Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

May 14, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: LaSalle County Station Units 1 and 2
Teledyne Open Item and Error/Deviation
Reports for the LaSalle Independent
Design Review - Final Transmittal; and
1st Transmittal of Responses
NRC Docket Nos. 50-373 and 50-374

Reference (a): C. W. Schroeder letter to H. R. Denton dated March 16, 1982, "Independent Design Review Initial Status Report for the Period of February 11 through March 12, 1982.

(b): C. W. Schroeder letter to H. R. Denton dated May 7, 1982, "Teledyne Open Item and Error/Deviation Reports for the LaSalle Independent Design Review."

(c): C. W. Schroeder letter to H. R. Denton dated May 13, 1982, "Teledyne Open Item and Error/Deviation Report for the LaSalle Independent Design Review - Second Transmittal."

Dear Mr. Denton:

The purpose of this letter is to provide you with controlled copy #8 of:

TES Proj. No. 5539
Date: 5-12-82
Open Item and Error/Deviation
Report for the LaSalle Independent
Design Review, Final Transmittal of Reports

B001
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1/1

Please note that the Attachment 2 contains only 2 Error/Deviation Reports, not 7 as stated in the cover letter from Mr. Flaherty to Mr. Shelton.

Under separate cover, controlled copy #9 is being provided to Mr. James G. Keppler.

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This report has also been provided to our Architect Engineer (Sargent and Lundy) for preparation of responses to open items and findings.

Also enclosed is a partial set of responses to the first set of Teledyne Open Item and Error/Deviation Reports which had previously been provided to you by Reference (b).

If there are any questions regarding this matter, please contact this office.

Very truly yours,

CW Schroeder 5/14/82

C. W. Schroeder
Nuclear Licensing Administrator

lm

Attachment

cc: NRC Resident Inspector - LSCS - 1/0

4111N

May 13, 1982

Mr. L.O. DelGeorge:

Subject: Teledyne Open Item and Error Deviation Reports (Third and Final Group) for the LaSalle Independent Design Review

Reference: May 12, 1982 transmittal of J.A. Flaherty to B.R. Shelton

Enclosed are copies of the subject report which you should transmit to the NRC. I am in the process of having the items identified in this report reviewed by Sargent & Lundy. I will provide you with a copy of their response for transmittal to the NRC as soon as it is complete.

I have made distribution of the ten copies as follows:

Copy #	Recipient
6	B.R. Shelton
7	L.O. DelGeorge
8	H. Denton (NRC)
9	J. Keppler (NRC)
10	R.J. Mazza (S&L)
11	R.H. Holyoak
12	T.E. Watts
13	C. Reed
14	J.J. Maley
15	B.B. Stephenson

You will be provided with any changes that may occur to this report as a holder of a controlled document. You should feel free to copy any portions of this document for your use or other distributions, but it is your responsibility to keep those recipients current as required.

B. R. Shelton 5/13

B.R. Shelton

BRS/bmb/1498L

TELEDYNE
ENGINEERING SERVICES

130 SECOND AVENUE

WALTHAM, MASSACHUSETTS 02254

(617) 890-3350 TWX (710) 324-7508

May 12, 1982
5539-9

TELEDYNE ENGINEERING SERVICES
CONTROLLED
DOCUMENT
TES PROJ. NO. 5539
DATE 5·12·82

Mr. Brent Shelton
Project Engineering Manager
for LaSalle County Station
Commonwealth Edison
One First National Plaza
Chicago, Illinois 60690

Subject: Open-Item and Error/Deviation Reports for the LaSalle Independent Design Review

COPY 8

Dear Mr. Shelton:

Enclosed are Open-Item and Error-Deviation reports. This represents the final transmittal of Open-Item and Error/Deviation reports. The numbering system is a continuation of the second package sent to you. This completes all Open-Item and Error/Deviation reporting.

Attachment 2 contains seven Error/Deviation reports and Attachment 3 contains eleven Open-Item reports. 2 9 awl 5/14/82

The Open-Item reports list those items which require further clarification from S&L.

All Open-Items and Error/Deviations reports have been reviewed by the Project Review Internal Committee.

The definitions used for this project are given in Attachment 1 to this letter.

In accordance with the TES Project QA Program, this letter with attachments has become part of the TES Project QA Records and is therefore a controlled document.

In order to maintain the independence on the project, any and all comments should be transmitted to TES in a controlled manner, care of TES Document Control.

Distribution of this letter with enclosures is as follows:

Copy 1 Record copy - TES Document Control

Copy 2 J. A. Flaherty - TES Project Manager

Copy 3 L. J. DiLuna - TES Assistant Project Manager

TELEDYNE
ENGINEERING SERVICES

Copy 4	N. S. Celia - TES Project Review Internal Committee Chairman
Copy 5	D. Messinger - TES Project Quality Assurance Engineer
Copies 6-15	B. R. Shelton - Commonwealth Edison Company
Copies 16-20	TES Document Control

If you require additional copies, please let us know.

Sincerely,

TELEDYNE ENGINEERING SERVICES

James A. Flaherty

James A. Flaherty, P.E.
Manager, Engineering Design and Testing

JAF:jej

enclosures

ATTACHMENT 1

For clarification, the following definitions are being used for the subject project:

Open-Item: A possible error or inconsistency that has not been verified or fully understood, and its significance assessed. An **Open-Item** can become an **Error**, **Deviation** or a **Closed Item**, but cannot remain an **Open-Item** in the TES Final Report.

Error: An incorrect result that has been verified as such. It may be due to any of several reasons:

Math Mistake

Omission of Data

Use of Inappropriate Data

Deviation: Not an error in analysis, design or construction, but a departure from standard procedure(s).

Closed Item: An **Open-Item** which, after further review, can be closed. Prior to completion of the Independent Design Review, all **Open-Items** must be defined as an **Error**, **Deviation** or **Closed Item**.

Observation: An item that does not impact the adequacy of the design or QA process but which the reviewer feels is a departure from standard practices which he is accustomed to.

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. A **Potential Finding** can become an **Error**, **Deviation**, or an **Observation**, but cannot remain a **Potential Finding** in the TES Final Report.

All **Potential Findings** and **Open-Items** will be submitted to the Project Review Internal Committee for disposition.

TELEDYNE
ENGINEERING SERVICES

ATTACHMENT 2

ERROR/DEVIATION REPORTS FOR PERIOD THROUGH MAY 12, 1982

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Error/Deviation Report No.: 19

Classification of Finding: **Error**

Reference: S&L Piping Stress Report RHR System, Subsystem RH-11, Revisions 3, 4 and 5

Statement: Revision 3 of the referenced report (page 48 of 84) specifies that the only thermal expansion case analyzed was the entire pipe line, RH-11, at 70°F, yet page 49 of 84 specifies that for the LPCI injection the entire line is at 212°F and in the standby mode 550°F to the isolation valve and 120°F beyond.

Conclusion: The choice of transients used is inconsistent with the main piping run RH-06 which connects to this subsystem. The only thermal case analyzed does not cover all thermal modes.

By _____
N. S. Cerra
Project Review Committee Chairman

By _____
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Error/Deviation Report No.: 20

Classification of Finding: **Deviation**

Reference: S&L Piping Subsystem RH-42 Stress Report, Revision 00, Dated November 11, 1981

Statement: The above-referenced report does not contain any reference to the Design Specification.

Conclusion: The Design Specification is the primary design document and should be referenced in the stress report.

By _____
N. S. Cetra
Project Review Committee Chairman

By _____
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

ATTACHMENT 3

OPEN-ITEM REPORTS FOR PERIOD THROUGH MAY 12, 1982

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 23

Reference: TES Field Audit of LaSalle County Nuclear Power Plant, Unit 1

Statement: Supports RH-58-1005S and RH-B9-1002S were indicated as snubbers on the support drawings. The snubbers were removed in early February.

ECN No. M-659-LS supplied by S&L states that the snubbers are to be removed.

The ECN reason for this is "the snubber thermal displacement is less than 1/16" and is not required.

The "As-Built" configuration does agree with the latest ECN. However, TES requests analytical justification for the removal of these snubbers.

Request: Has S&L remodeled the piping system or reviewed the analysis to determine if the system is still acceptable for the seismic loads imposed? S&L is requested to supply analytical justification for the removal of these restraints.

By _____
N. S. Cerra
Project Review Committee Chairman

By _____
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 24

Reference: TES Field Audit of LaSalle County Nuclear Power Plant, Unit 1

Statement: At elevation 761', the RHR pipe is touching the floor penetration sleeve. The analysis assumed that there was clearance. The support close to the sleeve shows thermal movements which could not be accommodated.

S&L had noted this problem in the field and a Hanger Problem sheet was generated. This condition was resolved in the field using analysis which stated that the increase in thermal stress would be insignificant.

TES feels that this condition should be considered in the analysis and final stress reports. There is now a nonlinear spring at the floor sleeve which was not accounted for in the original analysis. The thermal and seismic analysis results will be affected.

Request: S&L is requested to supply analytical justification for not including this condition in the stress analysis report.

By _____
N. S. Celia
Project Review Committee Chairman

By J. A. Flaherty
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 25

References: 1) FSAR

2) SRV/LOCA Hydrodynamic Loads Revised Design Basis Summary Report - Report SL-3876 Dated October 1, 1981

Statement: A comparison between the FSAR, Table 3.9-25, and Reference 2, Tables 2.7-1 and 2.7-2, shows that the ordering of the load cases betwen these two documents is not consistent. Load cases 3 and 4 have been reversed. Also, load case 5 is different when comparing the two documents.

Since the load combinations are bounded, there should not be an error in the analysis.

The Design Basis Summary Report lists two condensation oscillation load cases, LEVY-1 and LEVY-2. The FSAR does not.

Request: S&L will be requested to supply information showing that the FSAR is being revised editorially. Will this table be revised?

Will the FSAR be revised to be consistent with the Design Basis Document?

By N. S. Cella
N. S. Cella
Project Review Committee Chairman

By J. A. Flaherty
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 26

Reference: RHR System, Subsystem RH-23, Quadrex Piping Stress Report QUAD-1-80-163, Revision No. 03

Statement: Form SA-24.B, Sheet 4 of 12, "Comparison of 'As-Design' Header Displacements with 'For Record' Analysis", requires three signatures. All signatures are missing which indicates that this comparison may not have been performed.

Request: S&L is requested to supply documentation why the signatures are missing or why the comparison was not done.

By _____
N. S. Ceka
Project Review Committee Chairman

By _____
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 27

Reference: RHR System, Subsystem RH-23, Quadrex Piping Stress Report QUAD-1-80-163, Revision No. 03

Statement: There are flanges within this subsystem, such as at node 126. There are no calculations in the report for them.

Request: S&L is requested to supply the calculations and justification for the flanges not appearing in the report.

By _____
N. S. Cella
Project Review Committee Chairman

By J. A. Flaherty
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 28

Reference: RHR System, Subsystem RH-23, Quadrex Piping Stress Report QUAD-1-80-163, Revision No. 03

Statement: The "General Notes" section of the report indicates that valve loads and accelerations are within allowables, but there is no evidence of how these were checked, such as Quadrex Form SA-7A, "Acceleration of In-Line Components".

Request: S&L is requested to supply form SA-7A or justification why the form was not transmitted to S&L by Quadrex.

By _____
N. S. Cotia
Project Review Committee Chairman

By _____
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 29

Reference: RHR System, Subsystem RH-23, Quadrex Piping Stress Report QUAD-1-80-163, Revision No. 03

Statement: In the recalculation of the stress intensification factor for the half-coupling branch connections, it was not shown that the requirements of Figure NC-3673.2(b)-1 and, specifically, Note 6 of the figure were met.

Request: S&L is requested to supply documentation that shows that the above figure was met in the recalculation.

By _____
N. S. Cole
Project Review Committee Chairman

By _____
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 30

Reference: RHR System, Subsystem RH-23, Quadrex Piping Stress Report QUAD-1-80-163, Revision No. 03

Statement: In the evaluation of expansion anchor bolts, an exponent equal to (5/3) is used in the interaction equations. This exponent is suggested for use in a paper on embedments (i.e., Nelson-headed studs). Linear interaction is conservative and more generally used; nonlinear interaction should only be used when actual test data (shear-tension interaction) is available.

There is no evidence in the report that expansion anchor-bolt loads are amplified to account for prying action.

Request: S&L is requested to supply justification for the use of the (5/3) exponent in the interaction equation. S&L is also requested to define how prying is accounted for in the analysis of concrete expansion anchor bolts.

By _____
N. S. Cetra
Project Review Committee Chairman

By _____
J. A. Flaherty
Project Manager

TELEDYNE
ENGINEERING SERVICES

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 12, 1982

Open-Item Report No.: 31

Reference: FSAR for LaSalle County Unit 1

Statement: The SAGS, LUG, and NOHEAT, etc., computer codes are used in the design and analysis of components and their supports. These computer codes are not listed in Appendix F of the FSAR as acceptable computer programs.

Request: S&L is requested to supply justification why the above computer codes are not listed in the FSAR as acceptable computer programs.

By _____
N. S. Cella
Project Review Committee Chairman

By J. A. Flaherty
J. A. Flaherty
Project Manager

DENTON

May 13, 1982

Mr. L.O. DelGeorge:

Subject: Teledyne Open Item and Error Deviation Reports for the LaSalle Independent Design Review

Reference: May 6, 1982 letter of B.R. Shelton to L.O. DelGeorge

Enclosed are copies of a partial response to the first series of items transmitted to us by Teledyne. You should transmit this information to Mr. Denton and Mr. Keppler.

B.R. Shelton 5/13

B.R. Shelton

BRS/bmb/1526L
cc: J. Flaherty (Teledyne)
R.H. Holyoak
T.E. Watts
C. Reed
J.J. Maley
B.B. Stephenson

SARGENT & LUNDY
ENGINEERS
55 EAST MONROE STREET
CHICAGO, ILLINOIS 60603
TELEPHONE 312-269-2000

May 13, 1982
Project No. 4266-24

Commonwealth Edison Company
LaSalle County Station - Unit 1

Third Party Independent Review

Mr. B. R. Shelton
Project Engineering Manager
Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dear Mr. Shelton:

Enclosed are 12 copies of Sargent & Lundy's response to Teledyne's Open Item Reports 1-5, 6-10 and Error/Deviation Reports 1-7 and 10. The remaining Open Item Reports from their letter of May 5, 1982, 6 and 11, and the remaining Error/Deviation Reports, 8, 9 and 11 will be responded to as we complete our review of them.

It is our understanding that Commonwealth Edison Company will distribute these simultaneously to Teledyne, the NRC and internally.

Yours very truly,

R. H. POLLOCK

R. H. Pollock
Mechanical Project Engineer

RHP:chm
In duplicate
Enclosures
Copies:
W. A. Chittenden (1/1)
E. V. Abraham (1/1)
G. C. Kuhlman (1/1)
R. J. Mazza (1/1)
E. B. Branch (1/1)
D. C. Haan (1/1)
W. G. Schwartz (1/0)
E. R. Weaver (1/0)
S. D. Killian (1/1)
File 85

COPY

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 1

Reference: S&L Piping Stress Report for Subsystem RH-07, Revisions 3 and 4

Statement: Report RH-07, Revisions 3 and 4, do not contain calculations substantiating that the flanges used were analyzed, evaluated and meet the requirements of NC-3647 of the ASME Code.

Request: Are calculations available? If not, how were the acceptability of the flanges determined?

Please supply TES with this information.

Response

Paragraphs NC-3612.1 and 3612.2 of the 1974 ASME B&PV Code Section III indicate that piping products manufactured in accordance with the standards of Table NC-3691.1 are not subject to the requirements of NC-3640. These paragraphs are consolidated by the 1980 version of the Code in NC-3647.1. All flanges were purchased to the applicable standard, B16.5, and are, therefore, exempt from the requirements of NC-3640.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 2

Reference: FSAR

Statement: There is a difference in the location of the fill line as shown on two S&L documents.

Figure 5.4-13 of FSAR does not agree with the P&ID Drawing No. 96, Sheet 3, Revision V, dated 9/18/81.

FSAR Figure 5.4-13 shows the fill line connecting to the discharge side of the RHR Loop C between valves F031C and F098C. Drawing 96, Sheet 3, shows the line connecting to the discharge side of the RHR Loop C after both valves.

Request: S&L should respond to the following questions:

1. Has S&L updated Figure 5.4-13 of the FSAR?

2. Has Drawing M-93, Sheet 3, been issued "As Built"? What is revision of "As Built"?

Please supply TES with revised documents, if they exist.

Response

1. The Figure 5.4-13 in the FSAR has not been updated. The location of the fill line for the RHR has not been updated. The location of the fill line for the RHR pump C is after the locked open valve 1E12-F089C. The location of the fill line before or after this locked open valve is strictly a matter of convenience for pipe routing. This locked open valve is provided only for maintenance purposes. The function of the system is not affected in any way by the change in the position of the fill line. We

will update the FSAR to incorporate this minor correction in the next scheduled revision. This will be well within the time required by 10CFR50.71(e).

2. Drawing M-96, Sheet 3, is the basic design document and reflects the current as-built conditions.

SARGENT & LUNDY
ENGINEERS
CHICAGO

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 3

Reference: RHR Loop C, Subsystem RH-63, QUAD Report 1-80-70, Revision 2, Dated 11/27/81

Statement: This subsystem is a branch line from a much larger line.

The displacements that were used as input for the thermal cases cannot be verified. TES has reviewed the RH-07 analysis and cannot duplicate the values used.

Request: Please supply TES with the information required to verify the values used.

Response

Thermal header movements used in this branch analysis come from node G10B of the RH-07 model. These do not match the movements listed in the RH-63 report on page 3 of Part B, Section II, because the movements are skewed corresponding to the local axis at G10B. TES may verify the movements used in the RH-63 report by resolving the RH-07 movements to the appropriate global axes on RH-63.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 4

Reference: RHR Loop C, Subsystem RH-63, QUAD Report 1-80-70, Revision 2, Dated 11/27/81

Statement: TES cannot ascertain if the analysis of baseplates and concrete expansion bolts includes the effects of prying action for this subsystem.

Request: TES requests the QUADREX procedure for the analysis of anchor bolts. If this procedure is the same as the S&L procedure PI-LS-16, then S&L should state this.

Response

Quadrex "Pipe Support Procedures and Guidelines", QUAD-7-79-027, Section 5, covers the analysis and design of expansion anchored plates. This procedure includes the same requirement as S&L procedure PI-LS-16 which accounts for the effects of plate flexibility.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 5

Reference: Subsystem RH-06, S&L Stress Report 4266-10, Revision 4

Statement: TES has reviewed the applicable Reactor Vessel Thermal transients as they apply to the RHR system.

In reviewing Tables 5.3, 5.4, 7.1 and 7.2, it appears that the signs of T_a-T_b, discontinuity stress, should be opposite for down transients (Groups 1, 2, 3 and 4) and up transients (Groups 5, 6, 7, and 8). However, Group 1 has a minus value and all the other groups have plus values.

The highest T_a-T_b values from the AXTRAN thermal computer code are from Group 7 with a designated thermal rate of 100°F/hr. Group 2 has a higher thermal rate, 4320°F/hr, yet does not have the largest T_a-T_b stress values.

There is no discontinuity temperature value input for lugs at support RH-53-1006. However, at this location (node 25 in computer model), the comparable PIPSYS computer run shows a T_a-T_b discontinuity value (from AXTRAN computer run).

Request: S&L should substantiate the development and choice of the values used in the thermal analysis. TES does not have a write-up of AXTRAN.

S&L should supply the AXTRAN computer write-up and computer runs associated with this Open-Item.

Response

AXTRAN computer program calculates stresses resulting from axial temperature differences along the pipe. It considers no flow transients, therefore, heat is transferred by conduction from a heat source, the RPV. The conduction process is so slow, that the initial steady state temperature profile dictates the sign of the T_a-T_b stress.

The initial temperature profile along the pipe is a function of the ambient temperature used. For events 2 through 8, the RPV is always at a higher temperature than ambient. Since side "A" is closer to the RPV than side "B", the T_a-T_b stress results must be positive.

For event No. 1, an ambient temperature of 130°F was used to reflect temperature of containment prior to shutdown. The transient used in the AXTRAN run reduces the RPV temperature to 70°F. The T_a-T_b stress will be negative in this case. This is also conservative because it allows for the maximum range (stress) when doing the fatigue analysis.

With respect to the relation between rate and stress, it is the maximum temperature difference during a transient and not rate that governs the stress magnitude for axial conduction problems. Event 7 has a larger temperature difference than Event 2.

The lugs at the support RH53-1006 do not show a T_a-T_b stress value in the lug computer input. The T_a-T_b stress (400 psi) resulting from AXTRAN at Node Point 25 is not significant. The conservatism inherent in the lug program should more than compensate for the neglecting of this small T_a-T_b stress.

The computer runs requested by TES can be found in the stress report microfiche.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 7

Reference: Subsystem RH-06, S&L Stress Report 4266-10, Revision 4

Statement: In reviewing this report, it was noted that Node 15 of the piping model is designated as the reactor pressure vessel nozzle with gamma plug (branch connection).

Point 15, RPV nozzle, a terminal end, has reported stresses which exceed the allowable of Subsection 2.3.4.2. Therefore, it should be designated as a postulated pipe break location.

Request: S&L is requested to supply the following information.

Where does the S&L jurisdiction begin? Is GE responsible for this data point? What is the Class 1 analysis point?

Why wasn't point 15, RPV nozzle, a terminal end, chosen as a postulated pipe break location.

TES requests the analysis and evaluation for this location.

Response

Circumferential breaks are postulated at terminal ends per the Standard Review Plan. Sargent & Lundy's jurisdiction begins at the weld of the pipe to the nozzle safe end. FSAR Fig. 3.6-11 shows that circumferential break C89 serve as the postulated pipe break for any location from the nozzle to the elbow, and is restrainted by the pipe whip restraint R32. Per Branch Technical Position MEB 3-1, no longitudinal breaks are postulated at terminal ends.

Node 75 is modeled as a gamma plug becuase a gamma plug is located near Node 75. Node 75 was also modeled as a transition joint (see microfiche EMD-029586 Run ID SKEK, 05-29-81, pg. 1) so that both types of discontinuity would be qualified by the analysis.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 8

Reference: Subsystem RH-06, S&L Stress Report 4266-10, Revision 4

Statement: Node 20A (elbow) of the piping model is designated to have gamma-plug (branch connection) indices.

This is typical for many Class 1 nodes in the model.

Request: S&L should explain why the choice of the gamma-plug indices for this node. Also, why is the index typical for many of the Class 1 nodes in the model.

Response

This node was run with both gamma-plug indices and elbow indices to obtain the most conservative result.

There are other locations in the model where gamma-plug indices were used because the analyst applied them at locations where it was felt that field weld inspections might exist to ensure that the worst stress discontinuity was evaluated. Some of these locations did not subsequently have gamma plugs, but because the analysis was conservative and to save the client the expense of reanalysis, the modeling was not changed.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 9

Reference: Subsystem RH-06, S&L Stress Report 4266-10, Revision 4

Statement: Reference pages 48 and 49 of S&L Stress Report, Revision 3: Three thermal expansion cases are listed on page 48 applicable to the fatigue analysis. Page 49 lists a thermal mode calling for the entire line (RH-06) to be at 550°F. How is this possible? Also, if entire line is 550°F, why are there zero thermal displacements given for Node 100? All these thermal flexibility cases were run on PIPSYS program; however, only the three correct cases, as listed on page 48, were applied to the Class 1 fatigue analysis.

Request: S&L should explain the note contained on page 49, and the questions contained above.

Response

The 550°F temperature is a conservatively high value that is based upon significant back flow due to the check valve and injection valve leakage. This temperature was used for valve ratings, material selection, and support design, but not fatigue analysis. The highest fatigue evaluation is based upon conservative, but realistic thermal modes.

Node Point 100 is a penetration anchor. Thermal analysis only requires relative displacements. The containment penetration, and all steel to which the supports on RH-06 are attached is,

at 130°F. Only the RPV is at 550°F; therefore, it will expand relative to the containment wall and steel. The penetration (N.P. 100) in LaSalle's post-tensioned concrete containment will restrain the pipe in all six degrees of freedom with no thermal displacement.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Open-Item Report No.: 10

Reference: Subsystem RH-06, S&L Stress Report 4266-10, Revision 4

Statement: Node 100 of the piping model is designated as a penetration. The indices input for the PIPSYS Class 1 evaluation is for a branch connection.

Request: S&L should supply the following information:

1. What is the justification for the choice of stress index?

2. What is the analysis point? Is it the girth butt weld between fluid head and pipe?

Response

The girth butt weld between the flued head and pipe is not an analysis point, but is qualified in the analysis of the penetration. The justification for the choice of stress index is that this particular PIPSYS Class I evaluation at this location qualifies the gamma plug that is located next to the penetration. The moments at the anchor are used to qualify the gamma plug.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Error/Deviation Report No.: 1

Classification of Finding: Error

References: 1) FSAR
2) Project Instruction PI-LS-16

Statement: The FSAR paragraph 3.7.3.3.1, Modeling of Piping Systems, requires that "the pipe lengths between mass points are not greater than the length which would have a natural frequency of 33 Hz when calculated as a simply supported beam."

Project Instrumentation PI-LS-16, Revision 16, Appendix R, page 10 of 16 requires that the designer check to see if the length/diameter ratio is less than 15.

The PIPSYS computer code prints a "Warning" message if the L/D ratio exceeds 10. However, the computer code does not default if this limit is exceeded.

Conclusion: The use of an L/D of 15 could result in a natural frequency less than 33 Hz which is not in compliance with the FSAR. The attached calculations demonstrate this for 24-inch schedule 40 and 24-inch standard weight pipe. The spacing (length) given in the examples are not unusual. The lengths are consistent with hanger spacing tables for deadweight given in B31.1.

Therefore, there is no objectiv evidence to ensure that the FSAR requirement was met.

Response

The governing requirement which must be satisified for modeling the piping systems is the FSAR paragraph 3.7.3.3.1. As noted in the TES statement this paragraph requires that the simply supported element frequency be greater than 33 Hz. The check-list requirements identified in Project Instruction PI-LS-16 are requirements that the coder must meet when doing initial modeling of the piping system. This requirement, in addition to the other coding requirements indicated in the checklist, assure that the model transmitted to the analyst is complete and accurate. In addition to this requirement, the analyst is also required to verify that the system is accurately modeled and is expected to correct L/D ratios as necessary to assure that the appropriate frequencies are obtained. As noted by TES the PIPSYS program prints a warning message if the element length between node points exceeds an L/D ratio of 10. This is intended to help identify potential areas of concern for the analyst to review.

The PI-LS-16 criteria of L/D less than or equal to 15 will guarantee an element frequency of greater than 33 Hz for piping up to 10-inch nominal diameter. In addition, for the large diameter piping, (greater than 10-inch nominal OD) the other

modeling rules required in PI-LS-16 would result in element frequencies greater than 33 Hz. For example, a 24-inch nominal OD pipe will need weight supports at a minimum of 34 feet. PI-LS-16 requires that at least one node be added in the middle of this span, resulting in an element length between modes of at most 17 feet. A 17 foot span results in an L/D of 8.5 for element frequency greater than 33 Hz. As this illustrates, for larger pipes, when systems are coded in accordance with requirements of PI-LS-16 is impossible to have spans between node points with frequencies lower than 33 Hz. This is because piping systems in nuclear power plants contain larger numbers of elbows, welds, fittings, and supports. By following the instructions of PI-LS-16 which require nodes at each of the above locations, and a minimum of one node between supports, the span between two nodes will always be shorter than the span producing 33 Hz.

This can be illustrated by reviewing the subsystems in questions, RH-06, 07, 11, and 63. As demonstrated on the attached table the minimum frequency for any span between two nodes is 43 Hz which meets the FSAR requirement. We therefore do not believe this item is an error.

TABLE #1

PIPING SUBSYSTEM	PIPE O.D in	SPAN FEET "L"	$\frac{L}{O.D}$	f c.p.s	COMMENT
RH-06 REV. 13 DATE 2-13-81	1.62	1.62	12	386	
	12.75	9.64	9.1	71	
	12.75	7.14	6.7	129	
RH-07 REV. 4 DATE 3-17-82	20.	14.64	8.8	43	
	18.	13.25	8.8	48	
	3.	1.83	7.3	516	
RH-11 REV. 5 DATE 3-12-82	18.	11.83	7.9	61	
	18.	10.21	6.8	81	
RH-63 REV. 11 DATE 11-27-81	2.375	1.41	7.1	712	
	2.375	1.34	6.8	789	

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Date: May 4, 1982

Error/Deviation Report No.: 2

Classification of Finding: Deviation

Reference: S&L Stress Report RH-07, Revisions 3 and 4

Statement: Report RH-07 does not state that those portions of the Subsystem classified Class B meet the requirements of the applicable Subsections (i.e., NC-3650) of Section III.

There is only a certification that the Class 1 portion meets the applicable Code requirements.

Conclusion: There is no apparent error in the analysis, design or construction, but there is a departure from standard practice.

Response

The text of the stress report does not specifically state that the Class B piping meets Code requirements. However, RH-07, Revision 03, EMD-024665, Ref. 19 and Section 8.0, "Interface Loading" address all equipment and valve qualification for Class A or B components. Class B piping and its component qualification is in microfiche.

EMD-035733 S21JJP 03-15-82 pages 1-6

EMD-024665 E082SW 11-19-80 page 1

EMD-024665 E286KP 09-26-80 pages 1-4

It should be pointed out that the 1974 Code does not require a certified stress report for Class II and III piping. This is not a departure from standard practice. We therefore do not believe this item is a deviation.

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Date: May 4, 1982

Error/Deviation Report No.: 3

Classification of Finding: Error

Reference: S&L Piping Stress Report RH-07, Revisions 3 and 4

Statement: Two supports on RH-58 (Loop C) are mislabeled. These are RH-58-1004S and RH-58-1007X.

Support RH-58-1004S is labeled as a Y-skew. It should be a Z-skew.

Support RH-58-1007X is labeled as a Z-skew. It should be Y-skew.

Support RH-58-1004S calls for a 3/4" diameter anchor bolt. Actual field verification shows 1" diameter anchor bolts.

Conclusion: The support drawings are mislabled and are therefore incorrect.

Also, the anchor bolt call-out does not agree with the "As-Built" condition.

Response

Supports RH58-1007X and RH58-1004S are coded at Node Point 65 as MM031000 boundary condition. This skew places the vertical rigid restraint (RH58-1007X) in the mode's skewed Z-axis, and the horizontal snubber (RH58-1004S) in the skewed Y-axis. Per the Basic Data coding, these labels are correct.

Support drawings are not updated to reflect as-built conditions that are within tolerance of the design drawings. The use of a

1" anchor bolt meets and exceeds the requirements for a 3/4" anchor bolt and is therefore, considered to be in tolerance of the design drawing.

Based upon the above, we do not believe this item is an error.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Error/Deviation Report No.: 4

Classification of Finding: Deviation

Reference: RHR, Loop C, Subsystem RH-11, Stress Report, Revisions 3, 4, 5

Statement: The report is certified to the Design Basis Report which includes hydrodynamic loads only. Reference should be made to the Design Specification DS-RH-01-LS, Revision 3.

This statement is applicable to most of the RHR subsystem stress reports.

Conclusion: The actual analysis and evaluation do consider the requirements of the Design Specification. However, this important document is not referenced.

Response

The reference to the Design Specification is contained in the report on page 10 of Revision 5, Article 1.4.2. We therefore do not believe this item is a deviation.

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Date: May 4, 1982

Error/Deviation Report No.: 5

Classification of Finding: Error

Reference: RHR, Loop C, Subsystem RH-63

Statement: The maximum temperature of the piping system was specified as 170°F in GE Specification 22A2817, Revision 3, Sheet 4.

The temperature analyzed in the line from which the subsystem draws water is 212°F.

Conclusion: The temperatures should be consistent or justification should be given that the choice of temperatures used are conservative.

Response

This piping system was analyzed in order to conservatively reflect a postulated worst case condition because it is connected to the suppression pool. The temperature of 212°F was chosen for the analysis to conservatively bound the pool transient analysis. The GE Specification is used as guidance. The Sargent & Lundy design specification DC-RH-01-LS which references the Sargent & Lundy analytical drawing governs.

This was done deliberately to be conservative and we therefore, do not believe this item is an error.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Error/Deviation Report No.: 6

Classification of Finding: Error

Reference: RHR, Loop C, Subsystem RH-63, QUAD Report 1-80-70, Revision 2, dated 11/27/81

Statement: This Subsystem is a branch from a much larger line. Only displacements have been applied. Rotations were ignored.

Conclusion: Rotations could have a significant effect on the loads and stresses in the branch line. Justification was not given for ignoring them.

Response

Both S&L and Quadrex take into account the rotation of the header connection. In this case, rotations from the larger lines imposed on the branch are less than 0.5°. Quadrex document QUAD-7-79-025-H-1, "Piping Stress Analysis Instructions, " specifies that rotation less than 0.5° may be ignored. We therefore do not believe this item is an error.

Project 5539 - LaSalle Independent Design Review - RHR System

Date: May 4, 1982

Error/Deviation Report No.: 7

Classification of Finding: Error

Reference: S&L Stress Report, Subsystem RH-06, Revision 4

Statement: The FSAR specified the Code edition of the RHR System as the 1974 Edition without Addenda. The evaluation used several Code Edition Dates.

The PIPSYS computer input for Class 1 piping components utilized stress index values from the 1980 Editon of the Code.

The Lug computer program results state that the 1977 Edition of the Code with Summer 78 Addenda is applicable for Equations 10 and 11.

The stress report contains calculations of stress indices for branch connections. The calculation sheets reference the 1971 Edition. However, the values listed are from Table NB-3681(a)-1 of the 1980 Code.

The PIPSYS computer input for nodes 28 and 35B, branch connections, shows the branch outside diameter and thickness values to be those of the branch fitting, which is allowed by the 1980 Code; but the 1974 Code specifies the use of branch pipe properties.

Conclusion: The Code evaluation is inconsistent and certification to the 1974 Code is incorrect.

The change in stress index values within the Code and their use in the evaluation make it very difficult to determine if the stress report results are conservative or unconservative.

Response

The basic code as identified in the FSAR for design and construction of the LaSalle Plant is the 1974 Section III without addenda. As identified in NC/NCA-1140 the owner is allowed to upgrade to later editions of the code for design.

The PIPSYS Computer Program has been modified to include all code changes for the 1977 Code through the Summer 1979 addenda. This has been done primarily because many of the stress intensification factors which are currently defined, were not originally defined in the 1974 Code. For convenience, these factors are used from the 1979 Summer Addenda.

The lug computer program used in the stress report (095-167-10) identifies the calculation basis as being Welding Research Council Bulletin 198. This bulletin is the basis of and is consistent with Code Case N-122 "Stress Indices for Integral Structural Attachments, Class 1, Section III, Div. 1." This code case was issued after the November 3, 1978 meeting and approved on January 8, 1979. The 1974 issue does not address stress calculations for welded attachments at all, therefore, WRC-198 was used.

The hand calculations performed, and the stress indices used in these calculations are in accordance with the 1977 Edition, Summer 1979 Addenda as is true for the balance of the analysis. This was also true for the computer input parameters used for

nodes 28 and 35B where the calculations were again performed in accordance with the Summer 1979 Addenda.

The subject stress report was not certified to a specific edition of the code, the various editions of the code used in the calculations were identified. For example, as indicated above the base code document was the 1974 Edition with no addenda. This was so identified in the stress report. Since the 1974 Edition does not have stress indices for all fittings, and since other indices that were defined in 1974 have been modified, it was determined that a consistent set of indices as defined in the Summer 1979 Addenda should be used.

Because the stress analysis was performed in accordance with a consistent set of stress indices, the stress analysis results are therefore correct and are consistent with Section III requirements. Based on the foregoing, S&L has not selectively updated the PIPSYS computer code for any particular code advantage and therefore do not believe this item is an error.

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Date: May 4, 1982

Error/Deviation Report No.: 10

Classification of Finding: Error

Reference: S&L Stress Report, Subsystem RH-06, Revision 4

Statement: For lugs at supports RH53-1550S and -1551S (nodes 63 and 63A); the cumulative fatigue usage factor value is U = 0.3517, from LUG computer output. This value is not included in Table 5.7 of the Stress Report listing locations of highest usage factor.

Conclusion: Thi value is higher than any value listed in Table 5.7 and should have been included.

Response

Usage factors at lug locations were not included in the tables because at shear lug locations the local stress in the piping is highly localized. Because of the localized stress, only local yielding of the pipe wall will occur, and it is not credible to postulate pipe breaks at shear lugs. We therefore do not believe this item is an error.