TMP. FOR THE FEEDWATER PIPING - WHAT IS MIN. IN REF. DOCUMENTS?)

D.F. Landers

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-6

Reference: RRF No. 5599-48, Rev. 0, 1 Date: July 14, 1982

PMR No. 5599-48, Rev. 0, 1

Internal Committee Resolution of Potential Finding: The Internal Committee has reviewed this item. Although the angle is outside the tolerance specified By Bechtel, it should not result in a change in the conclusion of the analysis. It therefore does not impact the adequacy of the design but has significance relative to the applicable procedure.

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

D. F. Landers
Project Manager Signature

J W Hanson
Committee Member Signature

Prasad R. Commisuni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ: NO: 5599
DATE 7/16/82

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-48 REV 1

Reviewer Name: ERIC SOLLA

Date: 7-14-82

Classification of Item: OBSERVATION

Reference Documents:

BECHTEL RESPONSE
RRF 48, RRF 46, RRF 46 REV 1

Description of Item:

THE DIFFERENCE BETWEEN THE ANGLE ON THE ISOMETRIC AND THE ANGLE USED IN THE ANALYSIS IS 5° WHICH IS GREATER THEN THE 3° ALLOWED IN SPECIFICATION 8856-M213. SINCE THE AS-BUILT AND TES FIELD DIM AGREE WITH THE ANALYSIS, THE ISO SHOULD BE CHANGED TO SHOW THE CORRECT ANGLE.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

Reviewer Signature

RECORD COPY

PROJ. NO. [illegible]

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 43, Rev 1; 47 Rev 1 and 48

Bechtel Response

Specification M-213 provides installation tolerances on design drawings. Field generates 'F' revisions e.g 1F1, 1F2 etc on engineering revisions when the installation deviates from the specification tolerances and are reviewed by engineering. As-built drawings reflect the as-built condition regardless of installation tolerances and these dimensions are reconciled with the analysis. The differences between the analysis and Bechtel as-built dwg or TES measurments as identified in TES RRF 5599-43, 47 and 48 are considered to be acceptable.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 8-3-82

Response by L. Memule

Date 7-7-82

Approved by R. Parker

Date 7/7/82

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

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PROJ. NO. 5599

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-48

Reference RRF No. 5599-48

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel to clarify the angle of the snubber on the Iso. Is it 49° or 44° for DCA-102-H9.

Classification of Item after Resolution: Open Item

RECORD COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6·8·82

Reviewer Signature

Project Manager Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-48

Reviewer Name: ERIC SOLLA

Date: 6-2-82

Classification of Item: OPEN ITEM

Reference Documents: FCI-P49-876 REV 12
DWG DLA-102-H9 REV 3F2
SPECIFICATION 8856-M-213

Description of Item:

ANGLE OF SNUBBER ON ISO IS 49°
ANGLE OF SNUBBER ON AS-BUILT IS 44°

ANGLE ON ISO MUST BE REVISED SINCE THIS IS [redacted] MORE THAN THE 3° TOLERANCE WHICH IS ALOWED AS STATED IS SPEC 8856-M-213

RECORD COPY
NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-3-82

Eric Solla
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-85JAP

Reference: RRF No. 5599-47 Rev. 2 Date: July 14, 1982

PMR No. 5599-47 Rev. 0, 1, 2

Internal Committee Resolution of Potential Finding:

The internal committee has reviewed this item. Although the angle is outside the Tolerance Specified by Bechtel, it should not result in a change in the conclusion of the analysis. It therefore does not impact the adequacy of the design but has significance relative to the applicable procedure.

RECORD COPY
PROJ. NO. [illegible]

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

D. F. Landers
Project Manager Signature

J W Hanson
Committee Member Signature

Ronald R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

RECORD COPY

PROJ. NO. [illegible]
TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-47, REV. 2

Reference RRF No. 5599-47, REV. 2

Date: 7/14/82

Description of Resolution:

A REVIEW OF DATA INDICATES THE FOLLOWING:

TES FIELD DATA	SUPPORT DWG	ANALYSIS ISO	ANALYSIS
51.72°	46°-16'	46°	46°

ALTHOUGH ALL OF THE BECHTEL DOCUMENTS ARE ≈ 46°, TES FIELD DATA INDICATES ALL 3 BECHTEL DOCUMENTS ARE OUT OF TOLERANCE. TES FIELD DATA WAS TAKEN TWICE – INITIAL DATA: 50°-50' THEREFORE TES IS SATISFIED OUR FIELD DATA IS APPROPRIATE. BECHTEL DRAWINGS SHOULD BE REVISED AND ANALYSIS RECONCILED.

Classification of Item after Resolution: OBSERVATION

Reviewer Signature

D. F. Landers

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-47 REV 2

Reviewer Name: ERIC SOLLA

Date: 7-14-82

Classification of Item: OBSERVATION

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

Reference Documents:

BECHTEL RESPONSE
RRF 47 & 47 REV 1

RECORD COPY
PROJ. NO. [illegible]

Description of Item:

THE DIFFERENCE BETWEEN THE ANGLE USED IN ANALYSIS AND ANGLE MEASURED BY TES IN THE FIELD IS APPROX 5°. THIS IS OUTSIDE OF THE TOLERENCE IN SPEC 8856-M-213, THEREFORE THE AS-BUILT SHOULD BE CHANGED TO MATCH ACTUAL FIELD DIM. AND THE DIFFERENCE SHOULD BE MENTIONED IN THE RECONCILLIATION CALC.

Eric Solla

Reviewer Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-47 Rev 1

Reference RRF No. 5599-47 Rev. 1

Date: 6-25-82

Description of Resolution:

Requires a response from Bechtel which addresses the angle of support DLA-102-H10 in the field as installed. TES has measured it twice, ① 50°-50' and ② 51.72°, both angles are more than 3° from the 46° analyzed and the 46°-16' on the as-built, DLA-102-H10 Rev. 3F1

RECORD COPY
PROJ. NO. 5599

TES PROJ. NO. 5599
DATE 6-29-82

Classification of Item after Resolution: Potential Finding

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-47 REV 1

Reviewer Name: ERIC SOLLA

Date: 6-25-82

Classification of Item: OPEN

Reference Documents: TRIP REPORT 1475

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6 29 82

Description of Item:

NEW FIELD ANGLE 51.72°

ANGLE IN ANALYSIS = 46°

ANGLE ON AS BUILT = 46°-16"

THIS IS NOT WITHIN THE 3° TOLERANCE.

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 43, Rev 1; 47 Rev 1 and 48

Bechtel Response

Specification M-213 provides installation tolerances on design drawings. Field generates 'F' revisions e.g 1F1, 1F2 etc on engineering revisions when the installation deviates from the specification tolerances and are reviewed by engineering. As-built drawings reflect the as-built condition regardless of installation tolerances and these dimensions are reconciled with the analysis. The differences between the analysis and Bechtel as-built dwg or TES measurments as identified in TES RRF 5599-43, 47 and 48 are considered to be acceptable.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

Response by L. Memule

Date 7-7-82

Approved by R. Parker

Date 7/7/82

RECORD COPY
PROJ. NO. 5599

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-47

Reference RRF No. 5599-47

Date: 6/1/82

Description of Resolution:

SEE PMR NO. 5599-42

Classification of Item after Resolution: OPEN

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6·3·82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

D.F. Landers

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-47

Reviewer Name: ERIC SOLLA Date: 5-27-82

Classification of Item: OPEN ITEM

Reference Documents: FCI-P49-876 REV 12
MEMO TO: EAS FROM VMC MAY 18, 1982
TRIP REPORT 1445
DWG DLA-102-H10 REV 3F1
SPECIFICATION 8856-M-213

Description of Item:

SPECIFICATION 8856-M-213 STATES "THE ANGLE BETWEEN THE CENTERLINE OF THE PIPE SUPPORT OR RESTRAINT ASSEMBLY AND THE DESIGN DIRECTION SHALL NOT EXCEED 3 DEGREES AT AMBIENT TEMPERATURE. OR 2 DEGREES AT OPERATING TEMPERATURE

SUPPORT MARK NO. DLA-102-H10
ANGLE MEASURED IN FIELD: 50°-50'
ANGLE ON AS-BUILT DWG: 46°-16'
ANGLE ON STRESS ISO: 46°
ANGLE USED IN ANALYSIS: 46°

5599
6.1.82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599- 4

Reference: RRF No. 5599- 43, Rev. 0, 1, 2

Date: July 14, 1982

PMR No. 5599- 43, Rev. 0, 1, 2

Internal Committee Resolution of Potential Finding:

The Internal Committee has reviewed this item. Although the angle is outside the Tolerance specified By Bechtel it should not result in a change in the results of the analysis. It therefore does not impact the adequacy of the design but has significance relative to the applicable procedure.

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

D.F. Landers
Project Manager Signature

J W Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO.
DATE
RECORD COPY

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-43, REV 2

Reference RRF No. 5599-43, REV. 2

Date: 7/14/82

Description of Resolution:

A REVIEW OF DATA INDICATES THE FOLLOWING:

TES FIELD DATA	SUPPORT DWG	ANALYSIS ISO	ANALYSIS
23.99°	21°	26°	26°

ALLOWABLE TOLERANCE IS 3°, THEREFORE THE SUPPORT DWG IS OUT-OF-TOLERANCE AND REQUIRES MODIFICATION

RECORD COPY

PROJ. NO. [illegible]

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

TES PROJ. NO. [illegible]

DATE [illegible]

Classification of Item after Resolution: OBSERVATION

Eric Selle

Reviewer Signature

D. F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-43 REV2

Reviewer Name: ERIC SOLLA

Date: 7-14-82

Classification of Item: OBSERVATION

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. [illegible]
DATE 7-2-82
RECORD COPY
PROJ. NO. [illegible]

Reference Documents:

BECHTEL RESPONSE
RRF 43 & 43 REV1

Description of Item: THE DIFFERENCE BETWEEN THE ANALYSIS & AS-BUILT, 5°, IS ACCEPTABLE. THE DIFFERENCE BETWEEN TES FIELD MEASUREMENT AND ANALYSIS IS 2°. EVENTHOUGH THIS IS ACCEPTABLE IT IS OUTSIDE OF THE 3° TOLERENCE STATED IN SPEC 8856-M-13 THEREFORE SHOULD HAVE BEEN INCLUDED IN THE RECONCILLIATION CALC WHICH IT WAS NOT.

Eric Solla

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-43 Rev. 1

Reference RRF No. 5599-43 Rev. 1

Date: 6-28-82

Description of Resolution:

Requires a response from Bechtel which reconciles the 21° angle on As-built drawing DLA-101-H1 (Rev. 5F, and Rev. 5F2) and the 26° angle on the stress iso, FCI-P49-876 Rev. 13, which was used in the analysis.

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6.29.82

Classification of Item after Resolution: Potential Finding

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 62982

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-43 REV 1

Reviewer Name: ERIC SOLLA

Date: 6-28-82

Classification of Item: OPEN ITEM

Reference Documents:

TRIP REPORT 1475

RECORD COPY
PROJ. NO. 5599

Description of Item: NEW FIELD ANGLE 23.99°

OLD FIELD ANGLE 24.1°

ANGLE ON STRESS ISO & IN ANALYSIS - 26°

ANGLE ON AS-BUILT DWG - 21°

THE DISCREPANCY BETWEEN THE AS-BUILT AND ANALYSIS IS GREATER THAN THE 3° ALLOWED

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 43, Rev 1; 47 Rev 1 and 48

Bechtel Response

Specification M-213 provides installation tolerances on design drawings. Field generates 'F' revisions e.g 1F1, 1F2 etc on engineering revisions when the installation deviates from the specification tolerances and are reviewed by engineering. As-built drawings reflect the as-built condition regardless of installation tolerances and these dimensions are reconciled with the analysis. The differences between the analysis and Bechtel as-built dwg or TES measurments as identified in TES RRF 5599-43, 47 and 48 are considered to be acceptable.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Response by L. Memula
Date 7-7-82
Approved by R. Parekh
Date 7/7/82

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-43

Reference RRF No. 5599-43

Date: 6/1/82

Description of Resolution:

BECHTEL AS-BUILT DWG. AND ANALYSIS ARE OUTSIDE ALLOWABLE TOLERANCE. TES FIELD SURVEY DATA AND BECHTEL ANALYSIS ARE WITHIN ALLOWABLE TOLERANCE. IN ORDER TO RESOLVE THIS ITEM REVIEWER IS DIRECTED TO VERIFY TES DIMENSIONS ON FINAL WALKDOWN. IF TES DIMENSION IS CORRECT THEN A NEW RRF MUST BE ISSUED ON BECHTEL AS-BUILT DRAWING. IF BECHTEL FIELD DIMENSION IS CORRECT THEN A RECONCILIATION CALCULATION MUST BE PROVIDED BY BECHTEL.

Classification of Item after Resolution: OPEN

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TES PROJ. NO. 5599
DATE 6·3·82

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PROJ. NO. 5599

Reviewer Signature

D.F. Landers
Project Manager Signature

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PROJ. NO. 5599

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠ 5599 6.1.82

RRF No. 5599-43

Reviewer Name: ERIC SOLLA

Date: 5-27-82

Classification of Item: OPEN ITEM

Reference Documents: FCI-P49-876 REV 12
MEMO TO: EAS FROM VMC MAY 18, 1982
TRIP REPORT 1445
DWG DLA-101-H1 REV 5 F1
SPECIFICATION 8856-M-213

Description of Item:

SPECIFICATION 8856-M-213 STATES "THE ANGLE BETWEEN THE CENTERLINE OF THE PIPE SUPPORT OR RESTRAINT ASSEMBLY AND THE DESIGN DIRECTION SHALL NOT EXCEED 3 DEGREES AT AMBIENT TEMPERATURE. OR 2 DEGREES AT OPERATING TEMPERATURE

SUPPORT MARK NO. DLA-101-H1
ANGLE MEASURED IN FIELD: 24.1°
ANGLE ON AS-BUILT DWG: 21°
ANGLE ON STRESS ISO: 26°
ANGLE USED IN ANALYSIS: 26°

Eric Solla

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-8

Reference: RRF No. 5599-32 Rev. 1
PMR No. 5599-32 Rev. 1

Date: July 15, 1982

Internal Committee Resolution of Potential Finding:

The ICR agrees with the reviewer. The calculations for the Fabricated Branch shown in calculation package 1503 belong in the stress report. Since this item does not impact ~~design~~ the adequacy of the design but has significance relative to conservatism, design practice and applicable procedures, it should be classified as an Observation

Classification of Item after Committee Resolution: Observation

James G. Flaherty
Committee Chairman Signature

D.F Landers
Project Manager Signature

JW Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

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Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-32 REV. 1

Reference RRF No. 5599-32 REV. 1

Date: 7/14/82

Description of Resolution:

PROJ. MGR. AGREES. THIS ITEM IS ALSO ADDRESSED AS ITEM B. OF RRF NO. 5599-20.

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Classification of Item after Resolution: OBSERVATION

Reviewer Signature

D.F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-32 SDW REV 1

Reviewer Name: Stanley Wharton

Date: 7-13-82

Classification of Item: OBSERVATION

Reference Documents:

SR 8856-1500 R1

Description of Item:

Reinforcement calculation shown in calc package 1503 not in stress report.

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DATE

Reviewer Signature

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne RRF. No. 5599 - 32

Bechtel's Response

We agree that branch connections are fabricated branches. The reinforcement calculation and the class 1 stress calculation for branch connection have been included in the final stress report, identified as calculation No. 1503 in Appendix E. See the attachment to the response to RRF No. 5599-20. The calculations are included in Appendix E not in the main body of stress Report.

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Responded By Chi Chern Date 7/6/82

Approved By L. Mesnea Date 7/7/82

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Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-32

Reference RRF No. 5599-32

Date: 6/2/82

Description of Resolution:

BECHTEL TO PROVIDE RESOLUTION OF THIS ITEM. THE STATEMENT ON P. 25 OF STRESS REPORT IS IN CONFLICT WITH ANALYSIS SINCE 1" BRANCH CONNECTIONS ARE INCLUDED IN ANALYSIS. (SEE RRF NO. 5599-20 FOR COMMENTS ON 1" BRANCH CONN. ANALYSIS)

Classification of Item after Resolution: OPEN

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Reviewer Signature

D.F. Landers
Project Manager Signature

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Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-32

Reviewer Name: Stanley Wharton

Date: 5-24-82

Classification of Item: OPEN

Reference Documents:

SR 28556-1500 R1

ORIGINAL
TES PROJ. NO. 5599
DATE 6.1.82

Description of Item:

PAGE 25 states no Fabricated branch connections but the the 1" connections could be considered as such. TES need details of these connections. TES cannot determine if these are or are not Fabricated branchs unless we have the details

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Reviewer Signature

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

APPENDIX 5

PHASE 2

FINDING DETAILS

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

Phase 2

Finding No. 1

Reviewer Signature

Donald F. Landers

Project Manager Signature

Project Review Internal Committee

Finding No. 1

(Phase 1 Finding Numbers 1 and 2)

The Bechtel response is unacceptable. The "Loss of FW Pumps, MSIV Closed" should not be classified as an Emergency Condition. The sixth sentence of Bechtel response states the following:

> "If the latter was to be the case, for a given condition that may have more than 25 cycles, the same condition would be classified differently from one system to another depending on the amplitude of the stress cycles."

This is the correct approach. Section III of the ASME, BPVC is a component Code and Plant Events (Operating Conditions) must be dealt with on a component basis. This approach will, in fact, result in classification of a specific Plant Event into various Operating Conditions depending on the component being considered and the amplitude of the stress cycles associated with that condition.

The Bechtel interpretation of the Code for this Finding is given in their response to Finding Number 2. It will be responded to by TES here. The major error in the Bechtel Code interpretation is in their third point.

> "The requirement of maintaining S_a to below endurance limit for stress cycles greater than 25 applies to primary type loads only. Under this .... "

The allowable stress associated with primary type loads in the Emergency Operating Condition category is 2.25 S_m. This value is significantly

greater than S_a at 10^6 cycles from the fatigue curves in the Appendices. The following example comparisons are given.

Material	2.25 S_M @ 500F	S_a at 10^6 Cycles
SA 106 Gr. B	45,250 PSI	14,000 PSI
SA 376 TP 304	39,400 PSI	25,000 PSI

The reason that NB-311.3.3 of Section III addresses number of cycles and stress amplitude is concern for the effect of a given condition on the fatigue adequacy of the component. To eliminate from consideration a condition that results in more than 25 cycles of a stress amplitude of the magnitude associated with this condition is not correct and is unconservative.

The fact that Bechtel has performed a study calculation to demonstrate that Code criteria is not exceeded even if this event is considered is not an acceptable response. In order to comply with Code criteria, Bechtel had to revise their calculations for other conditions to eliminate any conservatisms that existed. The real TES concern is that the philosophical approach used by Bechtel is not in compliance with the Code (as TES understands the formulation of those rules) and this can have effects beyond the specific system being reviewed and the specific plant event (Loss of FW Pumps, MSIV Closed) being discussed.

Further, a review of the Bechtel study calculations indicates that a significant change in the expansion moments was made for Conditions 9, 13 and 16. The new calculations use an expansion condition of the pipe at 100F and the RPV at 100F. Since the RPV is still hot TES feels that the condition for expansion moments should be pipe at 100F and the RPV at 420F (SHTD 100F). This is the condition used in the original Bechtel analysis. This effect is significant since the use of SHTD 100F would increase the calculated value of S_n to the region where significant K_e values are applied to the alternating stress.

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-1

Reference: RRF No. 5599-49, Rev. 0 and Rev. 1. Date: July 14, 1982

PMR No. 5599-49

Internal Committee Resolution of Potential Finding:

The Internal Committee agrees with the Reviewer statements. The "Loss of FW Pumps, MSIV Closed" should be Classified as an Upset Condition in accordance with NB-3113.3. There is ~~an~~ also an inconsistency between the Bechtel Design Spec. (which also references the GE Spec) and the Bechtel Drawing 8856-MI-811-89(2). However, either document would result in more than 25 cycles of stress exceeding Sa at 10^6. The governing Document, the Design Specification references the GE Spec. ~~and~~ The use of the Design Spec would result in approximately 80 stress cycles.

Classification of Item after Committee Resolution:
Finding

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James A. Flaherty
Committee Chairman Signature

D. F. Landers
Project Manager Signature

J W Hanson
Committee Member Signature

Francis R. Komminum
Committee Member Signature

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Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-49, REV. 1

PG 1 OF 3

Reviewer Name: DF LANDERS

Date: 7/9/82

Classification of Item: POTENTIAL FINDING

Reference Documents: 1. SPECIFICATION 8856-M-175, REV. 5

2. GE SPECIFICATION 22A2925, REV. 6

3. BECHTEL RESPONSE TO RRF NO. 5599-49, DATED 7/6/82, REC'D BY TES 7/8/82

4. RRF NO. 5599-49

Description of Item:

THE BECHTEL RESPONSE (REF. 3) IS NOT ACCEPTABLE.

A DETAILED REVIEW OF THE GE SPEC. (REF. 2) INDICATES THE FOLLOWING FOR THIS TRANSIENT

INITIAL TMP	FINAL TMP	TIME
420	5460	STEP
546	40	STEP
40	546	23 MIN
546	40	STEP
40	546	51 MIN
546	40	STEP
40	300	5 MIN
300	546	100F/HR
546	100	STEP
100	250	STEP
250	420	30 MIN

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PROJ. NO. 5599

DF Landers
Reviewer Signature

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Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-49, REV. 1

PG 2 OF 3

Reviewer Name: DF LANDERS

Date: 7/9/82

Classification of Item:

Reference Documents:

Description of Item:

REFERENCE 4. NOTED THAT A POTENTIAL FOR 8 STRESS CYCLES PER OPERATING CONDITION EXISTS. THIS IS VERIFIED BY GE SPEC. (REF. 2). THE PREPARER OF THE BECHTEL SPEC. USED A GE HISTOGRAM (GE DWG 761E579 "REACTOR VESSEL THERMAL CYCLES" WHICH IS NOT REFERENCED IN THE GE SPEC. REGARDLESS, THE PREPARER OF THE DESIGN SPEC. FOR A GIVEN SYSTEM IS RESPONSIBLE FOR DETERMINING THE CLASSIFICATION OF A PLANT OPERATING CONDITION ON HIS SYSTEM. THE FACT THAT SO MANY STRESS CYCLES (>25) WHICH EXCEED S_a AT 10^6 CYCLES RESULT FROM

DF Landers

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-49, REV 1

PG 3 OF 3

Reviewer Name: DF LANDERS

Date: 7/9/82

Classification of Item:

Reference Documents:

Description of Item: THIS TRANSIENT PLACES IT IN THE UPSET OPERATING CONDITION CATEGORY. THE GE. SPEC. DOES NOT DEFINE OPERATING CONDITION CATEGORIES FOR ANY TRANSIENTS LISTED IN TABLE A-2. GE DWG 761E579 IS FOR THE REACTOR PRESS. VESSEL ONLY. FOR THIS SPECIFIC CONDITION, "LOSS OF FEEDWATER PUMPS, ISOLATION VALVES CLOSE" THE GE DWG ONLY LISTS 5 CYCLES (OCCURENCES) AND DOES NOT DEFINE TEMPERATURE EXCURSIONS WHICH AGREE WITH REF. 2

D.F. Landers

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 49

Bechtel Response

The classification of the "Loss of FW pumps MSIV closed," as emergency condition is based on GE dwg. 761E579 "Reactor Vessel Thermal Cycles". (Bechtel dwg. No 8856-M1-B11-89(2)-2. The dwg attached

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Response by Tien Pei Lee

Date 7-6-82 7/6/82

Approved by L. Memula

Date 7-6-82

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-49

Reference RRF No. 5599-49

Date: 6-4-82

Description of Resolution:

Agreed that an additional thermal transient exist which should be addressed.

Bechtel shall address the discussed thermal condition and justify the classification of the "loss of FW Pumps MSIV Closed" as emergency condition.

Classification of Item after Resolution: Potential Finding

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DATE 6-7-82

DF Landers
Reviewer Signature

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TES PROJ. NO. 5599
DATE 6-4-82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-49

Reviewer Name: D.F. LANDERS

Date: 6/2/82
SHT 1 OF 2

Classification of Item: POTENTIAL FINDING

Reference Documents: SPECIFICATION 8856-M-175, REV. 4

Description of Item: HISTOGRAM, PG. 1, APP. A

"LOSS OF FW PUMPS, MSIV CLOSE" SHOULD NOT BE CLASSIFIED AS AN EMERGENCY CONDITION. NB-3113.3 STATES THAT "THE TOTAL NO. OF POSTULATED OCCURRENCES... SHALL NOT CAUSE MORE THAN 25 STRESS CYCLES HAVING AN S_a VALUE GREATER THAN THAT FOR 10^6 CYCLES FROM THE APPROPRIATE FATIGUE DESIGN CURVES..."

FOR THE PIPING SYSTEM NEAR THE REACTOR PRESSURE VESSEL THERE IS A POTENTIAL FOR 8 STRESS CYCLES PER OPERATING CONDITION

D. F. Landers
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

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PROJ NO 5599
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DOCUMENT
TES PROJ. NO. 5599
DATE 6.4.82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form

RRF No. 5599-49
SHT 2 OF 2

Reviewer Name: D.F. LANDERS

Date: 6/2/82

Classification of Item:

Reference Documents:

Description of Item:

RESULTING IN 80 STRESS CYCLES. THE FLUID IN THE PIPE CAN REACH TEMPERATURES CLOSE TO RPV TEMP. (546F) FOLLOWED BY 40F WTR BEING PUMPED INTO RPV. THIS COULD BE DEFINED AS A STEP CHANGE FROM 546F TO 40F, 3 TIMES - FOLLOWED BY A RAMP TO 546 - THEN A STEP FROM 546F TO 40F, 1 TIME - FOLLOWED A STEP TO 250F AND RAMP TO 420F. THESE KINDS OF TEMP. EXCURSIONS SHOULD RESULT IN S_a VALUES GREATER THAN 15,000 PSI.

D. F. Landers
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-2

Reference: RRF No. 5599-35, Rev. 0 and Rev. 1 Date: July 14, 1982

PMR No. 5599-35

Internal Committee Resolution of Potential Finding:

The Internal Committee has reviewed the Reviewer comment and the Bechtel Response. The Bechtel Response is incorrect in that it references Operational Cycles not stress cycles. The Loss of FW Pumps, MSIV Close should be defined as an Upset & Condition.

The Stress Report should have accounted for this event in the Fatigue evaluations in accordance with NB-3113.3

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

D F Landers
Project Manager Signature

J W Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-35, REV 1

Reference RRF No. 5599-35, REV 1

Date: 7/14/82

Description of Resolution:

DATA HAS BEEN REVIEWED. BECHTEL RESPONSE IS UNACCEPTABLE. THIS RRF IS ASSOCIATED WITH RRF NO. 5599-49

Classification of Item after Resolution:

Reviewer Signature

DF Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-35 REV1

Reviewer Name: Stanley Wharton Date: 7-14-82

Classification of Item: POTENTIAL FINDING

Reference Documents:
SR 8856-1500 R1

Description of Item:

Design is to NB-3000 - with piping covered by NB-3650 - NB-3113 under design says only events over 25 cycles need Fatigue evaluation. Low of F.W Pumps has 8 stress cycles per event - this equalls 80 stress cycles (10 events)

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Stanley Wharton
Reviewer Signature

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne RRF. No. 5599 - 35

Bechtel's Response

The Feedwater lines have been analyzed in accordance with ASME Section III, NB3650. According to NB3650, it is not required to have fatigue calculation for emergency and faulted conditions. 10 cycles of F. W. Pump event are specified in Specification as emergency condition. Therefore, it is not necessary to be included in fatigue evaluation. Also, we do not have 8 stress cycles for each event, the total no of cycles for emergency condition specified in the Spec. is 10+1+8+1+1 = 21 which is less than 25.

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DATE 7-8-82

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Responded By Chi Chern Date 7/6/82

Approved By L. Memula Date 7/7/82

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-35

Reference RRF No. 5599-35

Date: 6/2/82

Description of Resolution:

TES REVIEWER TO REVIEW FINAL STRESS REPORT. THIS TRANSIENT COULD BE THE MOST SEVERE CONDITION WITH RESPECT TO FATIGUE ON THE FEEDWATER SYSTEM. WITH RESPECT TO FEEDWATER SYSTEM THIS TRANSIENT IS ONE OF THE MOST SEVERE. BECHTEL TO PROVIDE JUSTIFICATION FOR EXCLUSION FROM FATIGUE CONSIDERATION AND FAILURE TO COMPLY WITH NB-3113.3 OF SECTION III

Classification of Item after Resolution: POTENTIAL FINDING

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DF Landers
Project Manager Signature

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Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

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PROJ. NO. 5899

RRF No. 5599-35

Reviewer Name: Stanley Wharton

Date: 5-24-82

Classification of Item: OPEN

Reference Documents: SR8856-1500 R1

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CONTROLLED DOCUMENT
TES PROJ. NO. 5899
DATE 6.1.82

Description of Item:

HISTOGRAM SHOWS 10 CYCLES FOR emergency condition - Loss of F.W. Pumps event This event actually has 8 stress cycles For For each occurrance. This gives a total of 80 Stress cycles. - Should be evaluated per NB-3113.3. This section states that 25 stress cycles can be excluded. We are above the 25 stress cycle limit

Stanley S. Wharton
Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW OPEN ITEM REV. 1

ICR NO: 1 & 2

Teledyne ICR No. 5599 - 1 & 2 RRF/PMR NO 49 & 35

Bechtel's Response

(1) ICR No. 5599-1- Specification

It is Bechtel's position that the loss of F.W. pumps, the MSIV close, is an emergency condition. This is consistent with GE supplied documents drawing No. 761E579, 158B8369 and Spec. 22A2925. It should be noted that under this condition, only 10 events are postulated to occur per GE's documents. In older documents (plants) this no. of events was only 5. This classification is justified because an emergency condition is categorized by the frequency of event and not by the no. of stress cycles associated with such an event. If the latter was to be the case, for a given condition that may have more than 25 cycles, the same condition would be classified differently from ~~our~~ one system to another depending on the amplitude of the stress cycles. This would also be an inconsistent approach which would require performance of a stress calculation before a condition can be classified as an emergency or upset. Bechtel does not interpret paragraph NB-3113.3 to require that an emergency event must be classified as an upset event if more than 25 stress cycles having a stress amplitude greater than the endurance limit. SEE ITEM # 2 BELOW FOR BECHTEL'S INTERPRETATION.

(2) ICR No. 5599-2- Stress Report

Bechtel's stress reports were prepared based on the interpretation of Section III code given as follows:

- No evaluation of secondary type loads associated with emergency conditions are required. Reference Para. NB3224.5 and figure NB-3224-1 of the code.
- Fatigue evaluation of secondary type loads for emergency condition is not required. Reference Paragraph NB-3655.
- The requirement of maintaining Sa to below endurance limit for stress cycles greater than 25 applies to primary type loads only. Under this interpretation, the primary stress associated with loss of F.W. pumps with the MSIV closed, are below the Sa value.

However, To respond to Teledyne comment on this item a study calculation in which Bechtel recalculated the fatigue life of feedwater system considering all stress cycles associated with the emergency condition (the loss of F.W. pumps, the MSIV close) was performed for three most

Teledyne ICR No. 5599 -2- Stress Report (continued)

Bechtel's Response

critical components. The results of this study shows insignificant change in the cumulative usage factor values documented in the Stress Report. The computer output of these calculations (Calc. No.'s 87226, 87227, 87230, 87233, 87242 & 87245) and the summary were given to Teledyne in the meeting on August 10, 1982.

A survey of this emergency condition for all other Class 1 piping systems was also performed. Bechtel has found that the same emergency condition for all other systems is much less severe than that for Feedwater system. As the thermal transients due to this emergency condition for Feedwater system have only insignificant impact on the cumulative usage factors, the impact of including the emergency condition in fatigue calculation for other systems will be negligible. (A comparison table is attached). Documentation of this conclusion will be in study calculations for affected systems which will be Complete by August 24, 1982 Bechtel's conclusion is that potential fatigue damage associated with the emergency condition cycles is insignificant. ~~[illegible]~~

Notes

1) This response was marked by △1 on the right side.

2) Page 3 remains the same.

Responded By Chi Chern

Approved By [illegible]

DATE : 8/13/82

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne ICR No. 5599 - 2 Stress Report (continued)

Bechtel's Response

3 typical thermal transients for 10 cycles of loss of F.W. pumps, MSIV close for other Class 1 piping systems are shown below:

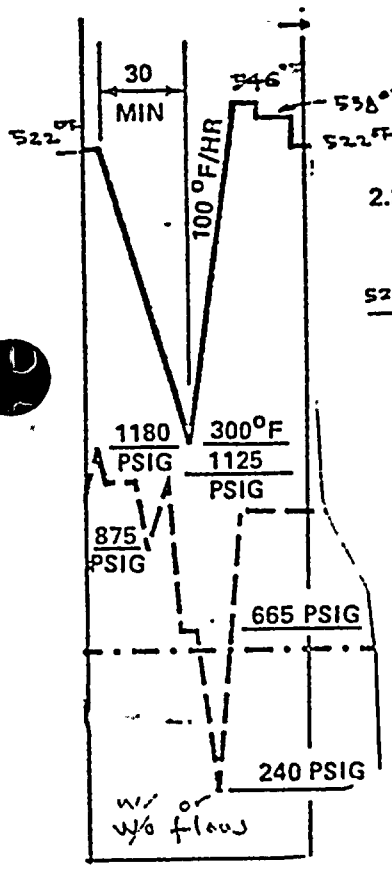


Fig. 1
For RHR Return & Supply Line (w/o)
RWCU (w/)

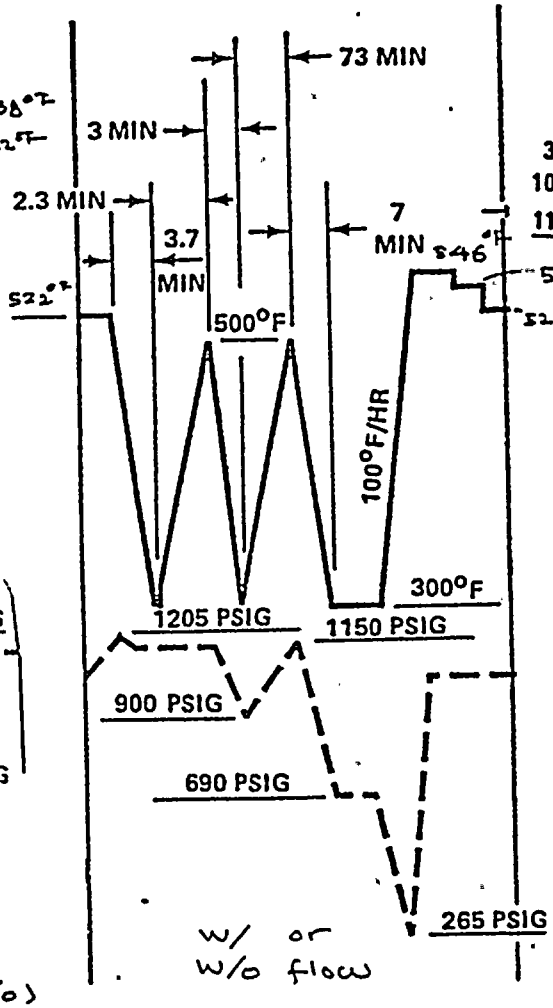


Fig. 2
For Core Spray (w/o)
Reactor Vessel Drain (w/)
Standby Liquid Control (w/o)

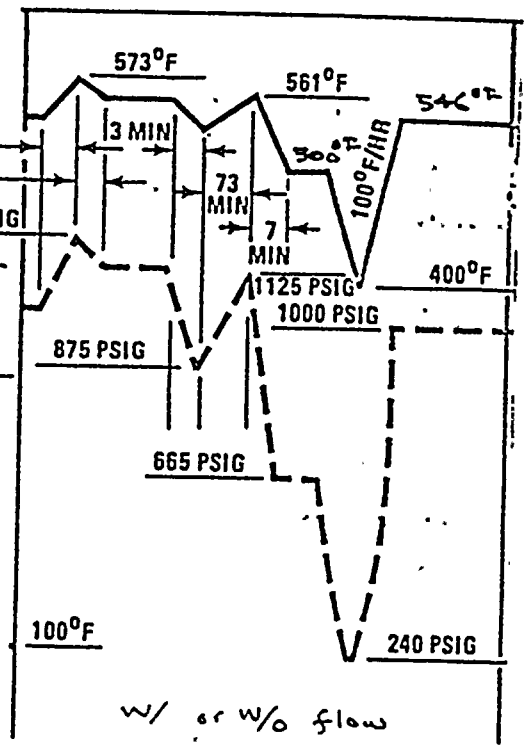


Fig. 3
for MSIV Drain (w/)
RCIC (w/)
MSIV Leakage (w/o)
Head Spray (w/o)
Head Vent (w/)
HPCI (w/)

Responded By Chi Chern 8/12/82

Approved By [illegible] 8/12/82

TELEDYNE
ENGINEERING SERVICES

Technical Report
TR-5599-3

Phase 2

Finding No. 2

Reviewer Signature

Donald F. Landers

Project Manager Signature

James A. Flaherty

Project Review Internal Committee

Finding Number 2

(Phase 1 Finding Numbers 7, 9 and 10, and Observation Numbers 3, 4, 5, 6, 7 and 9)

A significant number of comments have been generated on the support design process. Most of these comments are related to reconciliation of as-built geometry by the support designer. The concern is basically associated with acceptability of the as-built support. Two major items (Finding Nos. 7 and 10) have been responded to by Bechtel in this Phase 2 portion of the review but they only tend to support that the process did not work.

The response to Phase 1 Finding No. 7 indicates that the pipe support reviewer and checker determine whether a relocated support was a significant enough change to warrant a Civil department review. In the case of the specific support of concern no Civil review is apparent. However, there is a new plate required in the as-built design which is the responsibility of the Civil department. The support design group calculations indicate that the plate will be handled by the Civil group and the Civil calculations do not address the plate since they do not know the support is located on it without having the as-built geometry forwarded to them. In the final Bechtel submittal the plate has been analyzed by the Civil department as a result of the TES findings.

The response to Phase 1 Finding No. 10 indicates that the weld at the shield wall is acceptable after reducing the conservatism in the original analysis and performing a detailed computer solution of the support. It is apparent that this weld was not aceptable by inspection as originally stated by Bechtel.

Responses to Finding Number 9 and the Observations listed under this Finding were reviewed and in some cases indicate the Observation

could have been closed if sufficient detail was provided in the Bechtel reconciliation process. During the August 10, 1982 meeting at TES, Bechtel indicated that group meetings and training sessions were held to explain procedures used in the reconciliation process. Further, the reviewer checks each item and determines acceptability and even crosses each item off that he judges is acceptable on a check print. None of this information is retained by Bechtel nor is there any record maintained of meetings or training sessions for this purpose.

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-14

Reference: RRF No. 5599-93

Date: July 15, 1982

PMR No. 5599-93

Internal Committee Resolution of Potential Finding:

The internal committee agrees with the reviewer. Based on the information supplied to date by Bechtel there is no objective Evidence that the "As Built" versus "As Analyzed" discrepancy was reviewed.

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Committee Member Signature

RECORD COPY

PROJ NO.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

TES PROJ. NO.

DATE

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-93

Reference RRF No. 5599-93

Date: 7/15/82

PG 1 OF 2

Description of Resolution:

THIS ITEM COULD BE INDICATIVE OF A BREAKDOWN IN THE INTERFACE REQUIREMENTS ASSOCIATED WITH TRANSFERRING OF INFORMATION BETWEEN GROUPS WITHIN BECHTEL. THE REVIEWER IS DIRECTED TO DETERMINE IF ANY OTHER SUPPORTS ARE NOT LOCATED PROPERLY ON CIVIL/STRUCTURAL CALCULATIONS.

PG. 2 OF THIS PMR GIVES AN INDICATION OF THE DISCREPANCY. NOTE THAT ANALYSIS OF PLATE ATTACHED TO BOX BEAM IS SUPPOSED TO BE PERFORMED BY CIVIL/STRUCTURAL.

Classification of Item after Resolution: POTENTIAL FINDING

RECORD COPY

PROJ. NO. [illegible]

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT

TES PROJ. NO. [illegible]

DATE [illegible]

[illegible]
Reviewer Signature

D.F. Landers

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

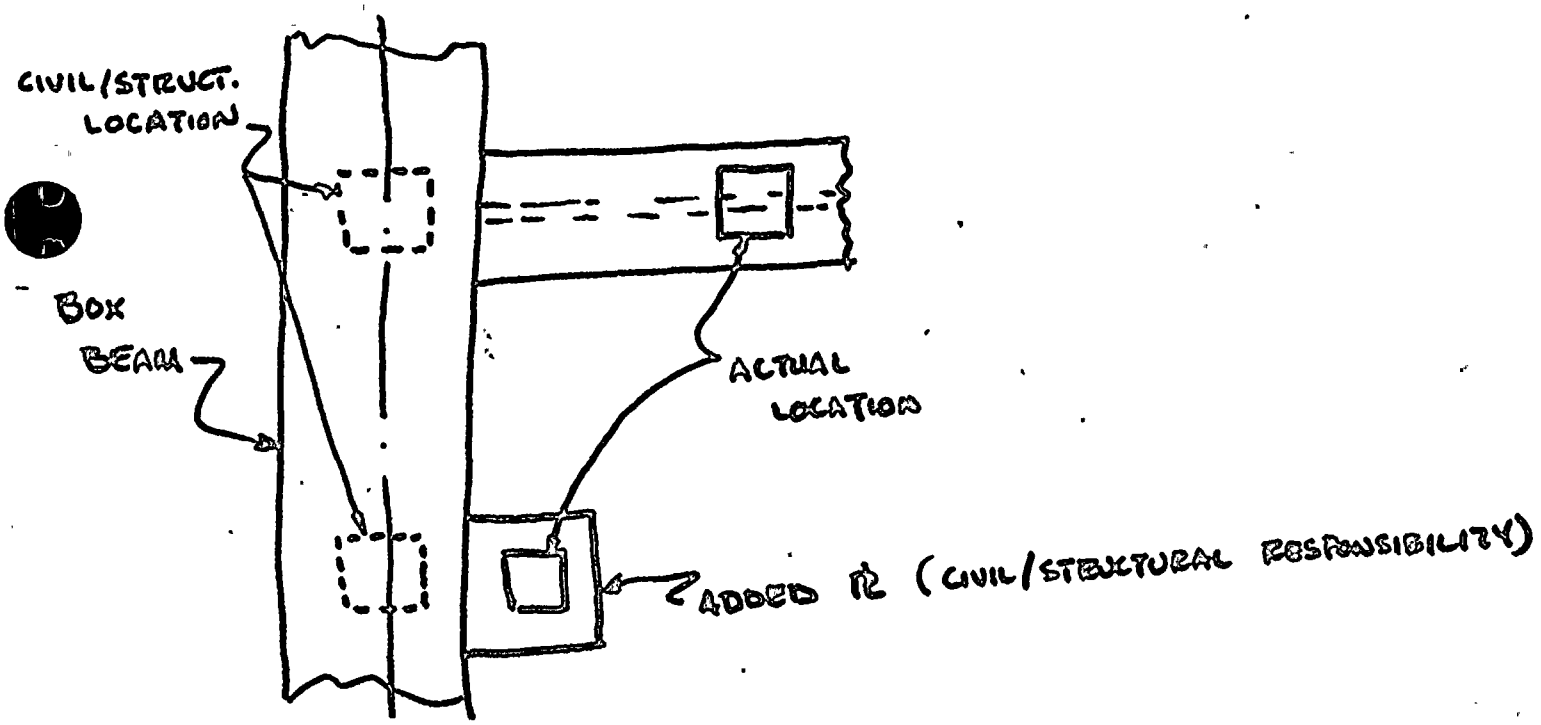
Project Manager Resolution Form ⚠

PMR No. 5599-93

Reference RRF No. 5599-93

Date: 7/15/82 R2 2 OF 2

Description of Resolution:



Classification of Item after Resolution: POTENTIAL FINDING

RECORD COPY
PROJ. NO.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599

Reviewer Signature

DF Landsas

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-93

Reviewer Name: William McBrine

Date: 7/13/82

Classification of Item: open

Reference Documents:

Support Drawing DLA-102-H5 Rev 4F2
Bechtel Civil Calc 91-F for DLA-102-H5 Job 8856 sheet 4 of 4

Description of Item:

The civil structural calculation considers support DLA-102-H5 to be in the center of Existing Box Beam No. 48. The as-built support drawing shows the support spanning between an existing W18x105 and 1"x13½"x15" plate.

There is no indication that this discrepancy has been reconciled.

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW ICR No 14

OPEN ITEMS:

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 8/12/82
RECORD COPY
PROJ. NO. 5599

Teledyne RRF No. 5599 - 93 (REV-1)

Bechtel Response (DLA-102-H5)

AS PART OF THE AS-BUILT RECONCILIATION PROCESS ALL HANGERS WERE REVIEWED FOR POSSIBLE IMPACT TO CIVIL STRUCTURES. THE JUDGEMENT OF THE REVIEWER AND CHECKER DICTATED WETHER THE CHANGES TO THE AS-BUILT DETAIL WERE SIGNIFICANT ENOUGH TO WARRANT A CIVIL REVIEW. SUCH WAS THE CASE FOR THIS PARTICULAR HANGER (DLA-102-H5, REV. 4/F2) WHERE THE IMPACT TO THE CIVIL STRUCTURAL MEMBER WAS JUDGED TO BE MINIMAL.

IN ALL INSTANCES, LOAD CHANGES AS A RESULT OF STRESS RE-ANALYSIS WAS COORDINATED WITH CIVIL.

Response by H. Cruz

Date 8/12/82

Approved by [illegible]

Date 8/13/82

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-24

Reference: RRF No. 5599-39, Rev. 2

Date: July 23, 1982

PMR No. 5599-39, Rev. 2

Internal Committee Resolution of Potential Finding:

The committee agrees with the reviewer and Project Manager. The items listed impact the adequacy of the design.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7/27/82

RECORD COPY
PROJ. NO. 5599

Classification of Item after Committee Resolution: Finding

James G. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-39 Rev. 2

Reference RRF No. 5599-39 Rev. 2

Date: 7-21-82

Description of Resolution:

The As-built drawing DLA-102-48 Rev. 2/F2 does not show the four sided weld fix between items ① and ③. Also the As-built still shows a 3/8" fillet weld which was shown to fail in the adequacy calc. Therefore the support has two welds which are not adequate.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 6699
DATE 72782

RECORD COPY
PROJ. NO. 6699

Classification of Item after Resolution: Potential Finding

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-39 Rev 2

Reviewer Name: William McBrine

Date: 7/16/82

Classification of Item: potential finding

Reference Documents:

Calculation 876 (PS)
Calc RE-DLA-102-H&C
Dwg. DLA-102-H8 Rev 2/F2

Description of Item: On sheet 82 of calc 876 (PS) a two sided fillet weld between items (1) and (3) is shown to be inadequate. Bechtel reconciliation calc calls out a four sided weld as a fix. This redesign is not shown on drawing DLA-102-H8 Rev 2/F2.

Also, a 3/8" fillet weld between item (3) and the shield wall proves inadequate in calc 876 (PS). No redesign is called out in the reconciliation calc or the support drawing.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7/27/82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-39 Rev. 1

Reference RRF No. 5599-39 Rev 1

Date: 6-25-82

Description of Resolution:

Requires a response from Bechtel addressing the design adequacy of support DLA-102-H8. Support calc's show the weld to be overstressed and the support was installed without increasing the weld size.

RECORD COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT

TES PROJ. NO 5599

DATE 6.29.82

Classification of Item after Resolution: Potential Finding

W. J. McBr

Reviewer Signature

R. E. Ens

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6/29/82

RRF No. 5599-39 Rev 1

Reviewer Name: William McBrine

Date: 6/21/82

Classification of Item: open

Reference Documents:

Calculation 876(PS)
Pipe Support Adequacy Calc.
drwg DLA-102-H8 Rev 2/F2

RECORD COPY
PROJ. NO. 5599

Description of Item:

The URS/BLUME Calc for Support Mark No. DLA-102-H8 indicates several over stressed welds. No modification calculation or weld change on the as-built support drawing is apparent.

Discussion with TES reviewers as suggested by PMR 5599-39 rev 0 have not closed this item.

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-39

Reference RRF No. 5599-39

Date: 6/2/82

Description of Resolution:

TES REVIEWER TO DISCUSS WITH TES ANALYSIS REVIEWER TO ATTEMPT TO RECONCILE.

TES REVIEWER TO REVISE RRF TO INDICATE RESULTS OF THIS DISCUSSION

Classification of Item after Resolution: OPEN

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6·3·82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

Project Manager Signature

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES

RECORD COPY
PROJ. NO. 5599
TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
PROJ. NO. 5599
DATE 6.1.82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-39

Reviewer Name: William McBrine

Date: 5/24/82

Classification of Item: open item

Reference Documents: Calculation 876 (PS)
Pipe Support Adequacy Calc
drwg DLA-102-H8 Rev 2/F2

Description of Item:
The URS/BLUME calc for Support Mark No. DLA-102-H8 indicates several over stressed welds. No modification caculation or weld change on the AS built Support drawing is apparent

W. J. McBrine
Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW ICR 24 & 19

OPEN ITEMS:

Teledyne RRF No. 5599 - RRF 39 (REV. 1) & RRF 73 (REV. 1)

OUTLINED BELOW ARE THE ISSUES RELATED TO HGR DLA-102-H8 (REV 2F2)

Bechtel Response

ADEQUACY OF THIS HANGER IS BASED ON THE FOLLOWING CONSIDERATIONS;

THE EXISTING PIPE SUPPORT CALC'S WERE RE-EVALUATED IN THE LIGHT OF ASSUMPTIONS AND INHERENT CONSERVATISM USED IN PERFORMING THIS PARTICULAR CALC. BY J. BLUME (e.g. out of plane bending). AS A RESULT OF THIS RE-EVALUATION THIS PIPE SUPPORT WAS FOUND ACCEPTABLE AND THE RELEVANT CALC'S WERE SUBMITTED TO TELEDYNE ON 8-10-82.

ALTERNATIVELY, A STRESS RE-ANALYSIS (STUDY) WAS PERFORMED TO REFINE AND REDUCE THE CONSERVATISM USED IN THE ORIGINAL ANALYSIS. AS A RESULT OF THIS REANALYSIS, THE LOADS ON THIS HANGER WERE REDUCED. THE P.S. CALC. WAS REVISED TO REFLECT THIS REDUCED LOAD AND OUR CONCLUSION IS THAT THE HANGER AS INSTALLED IS ACCEPTABLE.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 8/18/82

RECORD COPY
PROJ. NO. 5599

Response by J. Cu
Date 8/12/82
Approved by R. Parsekh
Date 8/13/82

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 -

Bechtel Response DLA-102-HB

ACCEPTANCE OF HGR. WITH REGARDS TO THE ABR PROGRAM

TELEDYNE REF. DOC.

(RRF 39 (REV. 1))

1) A BASIC PREMISE OF THE AS-BUILT RECONCILIATION PROCESS WAS THAT THE LATEST ENGINEERING REVISION ISSUED TO THE FIELD WAS THE BASIS OF COMPARING AND ACCEPTING FIELD DEVIATIONS IN THE AS-BUILT HANGERS. HENCE, ANY ITEM WHICH WAS CHECKED & APPROVED ON THE ENGINEERING REVISION AND DID NOT GET CHANGED IN THE AS-BUILT DETAIL WOULD AUTOMATICALLY BE APPROVED, AS PER "FIG. 2" OF THE GENERAL "ABR" FLOW CHART. THIS WOULD ACCOUNT FOR THE WELD BETWEEN ITEM # 3 AND THE SHIELD WALL NOT BEING REVIEWED, UPON RE-EVALUATION, THE NEW CALCULATIONS FURNISHED BY BECHTEL TO TELEDYNE REGARDING THIS ITEM, DEMONSTRATED THAT THIS PARTICULAR WELD IS ACCEPTABLE.

~~Response by~~ _____

~~Date~~ _____

~~Approved by~~ _____

~~Date~~ _____

(SHT. 2 OF 4)

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 -

Bechtel Response CONTINUED DLA-102-HB

RRF 39 (REV. 1)

2) WITH REGARDS TO THE WELDS BETWEEN ITEM #3 AND ITEM #1, RECONCILIATION WAS DONE BY COMPARING THE ENGINEERING REV. AND THE CORRESPONDING "R.E." CALC'S. WITH THE DEVIATIONS SHOWN ON THE AS-BUILT DET'L. (REFER TO SECT. III, SUB-SECT. 5 OF THE MEMO EXPLAINING "ABR" PROCESS AND PROCEDURES), THE DESIGN IN CALC. HAD SUFFICIENT MARGIN TO ACCEPT THE UNDERSIZE WELD BY INSPECTION (DUE TO B31.1 ALLOWABLES). IT WOULD HAVE BEEN CLEARER TO HAVE NOTED THIS DIFFERENCE IN THE ABR BINDER, (THIS WAS NOT DONE) HOWEVER; THE VARIOUS DOCTRINATION CLASSES GIVEN DAILY ALONG WITH THE MEMOS AND CHECKLIST FURNISHED TO ALL GROUPS ASSURED THAT THIS ITEM WAS NOT MISSED, (REF. TO MEMO REGARDING PROCESS & PROCEDURES SECT. 2, PARA. 1)

Response by _____

Date _____

Approved by _____

Date _____

(SHT 3 OF 4)

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 -

Bechtel Response CONTINUED.... DLA-102-H8

RRF 73 (REV. 1)

8) PROBLEM

W6 X 49 SHOWN ON AS-BUILT DETAIL.
W8 X 28 REQUIRED BY CALCULATION ALTHOUGH A W10 X 49 WAS SHOWN ON ENGINEERING REVISION, W8 X 28 EXIST PER FLD. VERIFICATION,

WHAT WAS RECONCILED?

RESOLUTION:

IT WAS ASSUMED THAT ITEM 5 (W6 X 49) SHOWN ON THE AS-BUILT DETAIL WAS A DRAFTING ERROR AND THAT A W10X49 WAS INSTALLED INSTEAD (AS SHOWN IN THE PREVIOUS ENG'G. REV.). SINCE THE R.E. CALCULATIONS SHOWED A W8 X 28 TO BE ADEQUATE, EITHER MEMBER WAS DEEMED ACCEPTABLE. THERE WAS, A MECHANISM IN THE AS-BUILT PROGRAM BY WHICH TO VERIFY THIS ITEM (ABV MEMO - SEE ATTACHMENT 'C'). FOR THIS PARTICULAR CASE THIS WAS NOT DOCUMENTED.

Response by _____

Date _____

Approved by _____

Date _____

(SHEET 4 OF 4)

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 -

Bechtel Response CONTINUED.... DLA-102-H8

RRF 73 (REV. 1)

8) PROBLEM

W6 X 49 SHOWN ON AS-BUILT DETAIL.
W8 X 28 REQUIRED BY CALCULATION ALTHOUGH A W10 X 49 WAS SHOWN ON ENGINEERING REVISION, W8 X 28 EXIST PER FLD. VERIFICATION,

WHAT WAS RECONCILED?

RESOLUTION:

IT WAS ASSUMED THAT ITEM 5 (W6 X 49) SHOWN ON THE AS-BUILT DETAIL WAS A DRAFTING ERROR AND THAT A W10X49 WAS INSTALLED INSTEAD (AS SHOWN IN THE PREVIOUS ENG'G. REV.). SINCE THE R.E. CALCULATIONS SHOWED A W8 X 28 TO BE ADEQUATE, EITHER MEMBER WAS DEEMED ACCEPTABLE. THERE WAS, A MECHANISM IN THE AS-BUILT PROGRAM BY WHICH TO VERIFY THIS ITEM (ABV MEMO - SEE ATTACHMENT 'C'). FOR THIS PARTICULAR CASE THIS WAS NOT DOCUMENTED.

Response by _____

Date _____

Approved by _____

Date _____

(SHEET 4 OF 4)

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-23

Reference: RRF No. 5599-68 Rev 2

Date: July 23, 1982

PMR No. 5599-68 Rev 2

Internal Committee Resolution of Potential Finding:

The ICR agrees with the reviewer and Project Manager. There is no objective evidence that all supports were considered when analyzing the structural steel.

This item ~~impa~~ can impact the adequacy of Design although for this specific case it does not.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7278c

RECORD COPY
PROJ. NO. 5599

Classification of Item after Committee Resolution: Finding

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad L. Commiuni
Committee Member Signature

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-68, REV.2

Reference RRF No. 5599-68, REV.2

Date: 7/15/82

Description of Resolution:

THIS ITEM RELATED TO 2 SUPPORTS.
* DLA-101-H2 WAS CONSIDERED IN THE RECONCILIATION CALCS SUPPLIED BY BECHTEL AND IS ACCEPTABLE. DLA-101-H1 WAS NOT. BASED ON BECHTEL RESPONSE, DLA-101-H1 IS ACCEPTABLE WITH NEW LOADS. HOWEVER, DLA-101-H2 HAD ONE OTHER SUPPORT ATTACHED WHICH APPLIED AND ADD'L 200-300#, DLA-101-H1 HAS TWO OTHER SUPPORTS ATTACHED WHICH APPLY AN ADDITIONAL 2000# (PER BECHTEL). IN BOTH CASES THE ADDITIONAL LOADS ARE ACCEPTABLE BUT THERE IS NO STANDARD CONCERNING WHEN TO CONSIDER THESE EFFECTS (I.E. LOAD, SIZE, NO. OF ATTACHMENTS). TES IS CONCERNED WITH CONTROL OF THE DESIGN PROCESS.

Classification of Item after Resolution: POTENTIAL FINDING

RECORD COPY
PROJ. NO. [illegible]

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

W. J. McBrien
Reviewer Signature

D.F. Landers
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO.
DATE

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RECORD COPY
PROJ. NO.

RRF No. 5599-68 Rev 2

Reviewer Name: William McBrine

Date: 7/15/82

Classification of Item: potential finding

Reference Documents:
Support Drawings DLA-101-141 Rev 5F2

Bechtel Calc 876(PS)

Description of Item:

The reviewer agrees that the attachment of the small pipe hangers to the feedwater support in question will not effect the support adequacy. There is no indication, however, that the impact of these attached supports was determined in the design process. The practice of attaching small pipe hangers to existing supports without reevaluating the existing structure could result in an overstressed situation

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-68 Rev. 1

Reference RRF No. 5599-68 Rev. 1

Date: 6-24-82

Description of Resolution:

Requires a response from Bechtel addressing the method used to include attached support reactions of supports SP HCC-137-2-H18 and SP-HCC-137-3-H2013 in the evaluation of support DLA-101-H1 adequacy. A copy of the backup calculation should be provided.

RECORD COPY

PROJ NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6 29 82

Classification of Item after Resolution: OPEN ITEM

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6/29/82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-68 Rev 1

Reviewer Name: William McBrine

Date: 6/18/82

Classification of Item: open

RECORD COPY
PROJ. NO. 5599

Reference Documents:

Support drawing DLA-101-H1 Rev 5 F2
Bechtel Calc 876(PS) and ABR-876

Description of Item:

The structural adequacy calculation for support DLA-101-H1 does not include the influence of two supports which are attached, SP-HCC-137-2-H18 and SP-HCC-137-3-H2013.

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 68

Bechtel Response

THE LOADS FOR THE TWO SMALL PIPE HANGERS IN QUESTION WAS NOT INCLUDED IN THE ANALYSIS FOR HGR DLA-101-H1 DUE TO THE RELATIVELY SMALL IMPACT SUCH AN INCLUSION WOULD HAVE ON EXISTING CALCULATIONS.

PER CALC 876(PS), THE STRESSES OF THE CRITICAL ITEM OF THE HGR DETAIL (ITEM #2) ALONG WITH IT'S RESPECTIVE ALLOWABLE STRESSES ARE;

LOAD CONDITION	EXIST. STRESSES	ALLOW STRESSES
NORMAL/UPSET	2470 psi	19100 psi
EMERG/FAULT	4460 psi	25400 psi

SEE PAGE 32 OF STRUDL OUTPUT, (ATTACHED)

BASED ON ABOVE TABLE, THE ADDITION OF APPROX. 2K (DUE TO THE SMALL PIPE ATTACHMENT) TO 38K L.P. LOAD WILL HAVE A NEGLIGIBLE EFFECT ON EXIST STRUCTURE.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 7.1.82

Response by H. Cruz
Date 7/9/82
Approved by L. Memuli
Date 7/10/82

RECORD COPY
PROJ NO. 5599

(W12 X190 BOXED WITH 1/2" PLATE)
ITEM # 2 & 3 R/4

LOADING	MAX NORMAL	AT SECTION		MIN NORMAL	AT SECTION	
1	2090.0	.0000	PA	1000.0	.0000	PA
2	0000.0	.0000		0000.0	.0000	
3	0000.0	.0000		0000.0	.0000	

MEMBER 0 (12" Φ SCH 160 PIPE)
ITEM # 8, R/4

LOADING	MAX NORMAL	AT SECTION		MIN NORMAL	AT SECTION	
1	0000.0	.0000	PA	0000.0	.0000	PA
2	0000.1	.0000		0000.1	.0000	
3	0000.0	.0000		0000.0	.0000	

MEMBER 0 (BUILT-UP BOX SECN)
R/4

LOADING	MAX NORMAL	AT SECTION		MIN NORMAL	AT SECTION	
1	900.0	.0000	PA	000.0	.0000	PA
2	090.1	.0000		1202.0	.0000	
3	090.1	.0000		1202.0	.0000	

MEMBER 0 (BUILT-UP BOX SECN)
R/4

LOADING	MAX NORMAL	AT SECTION		MIN NORMAL	AT SECTION	
1	790.0	.0000	PA	000.0	.0000	PA
2	000.0	.0000		902.0	.0000	
3	1000.0	.0000		1202.0	.0000	

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-68

Reference RRF No. 5599-68

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel addressing how loads and reactions from other supports, which are attached to the F.W. systems support, are incorporated into the final design calculations.

Classification of Item after Resolution: Open Item

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6-8-82

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-68

Reviewer Name: William McBrine

Date: 6/4/82

Classification of Item: open

Reference Documents:

Support Drwgs DLA-101-H1 Rev 5F1
DLA-101-H2 Rev 5F2
Bechtel Calc 876(PS) "final"

Description of Item:

The structural adequacy calculation for support DLA-101-H1 does not include the influence of two supports which are attached, SP HCC-137-2-H18 and SP HCC-137-3-H2013.

The calc. for DLA-101-H2 also does not mention an existing support shown on the drawing which is attached.

TELEDYNE ENGINEERING SERVICES

Reviewer Signature

RECORD COPY

CONTROLLED DOCUMENT

PROJ. NO. 5599 TES PROJ. NO. 5599

DATE 6.8.82

ICR NO: 23

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 8.5.82

TELEDYNE RRF NO 5599 - 68 (REV. 1)

RECORD COPY
PROJ. NO 5599

BECHTEL RESPONSE:

SPECIFICATION M-391 PARAGRAPH 5.1 B REQUIRES THAT THE AS-BUILT, LARGE P/S DETAIL SHOW ANY ATTACHMENT, SUCH AS SMALL PIPE SUPPORTS. THE AS-BUILT REVIEW PROCESS DID EVALUATE THESE ADDITIONAL LOADS, AND PERFORMED CALCULATIONS WHEN DEEMED NECESSARY BY THE DESIGNER AND REVIEWER AND CHECKER.

RESPONSE BY H. Cay

DATE: 8/5/82

APPROVED BY [illegible]

DATE: 8/5/82

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-17

Reference: RRF No. 5599-71, Rev.1
PMR No. 5599-71, Rev.1

Date: July 23, 1982

Internal Committee Resolution of Potential Finding:

The ICR agrees with the comments of the reviewer and project Manager. The resolution of "As Built" differences versus design should be detailed in the revised calculations.

However, this item does not impact the adequacy of the Design but has significance relative to the design process.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 0599
DATE 72782

RECORD COPY
PROJ. NO. 0599

Classification of Item after Committee Resolution: Observation.

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Susquehanna Steam Electric Station Unit 1

TES PROJ. NO. 5599
DATE 72782

Project Manager Resolution Form ⚠

RECORD COPY

PMR No. 5599-71 REV. 1

PROJ. NO. 5599
Reference RRF No. 5599-71 REV. 1

Date: 7/22/82

Description of Resolution: [redacted]

THE USE OF A SINGLE STATEMENT TO RECONCILE A NUMBER OF DIFFERENCES BETWEEN AS-BUILT GEOMETRY AND AS ANALYZED IS DIFFICULT TO PASS JUDGEMENT ON. IT WOULD BE MORE APPROPRIATE TO LIST THE DISCREPANCIES THAT HAVE BEEN RECONCILED BY INSPECTION TO ASSURE EACH DIFFERENCE WAS ADDRESSED

Classification of Item after Resolution: OBSERVATION

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

TES PROJ. NO. 5599
DATE 72782

RECORD COPY

PROJ. NO. 5599

RRF No. 5599-71 Rev 1

Reviewer Name: William McBrine

Date: 7/20/82

Classification of Item: Observation

Reference Documents: RRF 5599-71 Rev 0 & Bechtel Response
Dwg DCA-102-1410 Rev 3/F1
Calc 876 (PS)
Calc ABR-876 Sheet 24

Description of Item: The discrepancies between the as-built drawing and the support calculations do not effect the design adequacy. As the Bechtel response indicates, the support design has been reconciled and approved. In this case the reconciliation does not mention the welds in question but only indicate that the calcs in general have been reviewed and approved. The reconciliation process does not guarantee the existence of objective evidence that each discrepancy has been in fact reviewed and approved by comparison or any other reason.

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-71

Reference RRF No. 5599-71

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel addressing the smaller welds used on the support, DLA-102-H10, As-Built and show that the welds are still ok.

Classification of Item after Resolution: Open Item

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6.8.82

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-71

Reviewer Name: William McBrine

Date: 6/7/82

Classification of Item: open

Reference Documents:
Bechtel Calc 876(PS) "final"
Drawing DLA-102-H10 Rev 3/F,

Description of Item:
Welds between items 1 & 4 and 3 & 4 are larger in the analysis than they are on the drawing. There is no evidence that this change has been reviewed and approved

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT

RECORD COPY

PROJ. NO. 5599

TES PROJ. NO. 5599

DATE 6.8.82

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-18

Reference: RRF No. 5599-66, Rev. 1
PMR No. 5599-66, Rev. 1

Date: July 23, 1982

Internal Committee Resolution of Potential Finding:

The committee agrees with the reviewer and project Manager

This item has significance relative to the design ~~process~~ practice and applicable procedures but does not impact the design

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 72782

PROJ. NO. 5899

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 0899
DATE 12782

RECORD COPY
PROJ. NO. 0899

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form △1

PMR No. 5599-66 Rev. 1

Reference RRF No. 5599-66 Rev. 1

Date: 7-21-82

Description of Resolution:

Agreed that the T.S. 6x6x½ is adequate for the design of this item and the calculations should show the actual member used in the as-built. In this case the subsituting of the T.S. 6x6x½ for the W8x31 does not affect the adequacy of the design but it does have a significance relative to the applicable design procedures.

Classification of Item after Resolution: Observation

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Susquehanna Steam Electric Station Unit 1

TES PROJ. NO. 5599

Reviewer Report Form ⚠

DATE 7/7/82

RECORD COPY

RRF No. 5599-66 rev 1

PROJ. NO. 0899

Reviewer Name: William McBride

Date: 7/17/82

Classification of Item: observation

Reference Documents:

Calc 876 (PS)
Calc RE-DLA-102-H12C
drwg DLA-102-H12 Rev 3/F2

Description of Item: Reconciliation Calculation RE-DLA-102-H12C calls out a W8x31 for member ③. The corresponding member on drawing DLA-102-H12 Rev 3/F2 is a T.S 6x6x1/2. The tube steel is not stronger than a W8x31 in the direction of highest loading and the calcs available for review do not justify this change.

This item does not effect the adequacy of design.

W. J. McBride
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-66

Reference RRF No. 5599-66

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel in the form of reconciliation calculations showing the new larger members are not overstressed. for Support DLA-102-H12.

Classification of Item after Resolution: Open Item

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

RECORD COPY

PROJ. NO. 5599 TES PROJ. NO. 5599

DATE 6·8·82

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-66

Reviewer Name: William McBrine

Date: 6/7/82

Classification of Item: open

Reference Documents:

Bechtel Calc 876 (PS) "final"
Drawing DLA-102-H12 Rev 3/F1

Description of Item:

Adequacy calc for DLA-102-H12 indicates the members 2 and 3 are overstressed. Larger members are used on the as-built but no calcs which demonstrate the adequacy of these members are included

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

RECORD COPY

PROJ. NO. 5599 TES PROJ. NO. 5599

DATE 6·8·82

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-19

Reference: RRF No. 5599-73, Rev. 1

Date: July 23, 1982

PMR No. 5599-73, Rev. 1

Internal Committee Resolution of Potential Finding:

The committee agrees with the reviewer and project Manager.

This item does not impact the design but does have significance relative to the design practice

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5899
DATE 72782

RECORD COPY
PROJ. NO. 5899

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form △1

PMR No. 5599-73, REV. 1

Reference RRF No. 5599-73, REV. 1

Date: 7/22/82

Description of Resolution:

THE PROJ. MGR. AGREES THAT THE INSTALLED SUPPORT IS ADEQUATE FOR THE SPECIFIED LOADING. HOWEVER, THE DIFFERENCES BETWEEN CALCS, DWGS & INSTALLATION INDICATE THAT RECORDS NEED TO BE UPDATED. THE DIFFERENCES ARE AS FOLLOWS:

CALCULATION	DRAWING	AS-BUILT
W8X20	W10X49	W8X28

CONCERNED WITH THE FACT THAT BECHTEL RESPONSE HAD TO BE REVISED SINCE THEIR INITIAL RESPONSE CALLED OUT DIFFERENT SIZES. THIS SITUATION INDICATES FAILURE TO COMPLY WITH PROCEDURES.

Classification of Item after Resolution: OBSERVATION

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 7/27/82

RECORD COPY

PROJ. NO. 5599

R. J. McBride
Reviewer Signature

D. F. Landers
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-73 Rev 1

Reviewer Name: William McBrine

Date: 7/17/82

Classification of Item: Observation

Reference Documents:

RRF 5599-73 Rev 0
Drwg DLA-102-H8 Rev 2/F2
Calc 876 (PS)
Bechtel Response to RRF-5599-73 Rev 0

Description of Item:

Item 5 on drwg DLA-102-H8 Rev 2F2 is mistakenly called out as a W6x49. The adequacy calcs consider this item to be a W8x20. The existing installation is a W8x28.

These discrepencies do not effect the design adequacy.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5699
DATE 72782

MASTER COPY

PROJ. NO. 5699

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-73

Reference RRF No. 5599-73

Date: 6-7-82

Description of Resolution:

Requires a response from Bechtel showing that the item (5) on Support Dwg DLA-102-H8 Rev. 2/F2, which was addressed in the adequacy calculations as a W8X28, is still ok.

Classification of Item after Resolution: Open Item

TELEDYNE ENGINEERING SERVICES

Reviewer Signature

CONTROLLED DOCUMENT

RECORD COPY

PROJ. NO. 5599

TES PROJ. NO. 5599

DATE 6.8.82

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-73

Reviewer Name: William McBrine Date: 6-4-82

Classification of Item: open

Reference Documents:
Bechtel Calc 876(PS) "final".
Drawing DLA-102-H8

Description of Item:
Item (5) in adequacy calculation is a W8x28. In the As-built it is a W6x49.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6·8·82

Reviewer Signature

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-20

Reference: RRF No. 5599-79

Date: July 23, 1982

PMR No. 5599-79

Internal Committee Resolution of Potential Finding:

The ~~reviewed~~ Committee agrees with the reviewer and Project Manager. This item does not impact the design but has significance relative to the design practice.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 72782

RECORD COPY
PROJ. NO. 5899

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-79

Reference RRF No. 5599-79

Date: 6-18-82

Description of Resolution:

Bechtel should develop the practice of recording all judgements of adequacy whether by comparison or by inspection. Not recording the method used to determine the adequacy prolongs the review and usually requires a request for more information from Bechtel to resolve the question. This does not impact the adequacy of the design.

RECORD COPY

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

TES PROJ. NO. 5599

DATE 6-29-82

Classification of Item after Resolution: Observation

W. J. McBride
Reviewer Signature

R. K. Emro
Project Manager Signature

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-79

Reviewer Name: William McBrine

Date: 6/4/82

Classification of Item: Observation

Reference Documents:

Bechtel Calculation 816(PS) "Final"

Description of Item:

In the structural adequacy calculations support structural members and welds are often not mentioned. It appears that these elements are passed by inspection or comparison. They should be noted so in the calcs.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-10-82

RECORD COPY
PROJ. NO. 5599

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599- 21

Reference: RRF No. 5599- 87, Rev. 1 Date: July 23, 1982

PMR No. 5599- 87, Rev. 1

Internal Committee Resolution of Potential Finding:

The ICR agrees with the reviewer and Project Manager. This item (2) does not impact the adequacy of design but has signifance relative to design practice

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 72782

RECORD COPY
PROJ NO. 5599

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Independent Design Review

Susquehanna Steam Electric Station Unit 1

TES PROJ. NO. 5599
DATE 7/23/82

Project Manager Resolution Form ⚠

RECORD COPY

PROJ. NO. 5599

PMR No. 5599-87 REV. 1

Reference RRF No. 5599-87 REV. 1

Date: 7/22/82

Description of Resolution:

ITEM 1. – PROJ. MGR. AGREES THIS ITEM IS CLOSED

ITEM 2. – PROJ. MGR. AGREES THAT A SINGLE WELD CALCULATION IS NOT ADEQUATE TO VALIDATE SUPPORT DESIGN. THE TES REVIEWER PERFORMED A NUMBER OF CALCULATIONS TO DETERMINE SUPPORT ADEQUACY. THE CALCULATION AS A MINIMUM SHOULD LIST ALL ITEMS PASSED BY COMPARISON WITH ITEM ANALYZED.

ITEM 3. – THIS ITEM IS BEING CARRIED UNDER RRF 93

Classification of Item after Resolution: OBSERVATION

W. J. McBrien
Reviewer Signature

D F Landers
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Independent Design Review

TES PROJ. NO. 6899 Susquehanna Steam Electric Station Unit 1

DATE 7278L

Reviewer Report Form ⚠

RECORD COPY

PROJ. NO. 6899

RRF No. 5599-87 Rev 1

Reviewer Name: William McBrine

Date: 7/20/82

Classification of Item: observation

Reference Documents: Calc 876 (PS) ABR-876
RRF-5599-87 Rev 0 & Bechtel Response
RRF 5599-93

Description of Item:

1) The analysis in question for support DLA-102-H1 is included with the civil calcs which were included with Bechtel's response. This item on the RRF is closed.

2) Upon further investigation the reviewer agrees that the support in question is adequate. However, the calculation done is an over simplification of the problem and the support adequacy is not apparent based on the calcs performed. (observation)

3) The item in question regarding the attachment of DLA-102-H5 to existing steel is persued in RRF 5599-93 (closed)

Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-87

Reference RRF No. 5599-87

Date: 6-24-82

Description of Resolution:

Bechtel to provide the methods used for evaluating the items addressed in RRF 87 for supports DLA-102-H1
DLA-102-H2
DLA-102-H5

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-29-82

RECORD COPY
PROJ. NO. 5599

Classification of Item after Resolution: OPEN ITEM

Reviewer Signature

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6 29 82

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-87

Reviewer Name: William McBrine

Date: 6/21/82

Classification of Item: open

Reference Documents:

Calc 876(PS) "final" RECORD COPY
Pipe Support Adequacy Calc. PROJ. NO. 5599
ABR-876

Description of Item:

The following items are not evaluated in the calculation package and they are not adequate by inspection.

Support DLA-102-H1 Reinforcing @ attachment to PR #604
" DLA-102-H2 Several welds & members not evaluated.
" DLA-102-H5 existing plates @ support base.

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599- ~~#~~ 25 JAF

Reference: RRF No. 5599- 88

PMR No. 5599- 88

Date: July 23, 1982

Internal Committee Resolution of Potential Finding:

This item does not impact the adequacy of the results, but has significance relative to design practice and applicable procedure.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 0599
DATE 72782

RECORD COPY
PROJ. NO. 5599

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

J M Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-88

Reference RRF No. 5599-88

Date: 6-24-82

Description of Resolution:

Calculations should be performed in such a manner that an independent reviewer can easily follow it and verify the completeness of it. This has no impact on the design adequacy but has a significance relative to the applicable procedure in the EPM.

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6-29-82

Classification of Item after Resolution: Observation

W. J. McBurn
Reviewer Signature

R. H. Egan
Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6.29.87

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-88

Reviewer Name: William McBrine

Date: 6/18/87

Classification of Item: observation

RECORD COPY
PROJ. NO. 5599

Reference Documents:

Bechtel Pipe Support Calc. 876 (PS)

Description of Item:

In many cases the structural adequacy calculations are not clear. Assumptions used in the analysis are not stated and the calcs can not easily be followed.

Reviewer Signature

RECORD COPY

PROJ. NO. 5599

ICR NO: 20 (RRF 79)

ICR NO: 25 (RRF 88)

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT

TES PROJ. NO. 5599

DATE 8/18/82

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 79, 88

Bechtel Response

PIPE SUPPORT DESIGNERS AND ENGINEERS HAVE BEEN INDOCTRINATED IN THE REQUIREMENTS OF PEPM (WHICH SUPERSEDES EPM).

ADDITIONALLY INDOCTRINATION CLASSES WILL BE CONDUCTED TO REINFORCE THE NEED FOR NOTING ALL ASSUMPTIONS AND TO ENSURE COMPLETENESS OF CALCULATIONS SO AS TO ENABLE COMPLETE TRACEABILITY. THE CLASSES WILL BE CONDUCTED BY 8/25/82

Response by N. Cruz

Date 8/12/82

Approved by [illegible]

Date 8/13/82

RECORD COPY

PROJ. NO. 5599

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

ICR NO: 17

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

TES PROJ. NO. 5599

DATE 8.18.82

Teledyne RRF No. 5599 - 71 REV. 1

Bechtel Response DLA - 102 - H10

RECONCILIATION OF THIS HANGER WAS BASED ON SEVERAL FACTORS. BASED ON BECHTEL CALC. 876 (PS) THE WELDS IN QUESTION SHOWN ON THE "AS-BUILT" DETAIL WERE ORIGINALLY DESIGNED CONSERVATIVELY.

HENCE, ANY CHANGES TO THESE WELDS WERE CLASSIFIED AS INSIGNIFICANT AND RECONCILED BY FOLLOWING THE STEPS OUTLINED ON SECT. IV PAGE 6, OF MEMO REGARDING "ADEQUACY REVIEW - INSIGNIFICANT CHANGES".

THE 3/16" AND 5/16" WELDS SHOWN ON THE AS-BUILT DETAIL FOR THE CORRESPONDING JOINTS HAVE BEEN APPROVED BY COMPARISON AND RECONCILED IN THE ABR PACKAGE. NO ADDITIONAL CALC'S WERE DEEMED NECESSARY DUE TO THE RELATIVELY LOW STRESSES IN CALC. 876 (PS).

ALSO, REFER TO MEMO (PAGE 7, ITEM 1) REGARDING NOTES ON THE AS-BUILT RECONCILIATION PROCESS.

Response by H. Cuy

Date 8/12/82

Approved by S. Parekh

Date 8/13/82

ICR NO: 18

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 8.18.82

RECORD COPY
PROJ. NO. 5599

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 - 66 (REV. 1)

Bechtel Response

DURING THE AS-BUILT REVIEW PROGRAM, DLA-102-H12 REV. 3/F1, WAS QUALIFIED ON THE BASIS OF THE CALCULATION PERFORMED BY THE RESIDENT ENGINEERING GROUP (SEE CALC. RE-DLA-102-H12C REV. 0).

THE CHANGES OF SIGNIFICANCE BETWEEN THE "AB" DRAWING REV. 3/F1 AND THE ENGINEERING REV. 2, IS IN THE SUBSTITUTION OF A TS 6X6X1/2 FOR A W8X31. UPON REVIEW OF THE EXISTING CALC'S FOR THE ENGR'NG. DET'L. (REV. 2), THE MEMBER STRESSES WERE SO LOW THAT THE USE OF A TS 6X6X1/2 WAS DEEMED ACCEPTABLE BASED ON ENGINEERING JUDGEMENT.

Response by [signature]

Date 8/12/82

Approved by [signature]

Date 8/13/82

ICR NO: 21

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 8.18.82
RECORD COPY
PROJ. NO. 5599

Teledyne RRF No. 5599 - 87 (REV. 2)

Bechtel Response

1) DLA-102-H1 → ITEM CLOSED, PREVIOUS RESPONSE (RRF 87, REV. 1) BY BECHTEL ACCEPTED BY TELEDYNE.

2) DLA-102-H2 → THE QUALIFICATION OF THIS HANGER WAS BASED ON MAXIMUM CAPACITY CALCULATIONS [SEE CALC. 876-(PS) REF. SECT. 2.2]. THE CRITICAL PORTION OF THIS HANGER HAS BEEN ANALYZED AND FOUND TO BE ACCEPTABLE AS PER THE STEPS OUTLINED IN THE MEMO "ABR PROCESS AND PROCEDURES" REGARDING "ADEQUACY REVIEW-SIGNIFICANT CHANGES" SECT. III - SUB-SECT. 5.

3) DLA-102-H5 → REFER TO RRF 93 FOR BECHTEL RESPONSE.

Response by H. Cary

Date 8/12/82

Approved by S. Vasaeli

Date 8/13/82

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

APPENDIX 6

PHASE 2

OBSERVATION DETAILS

TELEDYNE
ENGINEERING SERVICES

Technical Report
TR-5599-3

Phase 2

Observation No. 1

Donald F. Landers

Reviewer Signature

Richard M. Esso

Project Manager Signature

James A. Flaherty

Project Review Internal Committee

Observation No. 1

(Phase 1 Observation No. 12)

This item will remain as an Observation since it is TES' opinion that sufficient control by the preparer of the Design Specification over the documents referenced is not maintained. The registers submitted by Bechtel do not include accompanying procedures which indicate the process of control used. At the August 10, 1982 meeting it was indicated that these existed and the Bechtel response lists ten new Project Procedures which have been initiated to control this. However, these have not been submitted and reviewed by TES. PP&L should review these new procedures to assure themselves that they provide the necessary control.

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form △1

ICR No. 5599-3

Reference: RRF No. 5599-50, Rev. 0 and Rev. 1 Date: July 14, 1982

PMR No. 5599-50

Internal Committee Resolution of Potential Finding:

Based on the data supplied by the reviewer and Bechtel, the Internal Committee has determined that this item does not impact the adequacy of design but does have significance relative to the design practice and applicable procedures

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

D. F. Landers
Project Manager Signature

J. W. Hanson
Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-50, REV. 1

Reviewer Name: D.F. LANDERS

Date: 7/9/82

Classification of Item: POTENTIAL FINDING

Reference Documents:
1. SPEC. 8856-M-175, REV. 5
2. BECHTEL RESPONSE TO RRF 5599-50, DTD 7/6/82, REC'D BY TES 7/8/82
3. RRF NO. 5599-50

Description of Item:

REFERENCE 2 INDICATES THAT "PROJECT PROCEDURES PROVIDE FOR COORDINATION BETWEEN AFFECTED DISCIPLINES IN THE PREPARATION AND CERTIFICATON OF THESE DOCUMENTS AND THE REVISIONS." DOES THE CERTIFIER OF THE DESIGN SPEC. REVIEW AND ACCEPT REVISIONS TO REFERENCED DOCUMENTS? IS THERE EVIDENCE OF HIS ACCEPTANCE (SIGN-OFF)? TES HAS NOT FOUND THIS LEVEL OF DETAIL IN THE PROJECT PROCEDURES TO DATE.

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

RECORD COPY
PROJ. NO. [illegible]

DF Landers
Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

Teledyne RRF No. 5599 -50

Bechtel Response: THIS ISSUE HAS ALREADY BEEN BROUGHT UP BY ASME DURING RECENT SURVEY. CERTIFICATION STATEMENT HAS BEEN MODIFIED IN CURRENT REVISION OF SPECIFICATION 8856-M-175 (REVISION 5, DATED 6-24-82). ALL REFERENCED DOCUMENTS THAT ARE DEVELOPED BY BECHTEL HAVE BEEN STAMPED BY A QUALIFIED REGISTERED PROFESSIONAL ENGINEER. REFERENCED DOCUMENTS DEVELOPED BY GENERAL ELECTRIC COMPANY (THE NSSS SUPPLIER), TO THE BEST OF BECHTEL'S KNOWLEDGE, CONFORM TO ASME SECTION III. CERTIFICATION STATEMENT HAS BEEN CHANGED TO STATE THIS ABOUT G.E. SUPPLIED INFORMATION. REVISION OF REFERENCED DOCUMENTS ARE CONTROLLED BY PROJECT PROCEDURES THROUGH THE USE OF DRAWING AND SPECIFICATION REGISTERS. PROJECT PROCEDURES PROVIDE FOR COORDINATION BETWEEN THE AFFECTED DISCIPLINES IN THE PREPARATION AND CERTIFICATION OF THESE DOCUMENTS AND THE REVISIONS. (SEE ATTACHED LETTER FROM BECHTEL TO ASME DATED 6/11/82)

Response by A.J. Dash

Date 7-6-82 7/6/82

Approved by L. Menuler

Date 7-6-82

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5559
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Bechtel Group, Inc.

Fifty Beale Street
San Francisco, California
Mail Address: P.O. Box 3965, San Francisco, CA 94119

June 11, 1982

Mr. Manuel Gutierrez
Director, Accreditation
ASME
345 E. 47th St.
New York, NY 10017

Subject: Site Renewal Audit at the Susquehanna Steam Electric Station Units 1&2, Berwick, PA

Ref: 1) Letter, J. A. Russo (ASME) to W. R. Smith, Sr. re: same subject dated May 7, 1982

Dear Mr. Gutierrez:

Reference 1) advised Bechtel that a nonconformance was reported during the Susquehanna site renewal audit relating to the Owner's Design Specification as prepared by Bechtel when functioning as the Owner's designee. Specifically, the ASME Audit Team Leader reported that there was no objective evidence that the documents required for conformance to Paragraph NA 3250 of ASME B&PV Code, Section III and referenced in the Design Specification were certified by a Registered Professional Engineer as required by Paragraph NA 3255 of Section III.

To resolve this nonconformance, Bechtel was requested by the ASME to take the appropriate corrective action to assure that Design Specifications prepared by Bechtel meet Code requirements. This corrective action was required to be implemented and verified by Bechtel's jobsite Authorized Inspection Agency by June 14, 1982.

The Code edition and addenda of ASME Section III that applies for the piping systems that are constructed by Bechtel at the Susquehanna jobsite is the 1971 Edition, Winter 1972 Addenda.

The following corrective action and implementation schedule is offered in response to reference 1) and represents action to be taken on the Design Specifications prepared by Bechtel for Pennsylvania Power & Light (PP&L) on the Susquehanna project. Although the nonconformance identified by the ASME Survey Team and the corrective actions to be taken involve primarily the thirteen (13) piping system Design Specifications that are prepared by Bechtel for the Owner, the Design Specifications for other components, such as pumps, valves, vessels and tanks, will be reviewed and the following corrective actions will be taken, as necessary.

1) Piping & Instrumentation Diagrams, technical specifications, seismic response spectra and other documents referenced in the Design Specification and required for conformance to Paragraph NA 3250 of ASME Section III shall be certified by a Registered Professional Engineer by June 21, 1982.

2) The documents that are referenced in the Design Specifications and required for conformance to NA 3250 of ASME Section III will not be identified by revision number in the Design Specifications. Instead, each of these documents will be certified by a Registered Professional as described in 1) above, and will continue to be controlled by the Susquehanna Project through the use of document control registers, i.e. drawing and specification control registers. Project procedures provide for coordination between the affected groups in the preparation and certification of these documents.

3) The piping system Design Specifications shall be reviewed and recertified by a Registered Professional Engineer by June 30, 1982. The Design Specifications for other components shall be reviewed and recertified, as necessary, by a Registered Professional Engineer by July 23, 1982.

4) Bechtel's jobsite Authorized Inspection Agency (Lumbermens Mutual Casualty) shall verify implementation of Bechtel's corrective action by August 6, 1982.

5) The ASME shall be notified by the jobsite Authorized Inspection Agency of the successful implementation of corrective action by August 13, 1982.

The above action refers to the documents prepared by Bechtel. In addition, the piping system Design Specifications include NSSS Supplier furnished design and operating criteria (temperatures, pressures, flow rates, etc.) that are required by NA 3250 of ASME Section III. Bechtel is certifying that this data supplied by the NSSS Supplier is the criteria used by Bechtel for the design of the ASME Section III piping systems.

If you have any questions with regard to Bechtel's corrective actions or require additional information, please contact J. R. Barbee at 415/930-2452.

Very truly yours,

WRS/JRB/sla

W. R. Smith, Sr.

W. R. Smith, Sr.

cc: M. N. Bressler
E. J. Hemzy
R. E. Muise
R. D. Norris
J. Russo

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-50

Reference RRF No. 5599-50

Date: 6-4-82

Description of Resolution:

Requires a response from Bechtel addressing how revisions to referenced spec's are incorporated into design spec and controlled as to not change the adequacy of the FW design.

Classification of Item after Resolution: Potential Finding

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6.7.80

DF Landers
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

RECORD COPY

PROJ. NO. 5599

Independent Design Review

Susquehanna Steam Electric Station Unit 1

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Reviewer Report Form ⚠

TES PROJ. NO. 5599
DATE 6.4.82

RRF No. 5599-50

Reviewer Name: D.F. LANDERS

Date: 6/2/82

Classification of Item: POTENTIAL FINDING

Reference Documents: SPECIFICATION 8856-M-175, REV. 4

Description of Item:

SPEC. REFERS TO 33 OTHER DOCUMENTS WHICH PROVIDE REQUIREMENTS NECESSARY TO SATISFY CODE. THERE IS NO INDICATION THAT CERTIFIER OF DESIGN SPEC. HAS ANY CONTROL OVER THESE OTHER DOCUMENTS AND THEREFORE CANNOT DETERMINE THEIR ACCEPTABILITY WITH RESPECT TO HIS CERTIFICATION. THE DOCUMENTS DO NOT EVEN LIST APPROPRIATE REVISIONS AND/OR DATES. IF CONFLICTS OCCUR BETWEEN SPEC. & REF. DOCUMENTS NO DIRECTION IS GIVEN AS TO WHICH CONTROLS. (EX. ¶ 3.2 LISTS A MIN. SERV. TMP. FOR THE FEEDWATER PIPING - WHAT IS MIN. IN REF. DOCUMENTS?)

D.F. Landers

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

ICR No. 3

Teledyne RRF No. 5599 - 50, Rev 1,0

Bechtel Response

Teledyne has a copy of the Project Procedures Manual which was used before July 1, 1982, for the control of revisions to the project Design Specifications and the referenced documents (drawings and specifications) in the Design Specifications. The following sections of that manual are pertinent:

Section 4.0 Design Drawings
Section 7.0 Specifications
- Appendix E Engineering Department Procedures
MED-4.50-0 Rev. 3 Nuclear Piping System Design Specifications
EDP-4.50 Rev. 0

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

ICR No. 3 cont'd

Teledyne RRF No. 5599 - 50, Rev 1,0

Bechtel Response

However, due to an ASME audit finding the project instituted the following additional efforts in the certification of the Design Specifications:

1) Design Specifications have new certification statement,
2) Design Specifications may be certified by a Registered Professional Engineer from any state,
3) Referenced documents shall be certified by Registered Professional Engineer.

See attached letter from Bechtel to ASME dated June 11, 1982, for more details.

The project maintains drawing and specification registers. Samples of these registers relating the Design Specifications will be provided (ATTACHED)

The project also has a Master Distribution Schedule for project drawings and specifications. A copy of this distribution shedule will be provided (ATTACHED)

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

ICR No. 3 cont'd

Teledyne RRF No. 5599 - 50, Rev 1,0

Bechtel Response

Teledyne and/or the NRC may inspect/review the following project procedures that now control revisions to the Design Specifications and the referenced documents in the Design Specifications in the Bechtel/PP&L offices:

1) EDPI-4.50.1 Rev. 0 } Nuclear Piping System Design Specifications

2) MED-4.49-0 Rev. 12
EDP-4.49 Rev. 2
EDPI-4.49.1 Rev. 0 } Project Specifications

3) MED-4.46-0 Rev. 13
EDP-4.46 Rev. 3
EDPI-4.46.1 Rev. 0 } Project Drawings

4) MED-4.47-0 Rev. 9
EDP-4.47 Rev. 2
EDPI-4.47.1 Rev. 0 } Drawing Change Notice

Note: Bechtel does not include the revision number of the referenced documents in the Design Specification because the latest revision of the referenced document always applies to the piping system.

Response by J. Saame

Date 8/12/82

Approved by J. Saame

Date 8/13/82

Bechtel Group, Inc.

Fifty Beale Street
San Francisco, California
Mail Address: P.O. Box 3965, San Francisco, CA 94119

June 11, 1982

JUN 28 '82 0170571

Mr. Manuel Gutierrez
Director, Accreditation
ASME
345 E. 47th St.
New York, NY 10017

Subject: Site Renewal Audit at the Susquehanna Steam Electric Station Units 1&2, Berwick, PA

Ref: 1) Letter, J. A. Russo (ASME) to W. R. Smith, Sr. re: same subject dated May 7, 1982

Dear Mr. Gutierrez:

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To resolve this nonconformance, Bechtel was requested by the ASME to take the appropriate corrective action to assure that Design Specifications prepared by Bechtel meet Code requirements. This corrective action was required to be implemented and verified by Bechtel's jobsite Authorized Inspection Agency by June 14, 1982.

The Code edition and addenda of ASME Section III that applies for the piping systems that are constructed by Bechtel at the Susquehanna jobsite is the 1971 Edition, Winter 1972 Addenda.

The following corrective action and implementation schedule is offered in response to reference 1) and represents action to be taken on the Design Specifications prepared by Bechtel for Pennsylvania Power & Light (PP&L) on the Susquehanna project. Although the nonconformance identified by the ASME Survey Team and the corrective actions to be taken involve primarily the thirteen (13) piping system Design Specifications that are prepared by Bechtel for the Owner, the Design Specifications for other components, such as pumps, valves, vessels and tanks, will be reviewed and the following corrective actions will be taken, as necessary.

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If you have any questions with regard to Bechtel's corrective actions or require additional information, please contact J. R. Barbee at 415/930-2452.

Very truly yours,

WRS/JRB/sla

W. R. Smith, Sr.

W. R. Smith, Sr.

cc: M. N. Bressler
E. J. Hemzy
R. E. Muise
R. D. Norris
J. Russo

REQUISITION, SPECIFICATION AND ADDENDA REGISTER

~~273~~-82

NO	TITLE		DATE OF ISSUE AND PURPOSE REV. 0	REV. 1	REV. 2	REV. 3	REV. 4	REV. 5	REV. 6	REV. 7	PURCH. BY	DATE PO ISSUED	SUPPLIER
G-1	GENERAL PROJECT REQUIREMENTS FOR PURCHASE ORDERS	Req.									SEE SHEET #2		
		Spec.	4/19/71 BP	9/15/71 BP	2/72 BP	5/4/72 BP	10/1/72 BP	2/11/72 BP	1/9/73 BP	1/28/73 BP			
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-2	CANCELLED	Req.											
		Spec.											
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-3	GENERAL PROJECT REQUIREMENTS FOR WELDING SHOP AND FIELD FABRICATED EQUIPMENT AND TANKS	Req.											
		Spec.	12/29/71 BP	4/24/72 BP	12/1/72 BP	1/9/73 BP							REV "0" RELEASED BY PLB 394 1/31/72
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-4	GENERAL PROJECT REQUIREMENTS FOR SHOP PRIMING OF MECHANICAL AND ELECTRICAL EQUIPMENT	Req.											
		Spec.	7/26/71 BP	3/3/72 BP	6/5/72 BP	1/9/73 BP	1/4/77 R						REV "0" RELEASED BY PLB 278 + 432
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-5	GENERAL PROJECT REQUIREMENTS FOR INTEGRAL AND FRACTIONAL HORSEPOWER INDUCTION MOTORS 200 HORSEPOWER & SMALLER	Req.											
		Spec.	7/12/71 BP	5/2/72 BP	6/29/72 BP	1/9/72 BP	1/3/72 BP	12/1/72 BP	1/9/73 BP	4/2/73 BP			REV 0 RELEASED BY PLB 134 + 182
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-6	GENERAL PROJECT REQUIREMENTS FOR LOCAL CONTROL BOARD ANNUNCIATORS	Req.											
		Spec.	11/17/71 BP	1/6/72 BP	11/13/72 BP	1/9/73	7/2/73 BP	9/25/73 BP	9-10-74 BP				REV "0" RELEASED BY PLB 36 1/21/72
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-7	GENERAL PROJECT REQUIREMENTS FOR VALVE MOTOR OPERATORS	Req.											
		Spec.	12/27/71 BP	3/27/72 BP	5/9/72 BP	1/9/73 BP	4/13/73 BP	5/6/74 R	5/29/74 R	1-21-75 R			REV "0" RELEASED BY PLB 35 1/21/72
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-8	GENERAL PROJECT REQUIREMENTS FOR STANDARD INSTRUMENTS, CONTROLS AND LOCAL BOARDS SUPPLIED WITH STATION EQUIPMENT	Req.											
		Spec.	3/27/72 BP	7/14/72 BP	10/24/72 BP	1/9/73 BP	2/13/73 A	5/31/73 A	7/12/73 A	10-8-74 BP			
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-9	GENERAL PROJECT REQUIREMENTS FOR QUALITY ASSURANCE ON PURCHASE ORDERS FOR Q DESIGNATED ITEMS	Req.											
		Spec.	2/7/72 BP	7/13/72 BP	1/9/73 BP	1/29/73 BP	3/17/73 BP	6-11-74	2-7	[illegible]			
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											
G-10	GENERAL PROJECT REQUIREMENTS FOR ASEISMIC DESIGN AND ANALYSIS OF CLASS 1 EQUIPMENT AND EQUIPMENT SUPPORTS	Req.											
		Spec.	3/3/72 [illegible]	11/6/72	1/11/72 BP	2/24/73 A							INCLUDED IN BFP
		Addenda 1.											
		Addenda 2.											
		Addenda 3.											

SYMBOLS

- A = Client Approval
- B = Bids
- P = Purchase
- R = Revision
- SC = Subcontract
- FB = Field Spec. Bids
- FS = Field Spec.
- C = Change Order
- X = Cancelled

PURCH BY:

- P.
- BC = Bechtel
- F = Field

Job No

LEGEND

— DRAWING STARTED
ISSUED FOR APPROVAL
ISSUED FOR CONST.

PROGRESS LAST PERIOD
PROGRESS THIS PERIOD
ISSUED FOR A – APPROVAL C – CONSTRUCTION
Q – QUOTATION P – PURCHASE

DRAWING CONTROL

BECHTEL POWER CORPORATION

POWER DIVISION
ENGINEERING DEPT.

JOB NO. 8696 PERIOD ENDING SEP
JOB PL 5685
SHEET 5A OF 30 SHEETS CONTINUATION

CODE	DRAWING NUMBER	TITLE	START DATE SCHED. / ACTUAL	FOR	COMP DATE SCHED. / ACTUAL	FOR	APP'D DATE	DATE ISSUED REV 0	REV 10	REV 11	REV 12	REV 13	REV 14	REV 15	REV 16	REV 17	REMARKS *DESIGNATES PRINCIPAL DRAWING
		HEATING AND VENTILATION															
		TURBINE BLDG UNIT 1															
▽	E-106435-2 V-9-2	AREA 9 PLAN OF EL 676'-0"	3-7-74 / 4-9-74		3-7-74 / 5-30-74			6-6-80									
▽	E-106436-5 V-9-5	AREA 9 PLAN OF EL. 762'-0"	1-2-73 / 1-2-73		5-10-74 / 5-30-74			4-7-77	7-18-77	9-1-77	9-2-77	2-2-78	7-24-78	10-26-79	12-8-80	8-1-81	
▽	E-106436-11 V-9-11	AREA 9,10,11, SECTIONS AT EL. 762'-0"	9-3-74		10-15-74 / 11-8-74			1-17-79	10-26-79	11-3-81							
▽	E-106435-4 V-10-4	AREA 10 PLAN OF EL 729'-0"	4-4-74 / 4-11-74		5-7-74 / 8-23-74			8-5-77	9-13-77	12-15-77	2-6-78	2-23-78	7-15-78	1-17-79	5-11-79	10-26-79	SEE CONTINUA
▽	E-106435-5 V-10-5	AREA 10 PLAN OF EL. 762'-0"	1-27-73 / 1-27-73		5-10-74 / 5-30-74			9-1-77	9-15-77	12-15-77	2-2-78	7-5-78	10-2-78	10-26-79	10-8-81	6-18-82	
▽	E-106435-12 V-10-12	AREA 10 SECTIONS OF EL. 762'-0"	5-3-74 / 4-19-74		5-15-74 / 5-30-74			10-26-79									
▽	E-106435-13 V-10-13	AREA 10 SECTIONS OF EL 762'-0"	5-15-74 / 4-20-74		5-16-74 / 5-30-74			10-2-78	10-26-79	11-3-81							

Q1000468 01

BPC 2-10LA

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

Phase 2

Observation No. 2

Reviewer Signature

Donald F. Landers

Project Manager Signature

James A. Flaherty

Project Review Internal Committee

Observation No. 2

(Phase 1 Observation No. 11)

This item will remain as an Observation. The major reason for this is that no information in the form of design drawings, procedures, instructions, etc.; has been presented to demonstrate that bolt tightening of some type is a requirement. The final Bechtel response that "bolt tightening is a QC Inspection attribute and field verification item" is meaningless without some defined bolt tightness requirements.

TES pointed out at the August 10, 1982 meeting that the special clamp could be a concern when it was not tight on the pipe. It was suggested that installation requirements may cover this. No information of this sort has been made available.

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-27

Reference: RRF No. 5599-86, Rev. 1 Date: July 23, 1982

PMR No. 5599-86, Rev. 1

Internal Committee Resolution of Potential Finding:

The Committee does not agree with the reviewer. This item should be classified as an Observation. The committee feels that this item has significance relative to Conservatism. The reason for this is. (1) It is TES' understanding that the Bolts are not preloaded to the Design Load (or not preloaded at all). ~~Th~~

(2) Due to preload Not being used, the effect of the elastic foundation can not be considered.

There is also signifance relative to Design Practice ~~X~~ For this specific case shear does not exists but this is not generally True

MASTER COPY
PROJ. NO. 5599

Classification of Item after Committee Resolution: Observation

James A. Flaherty
Committee Chairman Signature

Project Manager Signature

Committee Member Signature

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 72782

TELEDYNE
ENGINEERING SERVICES

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form △1

PMR No. 5599-86, REV. 1

Reference RRF No. 5599-86, REV. 1

Date: 7/14/82

Description of Resolution:

THE REVIEWER HAS INDICATED A PROBLEM WITH THE BECHTEL APPROACH TO SPECIAL CLAMP DESIGN BY INCLUDING THE EFFECT OF BOLT BENDING. THIS APPROACH USES REACTIONS CALCULATED FROM A BECHTEL ANALYSIS.

SINCE THE BOLT BENDING STRESS IS SIGNIFICANT (19,500 PSI) THIS CREATES CONCERN WITH ALL SPECIAL CLAMPS.

RECORD COPY
PROJ. NO. 6599

TELEDYNE ENGINEERING SERVICES
CONTR[illegible]
DOCL[illegible]
T[illegible] PROJ. NO. 5599
DATE 72782

Classification of Item after Resolution: POTENTIAL FINDING

Reviewer Signature

D. F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT

Independent Design Review

TES PROJ. NO. 5599 Susquehanna Steam Electric Station Unit 1

DATE 72782

Reviewer Report Form ⚠

RECORD COPY

PROJ. NO. 5599

RRF No. 5599-86 Rev 1
sheet 1/2

Reviewer Name: William McBrine

Date: 7/14/82

Classification of Item: Potential Finding

Reference Documents:
Bechtel Calc 876 (PS) clamp qualification calcs.
Drawing DLA-101-14 Rev 6F,

Description of Item: The Bechtel Response to RRF 5599-86 dated 7/7/82 indicates that the EDS methodology for clamp qualification does not require shear to be transmitted through the clamp bolts. This is true for the load cases considered in the EDS methodology. However, the referenced Bechtel Calculation derives a bolt reaction do to skewed attachments to the clamp, a case not considered in the EDS methodology. The bolts are analyzed for the direct shear but bolt bending is not considered. Example:

(continued)

W. J. McBrine
Reviewer Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

TELEDYNE ENGINEERING SERVICES CONTROLLED DOCUMENT

Susquehanna Steam Electric Station Unit 1

TES PROJ. NO. 5699
DATE 72782

Reviewer Report Form ⚠

RECORD COPY
PROJ. NO. 5599

RRF No. 5599-86 rev1
sheet 2/2

Reviewer Name:

Date: 7/14/82

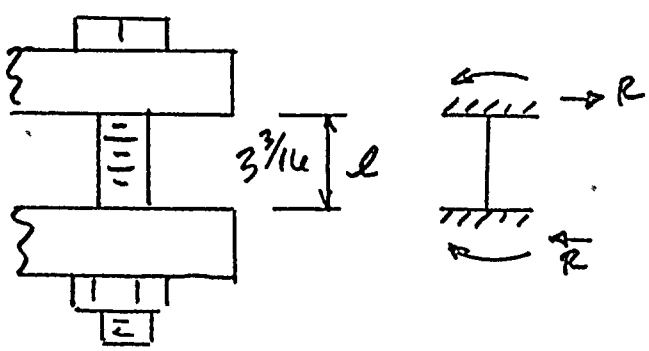
Classification of Item:

~~Reference Documents:~~

Evaluating bolt bending stress for DCA-101-141 & 144 using the bolt shear reaction from sheet 8 of the Bechtel clamp calc for this clamp.

~~Description of Item:~~

chk'd AJM 7/14/82



$R = 3987^{lb}/Bolt$

$M = \frac{R\ell}{2} = \frac{3987^{lb}(3\frac{3}{16})}{2} = 6354^{"-lb}$

for $1\frac{3}{4}$ ø Bolt Root r = 1.49"

$S = \frac{1}{4}\pi r^3 = \frac{1}{4}\pi\left(\frac{1.49}{2}\right)^3 = .325\ in^3$

$f_b = M/S = \frac{6354^{"-lb}}{.325\ in^3} = 19{,}551$ psi due to bolt bending

This stress may be higher in other cases where the loads are higher or the attachment is skewed more than 23° from vertical

Reviewer Signature

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

WJ 111

Teledyne RRF No. 5599 - 86

Bechtel Response

FOR RESPONSE TO THIS ITEM, PLEASE REFER TO ATTACHED MEMO FROM EDS - NUCLEAR INC.

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Response by H. Guy
Date 7/7/82
Approved by L. Memula
Date 7-7-82

eds nuclear

EDS Nuclear Inc.
220 Montgomery Street
San Francisco, California 94104
(415) 544-8000

July 7, 1982
0020-866-001

Bechtel Power Corporation
Post Office Box 3965
San Francisco, California 94623

ATTENTION: Mr. Chuck Chakravartula

SUBJECT: Susquehanna Pipe Clamp
Methodology, Design Review Comments

Gentlemen:

Enclosed please find the summary of our response to the Design Review comments on the methodology developed for evaluation of nonstandard clamps for the Susquehanna Steam Electric Station.

Should you have any questions or comments, please do not hesitate to contact Mr. Sohrab Esfandiari or the undersigned.

Very truly yours,

R. M. Polivka

for/ D. M. Witt
Manager
Structural Design Division

DMW/SE/acr
Enclosure

Summary of Response to Design Review Comments

EDS Nuclear

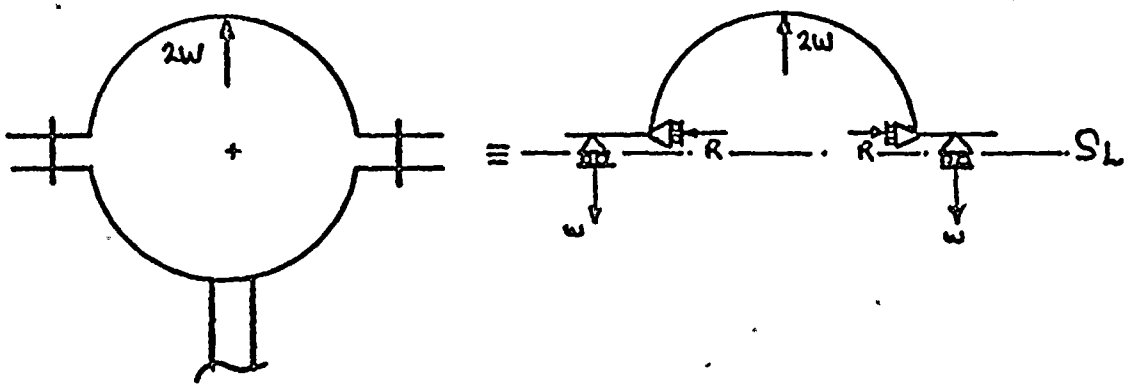
July 7, 1982

Reference : Design review comment on Bechtel calc. 876 (PS) and clamp qualification calc. for hanger DLA-101-H1 & H4, dated 6-23-82.

Response : In developing the methodology for nonstandard pipe clamp evaluation for the Susquehanna Steam Electric Station, it was consistently assumed that bolts connecting the two halves of clamp do not transmit shear. This is based on assuming that the bolt-clamp joint resembles a pin condition.

The structural models and corresponding load transfer mechanisms for different load cases, as utilized for the Susquehanna pipe clamp methodology, are summarized overleaf.

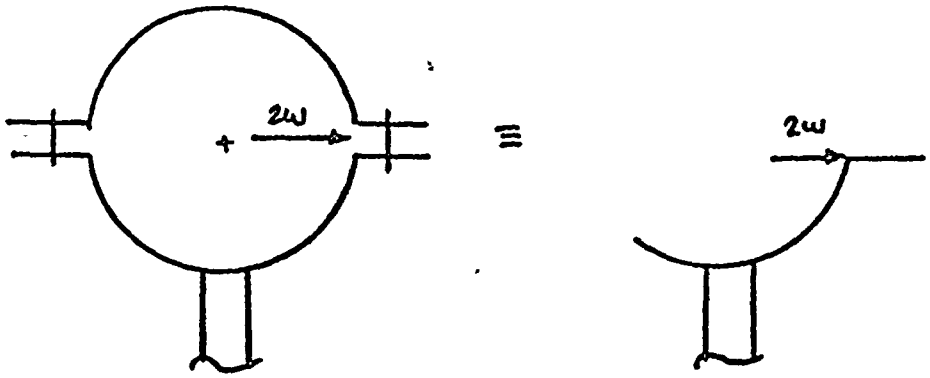
Case (a) : <u>Vertical load with vertical support</u>



Support Configuration Structural Model

Note That R is The reaction between clamp and pipe. Bolts transmit tension only.

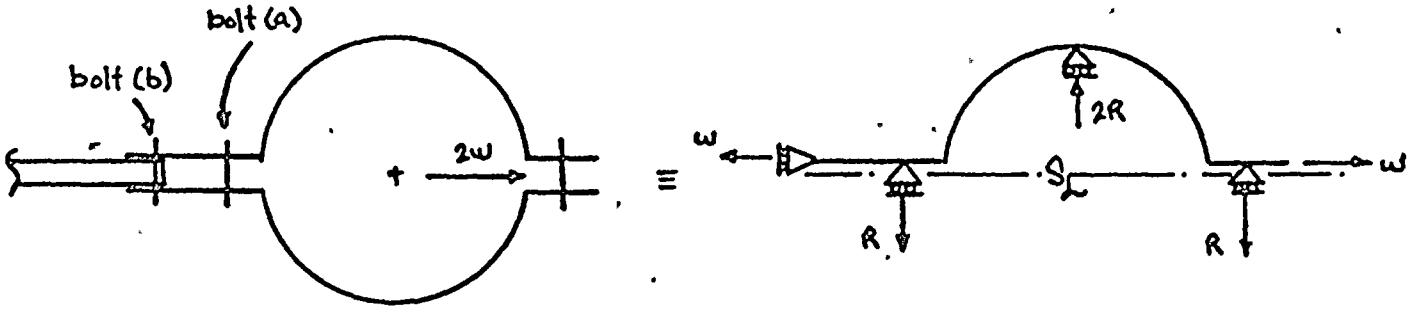
Case (b) : <u>Horizontal load with vertical support</u>



Support Configuration structural model

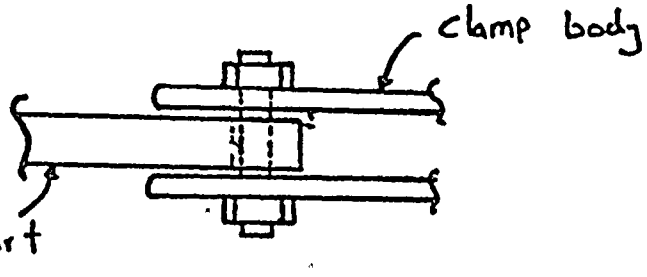
Load is transmitted solely via clamp body to The Stanchion. The upper half and The bolts do not

Case (c): <u>Horizontal load with horizontal support</u>



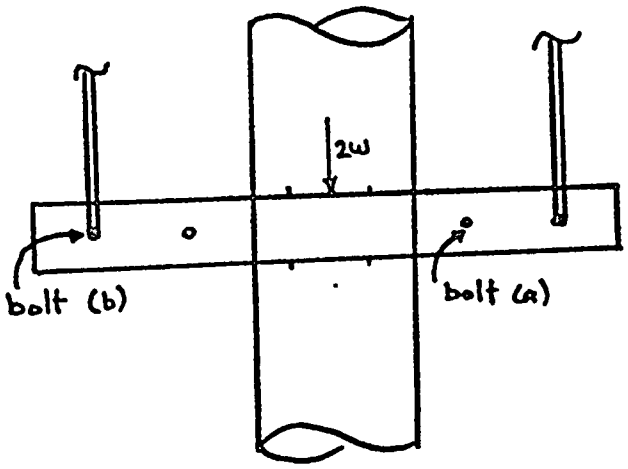
Support Configuration Structural Model

Note: Bolt (a) is modelled as a roller and transmits tension only. The load is transmitted via clamp body & bolt (b) into the horizontal support. Bolt (b) although transfers shear, w, but is prevented from bending by the relatively rigid support. Hence no local bending stresses are induced. Figure below shows this connection in more detail:

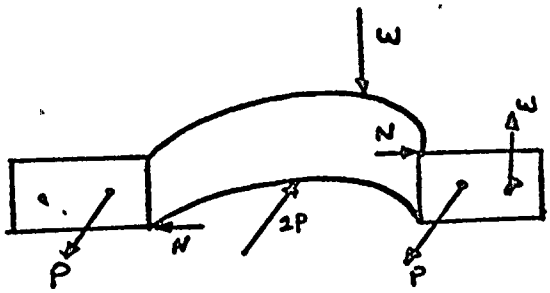


(rigid rod or strut assembly)

Case (d): <u>Riser clamps</u>



Support Configuration



Structural Model

Note: Bolt (a) transmits tension only. The load is transmitted via the clamp body & bolt (b) into the support. Bolt (b) does transfer the load, w, to the support via shear, however this case is analogous to that of case (c), and no local stresses are induced.

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-86

Reference RRF No. 5599-86

Date: 6-24-82

Description of Resolution:

Requires a response from Bechtel addressing the bending in the bolt of the clamp and the local stresses in the clamp itself.

RECORD COPY
PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-29-82

Classification of Item after Resolution: OPEN ITEM

W. J. McBrams
Reviewer Signature

R K Ewo

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6/29/82

RRF No. 5599-86

Reviewer Name: William McBride

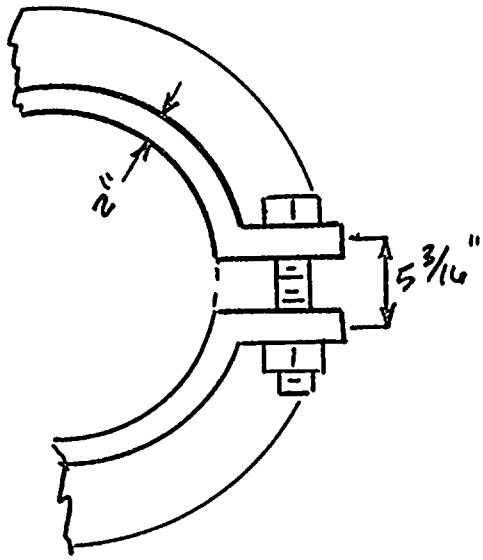
Date: 6/23/82

Classification of Item: open

RECORD COPY
PROJ. NO. 5599

Reference Documents: Bechtel Calc 876 (PS) Clamp Qualification Calc for DLA-101-H1 & H4

Description of Item:



The methodology used for the evaluation of special pipe clamps is based on the assumption that the bolts transmit both shear and tension between clamp halves. The clamp ears for DLA-101-H1/H4 have a center to center spacing of 5 3/16". Shear loads transmitted through the bolts would induce a significant moment in the bolts because of this gap. Bolt bending stress and local stresses in the clamp have not been evaluated for this moment.

W. J. McBr
Reviewer Signature

ICR NO: 27

RESPONSE TO INDEPENDENT DESIGN REVIEW

OPEN ITEMS:

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 8.12.82

Teledyne RRF No. 5599 - 86 (REV. 1)

RECORD COPY
PROJ. NO. 5599

Bechtel Response

FOR THE SPECIAL CLAMPS : THE BOLTS TIGHTENING IS A QC INSPECTION ATTRIBUTE AND FIELD VERIFICATION ITEM.

Response by H. Cruz

Date 8/12/82

Approved by R. Vparekh

Date 8/13/82

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

Phase 2

Observation No. 3

Reviewer Signature

Donald F. Landers

Project Manager Signature

James A. Flaherty

Project Review Internal Committee

Observation No. 3
(Phase 1 Finding No. 4

This item will remain an Observation since a review of the Bechtel calculations provided with their response indicates that mixing in the feedwater pipe due to flow in the reactor vessel was not considered. For the Feedwater System this effect results in a beginning temperature at the branch connection of 210F versus the 173F obtained by Bechtel. This difference is considered by TES to be insignificant. However, geometries could exist in which the branch connection lies in the flow mixing zone and the Bechtel approach used in the Feedwater System would be more unconservative (ie., the closer the branch connection is to the flow in the RPV the greater the problem).

TELEDYNE ENGINEERING SERVICE

Enclosure (1)
EP-1-015

Independent Design Review
Susquehanna Steam Electric Station Unit 1

Internal Committee Resolution Form ⚠

ICR No. 5599-9

Reference: RRF No. 5599-20, Revision 1 Date: July 15, 1982

PMR No. 5599-20, Rev. 1

Internal Committee Resolution of Potential Finding:

Items A, and B should be classified as Observations since they do not impact the adequacy of design

Item D has been covered and reviewed under ICR No. 2 and need not be reviewed with this ICR.

Item C- The ~~ICR of this item and~~ Internal Committee (JAF) agrees with the reviewer. Both the Loss of F.W. Pumps, MSIV closed and Start up conditions should be included in the fatigue evaluation. Therefore this item impacts the adequacy of the Design.

Classification of Item after Committee Resolution: Items A & B - Observation
Item C- Finding: Item D - redundant addressed in ICR No. 2

James A. Flaherty
Committee Chairman Signature

DF Landers
Project Manager Signature

RECORD COPY
PROJ. NO. 4597

J. W. Hanson
Committee Member Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
DOCUMENT NO. 3559-1
DATE 7-21-82

Prasad R. Kommineni
Committee Member Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-20, REV. 1

Reference RRF No. 5599-20, REV. 1

Date: 7/14/82

Description of Resolution:

MAJOR CONCERN IS ASSOCIATED WITH ITEM C. OF RRF. SINCE POINT 120 U = 0.6521 INCLUSION OF PROPER START UP CONDITIONS COMBINED WITH LOSS OF F.W. PUMPS - MSIV CLOSED* COULD REQUIRE REVISIONS TO APPROACH, (i.e. NB-3200 ANALYSIS) TO COMPLY WITH ASME III. FOR THIS REASON THE PROJ. MGR. IS UPGRADING THE RRF FROM THE OBSERVATION CATEGORY.

RECORD COPY
PROJ. NO. [illegible]

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. [illegible]
DATE [illegible]

* SEE RRF 5599-35 AND 5599-49

Classification of Item after Resolution: POTENTIAL FINDING

Reviewer Signature

D.F. Landers

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
EP-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-20 REV 1

Reviewer Name: Stanley Wharton

Date: 7-13-82

Classification of Item: ~~OPEN ITEM~~ OBSERVATION

RECORD COPY

Reference Documents:

ME 913 SEQ 01999
CALC PKG 1503

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 7 21 82

Description of Item:

A. Calculation package 1503 not provided. in Appendix E Rev. 1 - Information provided by Bechtel resoonse does not show how ΔT_1 and ΔT_2 were determined - TES needs ME-912 OR Calculations that show ΔT_1 & ΔT_2 determination.

B. Branch reinforcement calculations should be included in stress report

C. This connections for points 44, 83 and 120

See page 2 of 2

~~Reviewer Signature~~

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
Encl 015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-20 REV 1

Reviewer Name: Stanley Wharton

Date: 7-13-82

Classification of Item: ~~OPEN ITEM~~ OBSERVATION

Reference Documents: Page 2 of 2

Description of Item:

are in heat affected zone - the ΔT's for start-up and shutdown seem low for a step 546° to 90°. ΔT_1 for straight pipe in this area is 191° vs 32° for weldolet

D. Usage factors for connections to 12" pipe are greater than those in the stress report i.e. SEQ 01999 RUN POINT 120 U=.6521 SR28856-1500 (REV.1) page 13 POINT 125 U=.5963 (same problem on DLA-101 24" pipe)

Reviewer Signature

RESPONSE TO INDEPENDENT

DESIGN REVIEW OPEN ITEM

Teledyne RRF. No. 5599 - 20

Bechtel's Response

This was an incomplete branch connection calculation. The final branch connection has been calculated by including $T_A - T_B$ effect for the branch connections. T_A and T_B were calculated based on the wall thickness of run pipe and average wall thickness of the fitting. The calculations were dated 4/28/82 and included in calculation No. 1503 of Appendix E, Rev. 1. A copy of typical branch connection calculations is attached

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 7-8-82

RECORD COPY
PROJ. NO. 5599

Responded By Chii Chern Date 7/6/82

Approved By L. Memula Date 7/7/82

Technical Report
R-5599-3

TELEDYNE
ENGINEERING SERVICES

SEE TES QA RECORDS

FOR DETAIL BECHTEL RESPONSES

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Project Manager Resolution Form ⚠

PMR No. 5599-20

Reference RRF No. 5599-20

Date: 6/2/82

Description of Resolution:

BECHTEL MUST PROVIDE JUSTIFICATION FOR NOT CALCULATING $T_A - T_B$ EFFECTS FOR BRANCH CONNECTIONS.

Classification of Item after Resolution: OPEN

TELEDYNE ENGINEERING SERVICES
CONTROLLED DOCUMENT
TES PROJ. NO. 5599
DATE 6·3·82

RECORD COPY

PROJ. NO. 5599

Reviewer Signature

D F Landers

Project Manager Signature

TELEDYNE ENGINEERING SERVICES

Enclosure (1)
-1-015

Independent Design Review

Susquehanna Steam Electric Station Unit 1

Reviewer Report Form ⚠

RRF No. 5599-20

Reviewer Name: Stanley Wharton

Date: 5-24-82

Classification of Item: OPEN

Reference Documents:

ME-912 (ΔT's) Runs

Description of Item:

Small branch connections (i.e. 1" connections & plugs) were not analyzed for T_A-T_R effects

Detail of small branch lines required

PROJ. NO. 5599

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5599
DATE 6-1-82

Reviewer Signature

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES 5599
DATE 8/18/82
RECORD COPY
PROJ. NO. 5599

RESPONSE TO INDEPENDENT

- DESIGN REVIEW OPEN ITEM Rev. 1

ICR NO: 9

Teledyne ICR No. 5599 - 9 RRF/PMR NO— 20

Bechtel's Response

A complete set of Appendix E & F for the final stress report was forwarded to Teledyne on August 11, 1982, ~~as a~~ Response, to Items of observation and finding are described below:

Item A:

ΔT_1 ΔT_2, Ta-Tb data were not included in branch connection calculation of Phase III Stress Report submitted to Teledyne. These data have been included in Appendix E & F of final stress reports.

Item B:

Branch reinforcement calculations are included in Appendix E of final stress reports.

Item C:

i) The initial temp. for Start-up condition at branch connection was established based on temperature profile calculation. The calculation that determined the initial temperature of Start-up transient is included in Appendix E of final stress reports.

ii) ~~The~~ Study calculations for ~~including~~ EVALUATING FATIGUE DAMAGE DUE TO the emergency condition (loss of F.W. pump, MSIV close) are shown in the computer output Calculation No. 87245 and 87242 submitted to Teledyne in the meeting dated August 10, 1982. The results show insignificant change in the cumulative usage factor, shown in the stress report. Refer to Bechtel's response as ~~also~~ included in ICR No. 5599-2.

Responded By Chii Chern 8/12/82

Approved By [illegible] 8/12/82

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

APPENDIX 7

DOCUMENT LIST

TELEDYNE ENGINEERING SERVICES

DOCUMENT LIST

Bechtel - Specifications and Reports

Spec. #8856-M-120, Rev. 1, Technical Spec. for Flued Head Fittings/Primary Containment Penetration.

Spec. #22A2925, Rev. 6, Nuclear Boiler System Design Specification, Bechtel Document No. 8856-SCR22-42-5.

Spec. #22A2925AD, Rev. 4, Nuclear Boiler System Data Sheet.

Spec. #22A1367, Rev. 8, Feedwater Control System Design Spec.

Spec. #22A1367AW, Rev. 5, Feedwater Control System Data Sheet.

Spec. #22A2707, Rev. 5, Water Quality (GE).

Spec. #22A4273, Rev. 2, General Instructions for Reactor Assembly.

Spec. #22A4628, Rev. 0, Installations for GE Piping Systems.

Spec. #22A2749, Rev. 2, Cleaning Piping and Equipment (GE).

Spec. #22A4000, Rev. 2, Definition of Piping Interfaces -Reactor Coolant Pressure Boundary - Boiling Water (GE).

Spec. #8856-M-167, Rev. 1, Technical Spec. for Internal Cleanness of Piping and Equipment.

Spec. #8856-M-201, Rev. 4, Technical Spec. for Shop Fabricated Piping for Nuclear Services.

Spec. #8856-M-204, Rev. 9, Technical Spec. for Field Fabrication and Installation of Nuclear Service Piping.

Spec. #8856-M-207, Rev. 6, Technical Spec. of Nuclear Service Piping.

Spec. #8856-M-210, Rev. A, Technical Spec. for Forged Steel Penetration Flued Head Fittings.

Spec. #8856-M-213, Rev. 9, Technical Spec. for Installation, Inspection and Documentation of Piping Supports, Hangers and Restraints.

Spec. #8856-M-214, Rev. 9, Schedule of Hydrostatic Test Pressure.

Spec. #8856-M-243, Rev. 0, Design Criteria for Design and Documentation of Pipe Support Hangers, Restraint for Pipe 2½".

Document List (Cont'd)

Spec. #8856-M-406, Rev. 0, Design Guidelines for Design Documentation of Detailed Piping Stress Analysis.

Spec. #8856-M-391, Rev. 1, Piping "As-Built" Program Specifications.

Spec. #8856-M-175, Rev. 2, Design Spec. for Nuclear Piping for Main Steam and Feedwater Systems for SSES Units 1 and 2.

Spec. #8856-M-175, Rev. 4, Design Spec. for Nuclear Piping for Main Steam and Feedwater Systems for SSES Units 1 and 2.

Spec. #375-217, Rev. A, Design of 24"-900# Carbon Steel Gate Valve (SMB-4-150) Limitorque Operator.

Spec. #175-11, Rev. A, Design of 24"-900# Tilting Disc Check Valve for Class 1 Nuclear.

Spec. #8856-M-221, Rev. 15, Technical Spec. for Nuclear Service Valves.

Spec. #8856-G-1, Rev. 12, General Project Requirements for P.O.'s.

Spec. #8856-G-7, Rev. 7, General Project Requirements for Valve Motor Operators.

Spec. #8856-G-9, Rev. 9, General Project Requirements for Quality Assurance on P.O.'s for "Q" Design Items.

Spec. #8856-P-11, Rev. 6, Valve Data Sheets for Power Operated Valves.

Spec. #8856-P-11, Rev. 10, Design Spec. for Nuclear Service Valves w/Appendices I, II and III.

Spec. #238X113AE, Rev. 19, Nuclear Boiler System Master Parts List, MPL B21.

QA Audit No. 8856-E501-1-2, Rev. 15, EDS Nuclear.

QA Audit No. 8856-M-397, Rev. 7, URS/Blume.

Spec. #8856-G-24, Rev. 4, Table I, List of Civil/Structural Group File for Mass Specific or Loading Response Spectra.

GE letter GB-82-6 with attachment (156961), dated 1/19/82, New Load Adequacy Evaluation Equipment Nozzle Overloads for RPV.

ME101/H3, 3 pages, Loading Combinations for Hanger Guidance.

Document List (Cont'd)

SR8856-1500, Rev. 1, dated 6/4/81, ASME Section III Class 1 Analysis of the Feedwater Lines for SSES Unit 1, Stress Report.

Annulus Pressurization Analysis (Superpipe) Input and Output only for Feedwater System.

Bechtel Calculation Package, "Calc. 876-(PS)" Containing hanger detail drawings, stiffness calculations, clamps and hanger design calculations.

Overpressure Protection Report, 22A4999, Rev. 1.

Final Stress Report for Flued Head No. X-9A, Document #74943-9A.

Stress Report, Bechtel Calc. No. 876 Piping, with Microfiche of Computer Analysis ME101.

Seismic Class 1 Analysis of 24"-900# Carbon Steel Gate Valve w/SMB-4-150 Limitorque Operator Document #80-234, Rev. B.

Susquehanna Steam Electric Station Unit 1 & 2, FSAR - Volumes 1 through 17.

Bechtel Calc. No. 876, Class 1 Analysis, with Microfiche of Computer Analysis ME101 Load Cases.

Stress Report Feedwater Lines Class 1 Analysis ASME Section III, Appendix E, Volumes 1 through 3.

<u>Bechtel - Response Spectra (Individual and Enveloped</u>

OBE (cracked).

OBE (uncracked).

SSE (cracked).

SSE (uncracked).

LOCA.

Chugging (asymmetric).

Chugging (axisymmetric).

Condensation Oscillation.

SRV (asymmetric).

Document List (Cont'd)

SRV (axisymmetric)

Annulus Pressurization.

Bechtel - Manuals

Quality Assurance Manual (D.C. No. 8856-37).

Engineering Procedures Manual (D.C. No. 71).

User Manual for Computer Program ME912 (Delta T) Piping Thermal Transient Program.

User and Theoretical Manual for Computer Program ME913 Nuclear Class 1 Piping Stress Analysis.

SP 0014 Superpipe Manual Rev. 1-31-82 and 1-15-79.

Bechtel - Drawings

Stress Isometrics

Dwg. #FCI-P49-876, Sheets 1 and 2, Rev. 4E1.

Dwg. #SK-M-6009, Sheet 1, Rev. D.

Restraint Load Summaries

Dwg. #FCI-P49-976, Sheet 3, Rev. 4E1.

Dwg. #SK-M-6009, Sheet 2, Rev. D.

Pipe Supports

Dwg. #DLA-101-H1, Rev. 5, Sheets 1-4, Rev. 7, Rev. 5F2, 7F1.

Dwg. #DLA-101-H2, Rev. 4, Sheets 1-3, Rev. 2F2, Rev. 5, Rev. 5F2, Rev. 2F2.

Dwg. #DLA-101-H3, Rev. 6, Sheets 1-4.

Dwg. #DLA-101-H4, Rev. 6, Rev. 6F1, Rev. 3F1.

Dwg. #DLA-102-H1, Rev. 7, Sheets 1-3.

Dwg. #DLA-102-H2, Rev. 2, Sheets 1-5.

Document List (Cont'd)

Dwg. #DLA-102-H3, Rev. 3, Sheets 1-2.

Dwg. #DLA-102-H4, Rev. 5, Sheets 1-4.

Dwg. #DLA-102-H5, Rev. 4, Sheets 1-3.

Dwg. #DLA-102-H6, Rev. 2, Sheets 1-3.

Dwg. #DLA-102-H7, Rev. 6, Sheets 1-3.

Dwg. #DLA-102-H8, Rev. 2, Sheets 1-4.

Dwg. #DLA-102-H9, Rev. 2, Sheets 1-4.

Dwg. #DLA-102-H10, Rev. 3, Sheets 1-4.

Dwg. #DLA-102-H11, Rev. 2, Sheets 1-3.

Dwg. #DLA-102-H12, Rev. 2, Sheets 1-3.

Dwg. #DLA-102-H1, Rev. 7, Rev. 7F1.

Dwg. #DLA-102-H2, Rev. 2, Rev. 1F23, Calc. 91-F-3, Rev. 0, Sheets 1 of 3, Rev. 4, Rev. 2F2.

Dwg. #DLA-102-H3, Rev. 3, Rev. 3F1.

Dwg. #DLA-102-H4, Rev. 5, Rev. 6, Rev. 3F1, Rev. 5F1A.

Dwg. #DLA-102-H5, Rev. 4, Rev. 4F2.

Dwg. #DLA-102-H6, Rev. 2, Rev. 2F1, Rev. 3F1.

Dwg. #DLA-102-H7, Rev. 6, Rev. 6F1.

Dwg. #DLA-102-H8, Rev. 2, Rev. 2F2.

Dwg. #DLA-102-H9, Rev. 2, Rev. 3, Rev. 3F2.

Dwg. #DLA-102-H10, Rev. 3, Rev. 3F1.

Dwg. #DLA-102-H11, Rev. 2, Rev. 2F3.

Dwg. #DLA-102-H12, Rev. 2, Rev. 3, Rev. 3F2, 3F1.

Dwg. #DLA-102-H13, Rev. 3, Rev. 3F1A.

Document List (Cont'd)

Dwg. #DLA-102-H14, Rev. 2, Rev. 2F1.

Dwg. #DLA-102-H15, Rev. 3, Rev. 3F1.

Dwg. #SD-DBA-104-1H, Sheet 1-3 w/calc.

Bechtel - Additional Reference Documents

Calc. 876, AP Spectrum Curves, 6 Sheets.

Calc. 876, Response Spectra Drywell, SSE Uncracked and Cracked, 9 Sheets.

Calc. 876, Response Spectra Drywell, OBE Uncracked, 6 Sheets.

Calc. 876, Response Spectra Drywell, OBE Cracked, 6 Sheets.

Calc. 876, Response Spectra Drywell, LOCA DBA, Sheet 1 of 11.

Calc. 876, Spectrum Curves, SRV ASYM, SRV SYM, 3 Sheets.

Calc. 876, Merging of Response Spectra Curves Containment, Chug-CT ASYM, 2 Sheets.

Calc. 876, Merging of Response Spectra Curves Containment, Chug-CT SYM, 2 Sheets

Calc. 876, Merging of Response Spectra Curves Containment, Condensation Oscillation, 2 Sheets.

Material Requisition, 8856-P-11, Rev. 11, Nuclear Service, Carbon Steel Gate and Check Valves, 600# ANSI Rating and Higher, 2½" and Larger, Impact Tested Material, 9 Pages.

Material Requisition, 8856-P-7, Rev. 4, Forged Steel Penetration Flued Head Fittings, 23 Pages.

Calc. 876, Rev. 1, Feedwater Piping Stress Summary w/check Cover Sheet, ASME Section III, Class 2 and 3, 65 Pages.

Computer Output, ID No. T10479-1 System A Response Spectra OBE (cracked and uncracked), SSE (cracked and uncracked), LOCA, CHUGGING (ASYM), CHUGGING (SYM), C.O., SRV (ASYM) and SRV (SYM).

AP - Response Spectra, Generation Mathematical Model, Mode Displacements/ Rotations and Mode Displacement Factors.

Document List (Cont'd)

AP - Analysis (Superpipe) Input and Output.

PP&L QAM #30 Rev. Various.

GE Dwg. 731E777, Rev. 5.

Meeting Minutes: GE/Bechtel contains Page 6 of GE 22A 3160 and Page 36 of 386 HA617.

731E777 Rev. 5 RPV Loads Sheet 1.

Bechtel Spec. M-199, Rev. 34 Piping Class Sheets.

Dwg. #M-141, Rev. 13 System Flow Diagram.

Dwg. #M-26-5, Rev. 19 System Piping Drawings.

Dwg. #M-26-11, Rev. 29 System Piping Drawings.

Dwg. #M-100, Sheets 1, 2, 3, P&ID Legend Sheets.

8856-J-G100, Sheets 1 and 2 Instrument Piping Class Spec.

117C4562, Rev. 2, Nuclear Boiler System Process Diagram.

117C4562AE, Rev. 2, Process Data Sheet.

761E579, Rev. 1, Reactor Vessel Thermocycles.

93-13718, Rev. D, Valve Drawing.

M-26-12 Drawing Reactor Bldg. Unit 1.

68-3331/32, Rev. 7, Vessel Outline.

919D988AE, Rev. 3, Vessel/Reac.

<u>Documents Received from Bechtel</u>

Final (Signed Off) Stress Report - ASME Section III, Class I Analysis of the Feedwater Lines for SSES, Unit 1, Job No. 8856, Doc. No. SR8856-1500 (Rev. 1).

Susquehanna Pipe Support Standard, 8856, Rev. 5.

Susquehanna Unit 1, 8856, Final As-Built Review Calc. No. ABR-876, 47 Sheets.

Document List (Cont'd)

Drawing No. FCI-P49-876, Rev. 13, 2 Sheets, Rev. 17, Sheets 1 and 2.

Feedwater ME 913 Runs:

Run #87226
Run #87227
Run #87230
Run #87233
Run #87242
Run #87245

Cal. Sheet, 1 page, Subject Feedwater Fatigue Analysis.

DLA-102-H5, Rev. 4F2A, 7 Pages.

SP DBA 104 H2000, Response to IDR Open Items RRF-89.

DLA-102-H8, Calculations, 12 Pages.

Specification 8856-G-24 Hydrodynamic Spectra (Portions)

Bechtel RRF Responses

1, 6, 8, 12, 13, 14, 16, 20, 21, 22, 24-30, 32, 33, 34, 35, 37, 39, 40, 42, 43, 47, 48, 49, 50, 51, 52, 54, 55, 56, 60, 62-73, 75, 77, 80-90.

ICR Responses for ICR-1 through ICR-10 and ICR-12 through ICR-27.

Complete copy of Appendices E and F of Feedwater Stress Report

Three additional backup calculations (87255, 87252, 87251) for ICR 5599-2.

Technical Report
TR-5599-3

TELEDYNE
ENGINEERING SERVICES

APPENDIX 8

ATTENDANCE LIST FOR AUGUST 10, 1982 MEETING

TELEDYNE ENGINEERING SERVICES

Technical Report
TR-5599-3

Susquehanna Meeting
at Teledyne Engineering Services
August 10, 1982

Attendees

Name	Affiliation TES
C. Y. Chern	Bechtel
H. Cruz	Bechtel
R. A. Enos	TES
J. B. Hopkins	NRC
M. Khlafallah	Bechtel
P. R. Kommineni	TES
D. F. Landers	TES
W. J. McBrine	TES
W. J. Rhoades	PP&L
D. Sattar	PP&L
R. J. Shovlin	PP&L
D. Terao	NRC/MEB
J. T. Tsacoyeanes (Part Time)	TES