

ATTACHMENT 2

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 1
DOCKET NO. 50-325 / LICENSE NO. DPR-71
ENGINEERING EVALUATION REPORT
EER No. 93-0502

Operability Assessment of Pinhole Leak
in 6" Vital SW Header

ENGINEERING EVALUATION
REPORTEER No. 93-0502Rev. No. 2Page No. 1

1. Reference ACR, LER, WR/JO, EWR etc. LCO T-1-93-0816 File No. 4060
2. Brief description of item/activity Operability ☒ Class A (Q-List)
Assessment of Pinhole Leak in 6" Vital SW Header ☐ Class B-3 (FP-Q)
☐ Other (Non-Q)
3. Disposition
☐ a. Use/acceptable as is
☐ b. Permanent repair/rework
☒ c. Temporary change
☐ Temporary repair, Expiration date _____
☐ Temporary modification
☒ OA/STSI (☐ Preliminary) Expiration date 10/15/93
☐ d. Information Transmittal
☐ e. Other _____
4. Final Resolution
☐ a. Complies with system DBDs, FSAR, design, code, and quality requirements. (See definitions for Design Change and Configuration Control)
☒ b. Acceptable deviation from system DBD, FSAR, design, code, or quality requirements. Safety review (AI-109) required.
5. Follow-up Requirements
☒ a. Surveillance activities, responsible group(s) Operations
☒ b. Action items, responsible group(s) NED, OM&M
☐ c. None
 Yes No
☐ ☒ Changes to system DBD, FSAR, design, drawing, code, or quality requirements are required due to this EER. (Provide details on Attachment 3 within 10 working days from EER approval.)

6. Review/Approval

NOTE: If Blocks 3d and 4a are checked, only the Responsible Engineer and Engineering Supervisor signatures are required. However, other reviewers may be necessary based on the disposition.

Responsible Engineer * Brian E. Clark B.E. Clark Date 8/18/93
 Print Signature
 Group NED-MEU

☒ Yes ☐ No Technical Review * W.H. Hayward Date 8/18/93
 Engineering Supervisor D.E. Simkins D.E. Simkins Date 8/18/93
 Print Signature
☐ Yes ☒ No EQ Review N/A Date _____
☒ Yes ☐ No ANII Review Gregory Spence Date 8/18/93
☐ Yes ☒ No PNSC Review N/A Date _____
 Approved Levin Levin Date 8/18/93
 Print Signature

INDEPENDENT SAFETY REVIEWS (Reference 6.2.6)

REQ	NOT REQ	REVIEW	COMPLETED	DATE
<input type="checkbox"/>	<input checked="" type="checkbox"/>	CNSR (Prior to Approval)	REF:	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	CNSR (Review after Approval)		

BNP DOC. CONTROL

7. Distribution:
 BNP Records Management (EER File)
 NED BESS Section Manager
 Manager - Maintenance
 Responsible Engineer
 Specialist - Regulatory Compliance
 NED Document Control
 Manager - Training Department

Other:

Supervisor - ISI
 Manager - Operations Staff
 Nuclear Engineering Department Raleigh
 Q-List/EDBS Coordinator - PEG
 EDC - Technical Support
 On Site NAD
 NED EQ Group - Raleigh

FOR INFO ONLY

Not to be used to perform maintenance, tests, surveillances, operate or manipulate plant systems, document activities, or write or implement design changes.

AUG 19 1993

ENGINEERING EVALUATION

LIST OF EFFECTIVE PAGES

<u>Page No.</u>	<u>Revision No.</u>
1, 2	2
4, 8	1
3, 5-7, 9-39	0

Scope of Revision:

Rev. 2 - Revised to correct unauthorized approval signature

Page 1: Revised to signify revision 2 of EER-0502

Page 2: Revised to add scope of revision and reflect new revision level

This revision to the EER does not impact the original safety review package.

Lead First Safety Reviewer DEH

Second Safety Reviewer Mark Hayward

This revision does not impact the EQ, Appendix R or SBO review.

Evaluator DEH

Rev. 1 -

Page 1: Revised to signify revision 1 of EER-0502

Page 2: Revised to add scope of revision and reflect new revision level

Page 4: Revised the intent of the daily surveillance requirement

Page 8: Revised the daily surveillance requirement

FORM 2

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*As applicable

ENGINEERING EVALUATION**PROBLEM DESCRIPTION**

A pinhole leak has been detected on a 6" branch of the Nuclear Service Water system. The leak is located adjacent to valve 1-SW-V116 on a weld which connects the carbon steel weld neck flange to the elbow (line no. 1-SW-117-6-157). The line is at elevation 15' of the Unit 1 Reactor Building. It is suspected that this leak may have been propagated by a recent partial system hydrostatic test. The purpose of this EER is to provide an operability assessment for the Nuclear Service Water system.

EVALUATION/DISPOSITION

A field inspection of the piping in question was performed. The pinhole leak is located on the 6" vital service water header of the Nuclear Service Water system. The 6" line taps off the main 30" SW header, line 1-SW-103-30-157. There is a span of carbon steel cement-lined pipe approximately 4' long between the 30" header and valve 1-SW-V116 (Reference Attachment 1). The leak is on this section of piping, at the weld which connects the elbow to the weld neck flange. This section of piping is quality class A (safety-related), seismic, ASME class 3 piping. The applicable installation specification is 248-117 class 157.

An ultrasonic test (UT) was performed on the section of piping containing the leak to determine the wall thickness of the pipe in the vicinity of the leak. The wall thickness values obtained from the UT were evaluated by NED and found to be acceptable, with the exception of the flawed location. The flaw was evaluated using the "Through-Wall Flaw" approach (Reference Calculation 1-SW-0081 Rev. 0) as outlined in Generic Letter 90-05. The calculation determined that the flaw did not compromise the structural integrity of the line.

The amount of leakage from the pinhole flaw is minuscule and does not impact any critical SW system parameters such as operating pressure or flow rate. There will be no reduction in system reliability due to the pinhole leak. Therefore, system operability is maintained.

In accordance with Generic Letter 90-05, a code repair of the flaw in the SW Header is required prior to Unit 1 startup. This permanent code repair will be accomplished by incorporating the repair into the existing Service Water Inspection Modification (Reference Action Item 1). The OM&M section will be assigned to perform the code repair prior to Unit 1 startup (Action Item 2).

As an interim measure, a 2"x2" soft rubber patch will be clamped over the section of the pipe containing the leak. This patch will provide a barrier against spraying salt water on any nearby equipment if the leak were to become worse. Protection from this type of occurrence is outlined in Generic Letter 90-05. The rubber patch does not affect the structural integrity of the flawed piping and is reversible. Additionally, the installation of the rubber patch will prevent further propagation of the hole due to flow erosion. A relief request is being prepared for this interim measure (temporary non-code repair) in accordance with GL 90-05.

As an additional precaution, a weekly surveillance will be established to observe the patched area, quantify any leakage noted, and report this leakage to the Tech Support System Engineer. This surveillance will remain in effect until the permanent repair of the piping is implemented. This will ensure that any further degradation of the pinhole is noted and evaluated. Operations personnel will be responsible for the weekly inspection while they are performing the operator rounds.

Based on the evaluation above, the pinhole leak found on the 6" vital Nuclear Service Water Header does not compromise system operability. The pipe was determined to have structural integrity. The leak does not result in any reduction in system reliability or operating characteristics. Thus the Nuclear Service Water system is determined to be operable in the present condition. This operability assessment is valid until 10/15/93.

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CORRECTIVE ACTIONS

The corrective actions as described in the evaluation section of this EER will be implemented to provide a permanent code repair of the pinhole leak.

ACCEPTANCE TESTING

None required. All code acceptance testing will be accomplished via the permanent repair document(s).

FORM 4
EER ACTION ITEM NOTIFICATION

EER No. 93-0502
Rev. No. 0
Page No. 6

TO: ☐ Manager - Operations Staff
☐ Manager - Maintenance
☐ Technical Support Manager - _____
☒ NED

FROM: Manager - NED-On-Site

SUBJECT: EER Action Item No. 1
Corporate Priority 5A

Is this EER a temporary change? ☒ Yes ☐ No
Expiration date 10/15/93
☐ Temporary repair ☐ Temporary modification ☒ OA/STSI
Is this EER action item required for resolution of the temporary
change? ☒ Yes ☐ No

The following Action Item is assigned to you by the above
Engineering Evaluation for completion no later than 9/1/93:

Revise the Service Water Inspection Modification (PM 91-047) to
incorporate provisions for a permanent repair of the pinhole leak in
the 6" vital SW header.

This notification was reviewed with Wes McGoun (name) of
the responsible organization, on 7/31/93 (date). Please
sign below and return this notification upon the satisfactory completion
of the specified action item.

Brian E. Clark 7/31/93
Responsible Engineer Date

[Signature] 7/31/93
Responsible Manager Date

To: Engineering Data Coordinator

The above action item requirement has been completed satisfactorily. The
reference document (WR/JO number, procedure, or DSR reference)
implementing this item is: _____

Responsible Manager Date

Distribution: BNP Records Management
(by EDC) Responsible Engineer
NED Document Control

FORM 4
EER ACTION ITEM NOTIFICATION

EER No. 93-0502
Rev. No. 0
Page No. 7

TO: ☐ Manager - Operations Staff
☐ Manager - Maintenance
☐ Technical Support Manager - _____
☒ Manager - OM&M

FROM: Manager - NED-On-Site

SUBJECT: EER Action Item No. 2
Corporate Priority 5A

Is this EER a temporary change? ☒ Yes ☐ No
Expiration date 10/15/93
☐ Temporary repair ☐ Temporary modification ☒ OA/STSI
Is this EER action item required for resolution of the temporary
change? ☒ Yes ☐ No

The following Action Item is assigned to you by the above
Engineering Evaluation for completion no later than 9/15/93:

Implement the permanent repair for the pinhole leak in the 6" vital
SW header as detailed in the Service Water Inspection Modification
(PM 91-047).

This notification was reviewed with Martin Dalla-Pozza (name) of
the responsible organization, on 7/31/93 (date). Please
sign below and return this notification upon the satisfactory completion
of the specified action item.

Brian E. Clark
Responsible Engineer

7/31/93
Date

[Signature]
Responsible Manager

7/31/93
Date

To: Engineering Data Coordinator

The above action item requirement has been completed satisfactorily. The
reference document (WR/JO number, procedure, or DSR reference)
implementing this item is: _____

Responsible Manager

Date

Distribution: BNP Records Management
(by EDC) Responsible Engineer
NED Document Control

FORM 6
EER SURVEILLANCE NOTIFICATION

EER No. 93-0502
Rev. No. 1
Page No. 8

TO: ☒ Operations Principal Engineer
☐ Manager - Maintenance
☐ Technical Support Manager - _____
☐ _____

FROM: Manager - NED- On-Site

SUBJECT: EER Surveillance Item No. 1

Is this EER a temporary change? ☒ Yes ☐ No
Expiration date 10/15/93
☐ Temporary repair ☐ Temporary modification ☒ OA/STSI
Is this EER surveillance item required for resolution of the temporary
change? ☐ Yes ☒ No

The following surveillance is assigned to you by the above
Engineering Evaluation. This surveillance shall be performed on the
required frequency of once per week. Surveillance performance
shall be documented on Form 8 each time performed. Surveillance shall
be performed until Form 7, Termination Notice, is received.

Inspect the rubber-patched area adjacent to valve 1-SW-V-16 (6" vital
SW header RB el. 15') and quantify any leakage noted. Report this
leakage to the Tech. Support System Engineer for further evaluation.

The acceptance criteria for the surveillance is:

There is no acceptance criteria required for this surveillance require-
ment. The leakage reported will be evaluated by Tech. Support to
determine any required actions.

This notification was reviewed with Jim Simon (name) of
the responsible organization, on 8/4/93 (date).

Brian E. Clark 8/4/93
Responsible Engineer Date

DC Simon 8/5/93
Responsible Manager Date

Distribution: Responsible Organization
(by EDC)

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SAFETY REVIEW COVER SHEET

DOCUMENT NO. EER 93-0502

REV. NO. 0

DESCRIPTION OR TITLE: Operability Assessment of Pinhole Leak in 6" Vital SW Header

1. Assigned Responsibilities:

Safety Analysis Preparer: Brian E. Clark
 Lead 1st Safety Reviewer: Brian E. Clark
 2nd Safety Reviewer: Stephen Kronenwetter

2. Safety Analysis Preparer: Complete PART I, SAFETY ANALYSIS

Safety Analysis Preparer B. E. Clark
 SIGNATURE

7/31/93
 DATE

3. Lead 1st Safety Reviewer: Complete Part II, Item Classification.

4. Lead 1st Safety Reviewer: III may be completed. If either question 1 or 2 is "yes," then Part IV is not required.

5. Lead 1st Safety Reviewer: Determine which DISCIPLINES are required for review of this item (including own) and mark the appropriate block(s) below.

DISCIPLINES Required:	(Print Name)	Signature/Date (Step 7)
<input type="checkbox"/> Nuclear Plant Operations		
<input type="checkbox"/> Nuclear Engineering		
<input checked="" type="checkbox"/> Mechanical	Brian E. Clark	<u>B. E. Clark</u> 7/31/93
<input type="checkbox"/> Electrical		
<input type="checkbox"/> Instrumentation & Control		
<input type="checkbox"/> Structural		
<input type="checkbox"/> Metallurgy		
<input type="checkbox"/> Chemistry/Radiochemistry		
<input type="checkbox"/> Health Physics		
<input type="checkbox"/> Administrative Controls		

6. A QUALIFIED SAFETY REVIEWER will be assigned for each DISCIPLINE marked in step 5 and his/her name printed in the space provided. Each person shall perform a SAFETY REVIEW and provide input into the Safety Review Package.

7. The Lead 1st Safety Reviewer will assure that a Part III or Part IV is completed (see step 4 above) and a Part VI if required (see 9.d of Part II). Each person listed in step 5 shall sign and date next to his/her name in step 5, indicating completion of a SAFETY REVIEW.

8. 2nd Safety Reviewer: Perform a SAFETY REVIEW in accordance with Section 8.0.

2nd Safety Reviewer Stephen KronenwetterDate 7/31/93DISCIPLINE: Mech

9. PNSC review required? If "yes" attach Part V and mark reason below:

☐ Potential UNREVIEWED SAFETY QUESTION
☐ Question 9 of Part IV answered "Yes"
☐ Other (specify): _____

Yes ☐ No ☒

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PART I: SAFETY ANALYSIS
(See instructions in Section 8.4.1)
(Attach additional sheets as necessary)

DOCUMENT NO. EER 93-0502 REV. NO. 0

DESCRIPTION OF CHANGE: This EER provides an operability assessment of a pinhole leak which has been detected on the 6" Nuclear Service Water vital header.

ANALYSIS:

The Nuclear Service Water Header in question has been evaluated and found to be operable. The pipe was ultrasonically tested to verify adequate wall thickness was present, with the exception of the flaw. The flawed spot was analyzed using fracture mechanics methods as outlined in Generic Letter 90-05. The calculation performed confirmed that the line maintains its structural integrity with the presence of the flaw.

The leak is of a very minor nature and does not result in a reduction of system reliability or operating characteristics. The SW system will still be able to perform all its designed functions. All FSAR Chapter 15 analyses are still valid and no addition transients are created, since the system still meets all of its design requirements.

REFERENCES:

FSAR 8.3, 9.2, 9.5, Chapter 15
Tech. Specs. 3/4.7.1.1, B 3/4.7.1

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PART II: ITEM CLASSIFICATION

DOCUMENT NO. 93-0502 REV. NO. 0

- | | <u>Yes</u> | <u>No</u> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|
| 1. Does this item represent: | | |
| a. A change to the facility as described in the SAFETY ANALYSIS REPORT? | [] | [x] |
| b. A change to the procedures as described in the SAFETY ANALYSIS REPORT? | [] | [x] |
| c. A test or experiment not described in the SAFETY ANALYSIS REPORT? | [] | [x] |
| 2. Does this item involve a change to the individual plant Operating License or to its Technical Specifications? | [] | [x] |
| 3. Does this item require a revision to the FSAR? | [] | [x] |
| 4. Does this item involve a change to the Offsite Dose Calculation Manual? | [] | [x] |
| 5. Does this item constitute a change to the Process Control Program? | [] | [x] |
| 6. Does this item involve a major change to a Radwaste Treatment System? | [] | [x] |
| 7. Does this item involve a change to the Technical Specification Equipment List (BSEP and SHNPP only)? | [] | [x] |
| 8. Does this item impact the NPDES Permit (all 3 sites) or constitute an "unreviewed environmental question" (SHNPP Environmental Plan Section 3.1) or a "significant environmental impact" (BSEP)? | [] | [x] |
| 9. Does this item involve a change to a previously accepted: | | |
| a. Quality Assurance Program | [] | [x] |
| b. Security Plan (including Training, Qualification, and Contingency Plans)? | [] | [x] |
| c. Emergency Plan? | [] | [x] |
| d. Independent Spent Fuel Storage Installation license? (If yes, refer to Section 8.4.2, "Question 9," for special considerations. Complete Part VI in accordance with Section 8.4.6) | [] | [x] |

SEE SECTION 8.4.2 FOR INSTRUCTIONS FOR EACH "YES" ANSWER.

REFERENCES. List FSAR and Technical Specification references used to answer questions 1-9 above. Identify specific reference sections used for any "Yes" answer.

FSAR 8.3, 9.2, 9.5, Chapter 15
T.S. 3/4.7.1.1, B 3/4.7.1

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PART III: UNREVIEWED SAFETY QUESTION DETERMINATION SCREEN

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- | | <u>Yes</u> | <u>No</u> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|
| 1. Is this change <u>fully</u> addressed by another completed UNREVIEWED SAFETY QUESTION determination? (See Section 7.2.1, 7.2.2.5, and 7.9.1.1) | [] | [x] |

REFERENCE DOCUMENT: _____ REV. NO. _____

- | | <u>Yes</u> | <u>No</u> |
|------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|
| 2. For procedures, is the change a non-intent change which <u>only</u> (check all that apply): (See Section 7.2.2.3) | [] | [x] |
| [] Corrects typographical errors which do not alter the meaning or intent of the procedure; or, | | |
| [] Adds or revises steps for clarification (provided provided they are consistent with the original purpose or applicability of the procedure); or, | | |
| [] Changes the title of an organizational position; or, | | |
| [] Changes names, addresses, or telephone numbers of persons; or, | | |
| [] Changes the designation of an item of equipment where the equipment is the same as the original equipment or is an authorized replacement; or, | | |
| [] Changes a specified tool or instrument to an equivalent substitute; or, | | |
| [] Changes the format of a procedure without altering the meaning, intent, or content; or | | |
| [] Deletes a part or all of a procedure, the deleted portions of which are wholly covered by approved plant procedures? | | |

If the answer to either Question 1 or Question 2 in PART III is "Yes," then PART IV need not be completed.

PART IV: UNREVIEWED SAFETY QUESTION DETERMINATION

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Using the SAFETY ANALYSIS developed for the change, test or experiment, as well as other required references (LICENSING BASIS DOCUMENTATION, Design Drawings, Design Basis Documents, codes, etc.), the preparer of the Unreviewed Safety Question Determination must directly answer each of the following seven questions and make a determination of whether an UNREVIEWED SAFETY QUESTION exists.

A WRITTEN BASIS IS REQUIRED FOR EACH ANSWER

Yes No

1. May the proposed activity increase the probability of occurrence of an accident evaluated previously in the SAFETY ANALYSIS REPORT?

[] [X]

The SW line has been analyzed and determined to be structurally acceptable. No detrimental effects to the SW system are incurred and there is no reduction in system reliability. The service water system is capable of adequately performing all of its designed functions. Therefore, there is no increase in the probability of occurrence of an accident previously evaluated in the SAR.

2. May the proposed activity increase the consequences of an accident evaluated previously in the SAFETY ANALYSIS REPORT?

[] [X]

The line has been analyzed and determined to be structurally acceptable. No detrimental effects to the SW system are incurred and there is no reduction in system reliability. The service water system is capable of adequately performing all of its designed functions. All abilities to mitigate the consequences of an accident are maintained. Therefore, the consequences of an accident analyzed in the SAR are not increased.

3. May the proposed activity increase the probability of occurrence of a malfunction of equipment important to safety evaluated previously in the SAFETY ANALYSIS REPORT?

[] [X]

The SW line has been analyzed and determined to be structurally acceptable. No detrimental effects to the SW system are incurred and there is no reduction in system reliability. The service water system is capable of adequately performing all of its designed functions, which is to supply water to equipment important to safety. Thus the answer to this question is no.

4. May the proposed activity increase the consequence of a malfunction of equipment important to safety evaluated previously in the SAFETY ANALYSIS REPORT?

[] [X]

The SW line has been analyzed and determined to be structurally acceptable. No detrimental effects to the SW system are incurred and there is no reduction in system reliability. The service water system is capable of adequately performing all of its designed functions, which is to supply water to equipment important to safety. All abilities to mitigate the consequences of an accident are maintained. Therefore, the consequences of a malfunction of equipment important to safety as previously evaluated in the SAR are not increased.

5. May the proposed activity create the possibility of an accident of a different type than any evaluated previously in the SAFETY ANALYSIS REPORT?

[] [X]

Service Water Pipe integrity and reliability are maintained. The system will function as originally designed. Therefore, no new accident scenarios are created.

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PART IV (Continued)

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Yes No

6. May the proposed activity create the possibility of a malfunction of equipment important to safety of a different type than any evaluated previously in the SAFETY ANALYSIS REPORT?

[] [X]

Service Water Pipe integrity and reliability are maintained. The system will function as originally designed. Therefore, no new failures of safety equipment are created.

7. Does the proposed activity reduce the margin of safety as defined in the basis of any Technical Specification?

[] [X]

The SW pipe maintains its originally designed functional capabilities and, as such, meets the margin of safety as defined in the Tech. Specs.

8. Based on the answers to questions 1 - 7, does this item result in an UNREVIEWED SAFETY QUESTION? If the answer to any of the questions 1-7 is "Yes", then the item is considered to constitute an UNREVIEWED SAFETY QUESTION.

[] [X]

9. Is PNSC review required for any of the following reasons?

[] [X]

If, in answering questions 1 or 3 "No", it was determined that the probability increase was small relative to the uncertainties; or, in answering question 2 or 4 "No", it was determined that the doses increased, but the dose was still less than the NRC ACCEPTANCE LIMIT; or in answering question 7 "No", a parameter would be closer to the NRC ACCEPTANCE LIMIT, but the end result was still within the NRC ACCEPTANCE LIMIT; then PNSC review is required.

REFERENCES:

FSAR 8.3, 9.2, 9.5, Chapter 15
T.S. 3/4.7.1.1, B 3/4.7.1

This Unreviewed Safety Question Determination is for the following DISCIPLINE(s): (Additional Part IV forms may be included as appropriate.)

[]	Nuclear Plant Operations	[]	Structural
[]	Nuclear Engineering	[]	Metallurgy
[x]	Mechanical	[]	Chemistry/Radiochemistry
[]	Electrical	[]	Health Physics
[]	Instrumentation & Control	[]	Administrative Controls

Will the evaluation, on either a temporary or permanent basis:

1. Justify the deletion of equipment/common components from the BSEP EQ program?
☐ Yes ☒ No
2. Justify the addition of (already existing) equipment/common components to the BSEP EQ program?
☐ Yes ☒ No
3. Authorize the repair of EQ equipment/common components with other than qualified like-in-kind equipment/components parts?
☐ Yes ☒ No
4. Affect the existing installation or interface (of EQ equipment/common component applications) as may be designated in EDBS and/or in the qualification data package (including changing the type of interface/installation)?
☐ Yes ☒ No
5. Justify the (quality class) upgrade of equipment/common components or component parts which could be utilized in EQ applications?
☐ Yes ☒ No
6. (Re)Define qualification parameters (e.g., normal or LOCA/HELB environmental conditions, postaccident operating time requirements, essential passive/active postaccident operating requirements, qualified life assumptions/results, etc.) for specific EQ equipment?
☐ Yes ☒ No
7. Provide an EQ-related justification for continued operation (as required per PLP-02, Section 4.4.3.3 or 4.4.4)?
☐ Yes ☒ No
8. Provide the resolution of a qualification problem (as required per PLP-02, Section 4.4.4)?
☐ Yes ☒ No

- Notes:
1. If all no, then no further EQ consideration is required. Mark the EER Traveler accordingly as required by ENP-12 and include this completed EER-EQIF within the EER package. An EQ Technical Review is not required.
 2. If any yes, an EQ impact assessment (per Section 5.3) must be performed during the evaluation process. Mark the EER Traveler accordingly and include this completed EER-EQIF within the EER package. An EQ technical review is required.

BRUNSWICK NUCLEAR PROJECT
STATION BLACKOUT (SBO)
SCREENING REVIEW FOR SBO IMPACT

PAGE 1 OF 2

Document Number: EER 93-0502

Revision: 0

Document Title: Operability Assessment of Pinhole Leak on 6" SW Vital Header

SBO SCREENING REVIEW CRITERIA

Does the change:

YES

NO

1. Increase the suppression pool existing high water level of (-)27 inches?		x
2. Decrease the suppression pool existing minimum water level of (-)31 inches?		x
3. Increase the licensed power output of the reactor above 2436 MWT?		x
4. Increase the reactor coolant system average temperature above 547°F?		x
5. Reduce the condensate storage tank low water level below 10 feet?		x
6. Change the motive power type or power source to any Safety Relief Valve B21-F013A, B, C, D, E, F, G, H, J, K, or L?		x
7. Change the motive power type or power source to the following instruments: CAC-LI-2601-1 CAC-PI-1230 CAC-LR-2602 CAC-TR-4426-1A and 1B		x
8. Modify the equipment or change the motive power type or power source to any components or instruments in the E41 (HPCI) system?		x
9. Change the location of or modify CST level indicator LIT-1160?		x
10. Cause the following valves to fail closed on loss of power: RNA-SV-5251, -SV-5253, -SV-5481, or -SV-5482?		x
11. Change the motive power or power source to the following RPV instruments: B21-PI-R605A, C32-LI-R606A?		x
12. Modify drywell pressure indicator CAC-PI-1230?		x
13. Modify existing containment penetrations or containment penetration valving 3-inch and larger?		x

BRUNSWICK NUCLEAR PROJECT
STATION BLACKOUT (SBO)
SCREENING REVIEW FOR SBO IMPACT

PAGE 2 OF 2

Document Number: EER 93-0502

Revision: 0

SBO SCREENING REVIEW CRITERIA (continued)

Does the change:

YES

NO

14. Add a new containment penetration and isolation valves 3-inch and larger?

x

15. Add heat loads to the RHR Room-South, HPCI Room, Control Area, Service Water Building, Diesel Generator Building Basement and E-Bus Rooms, ECCS Pipe Tunnel, or Mezzanine Area Pipe Chase above HPCI Room Roof?

x

16. Modify the equipment or change the motive power type or power source to Battery Room Fans 1B-EF-CB, 1B-SF-CB, 1C-EF-CB, 1C-SF-CB, 2B-EF-CB, 2B-SF-CB, 2C-EF-CB, or 2C-SF-CB?

x

17. Add electrical loads to any of the Class 1E 125VDC system batteries 1A1, 1A2, 1B1, 1B2, 2A1, 2A2, 2B1, or 2B2?

x

18. Add black start loads to MCCs 1CA, 1CB, 2CA, 2CB, 1PA, 1PB, 2PA, 2PB, 1XE, 2XE, 1XF, 2XF, 1XL, 2XL, 1XM, 2XM, DGA, DGB, DGC, or DGD?

x

19. Add black start loads to Panels 1E5, 1E6, 2E7, or 2E8?

x

20. Add black start loads to 4160VAC Emergency Buses E1, E2, E3, or E4?

x

21. Modify equipment or circuitry in 4160VAC switchgear cubicles AG0 (E1-E3), AE6 (E1-1D), AJ5 (E3-E1), AI2 (E3-2D), AH9 (E2-E4), AG4 (E2-1C), AL5 (E2-E4), or AJ9 (E4-2C)?

x

22. Alter the FSAR statement that the 24/48 VDC power system batteries are capable of supplying the connected loads for a period of four hours (Section 8.3.2.2.1b)?

x

A. If the response to all of the above screening review criteria is "no", a SBO compliance review is not required.

B. If the response to any of the above screening review criteria is "yes", a SBO compliance review is required and should be processed in accordance with NED Procedure 3.17.

Brian E. Clark

Lead Engineer

7/31/93

Date

CAROLINA POWER & LIGHT COMPANY
FIRE PROTECTION OF SAFE SHUTDOWN
CAPABILITY REVIEW FORM
FOR BRUNSWICK AND ROBINSON PLANTS

EXHIBIT A

Plant/Project: BSEP Unit 1 Date 7/31/93
Title: Operability Assessment of SW leak File No. 4060
Document No.: EER 93-0502 Document Type: EER
Lead Engineer: Brian E. Clark Organization: NED-MEU

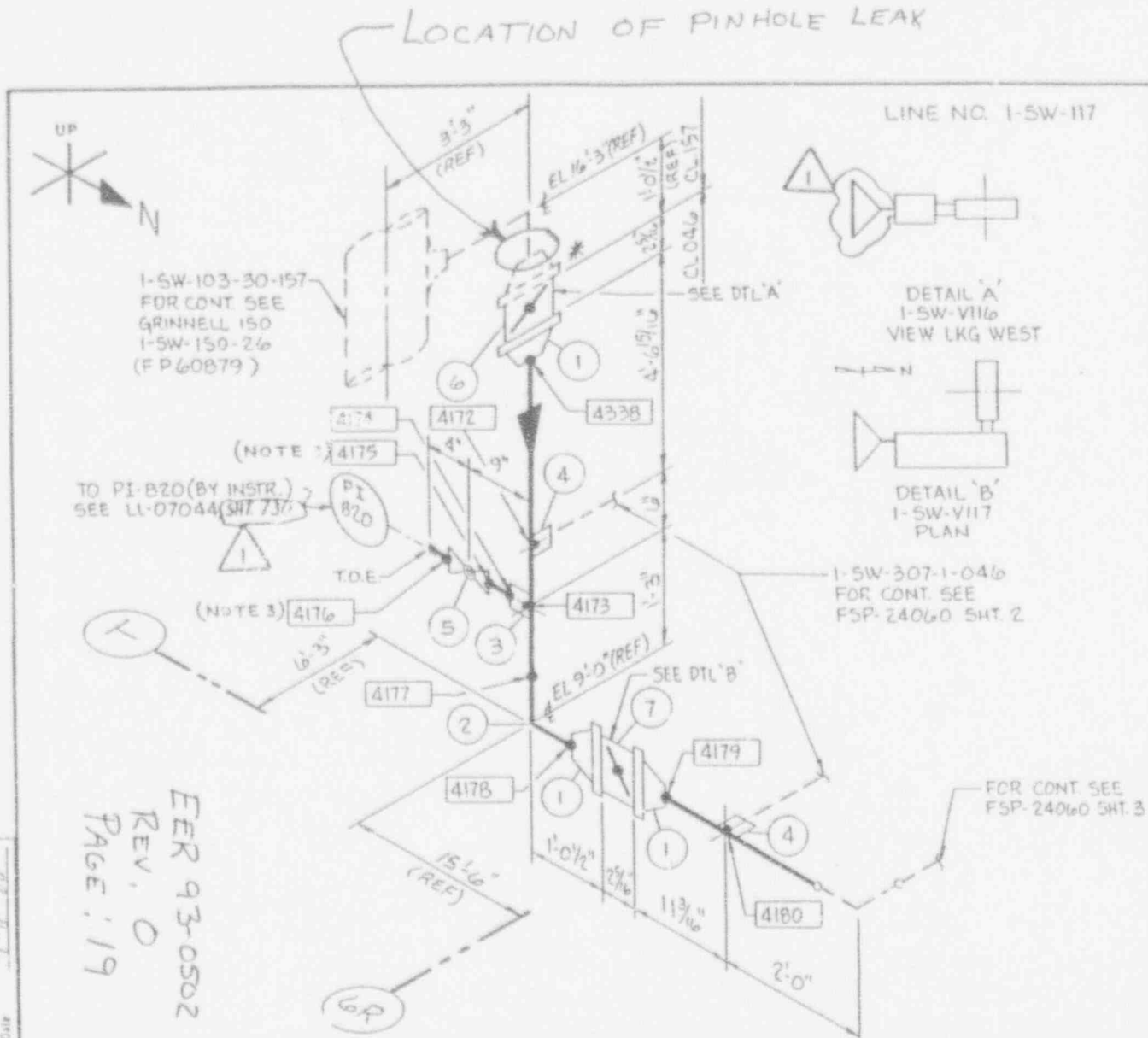
- | | Yes | No |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|
| 1. Does the change install a new plant system, subsystem, or component? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Does the change delete an existing plant system, subsystem, or component? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3. Does the change affect the operating mode, active logic or normal/emergency status of any component? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4. Does the change connect to or disconnect from any plant AC or DC power source? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Does the change modify protective circuitry on any power source (circuit breakers, fuses, relaying, etc.)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 6. Are the plant communications systems modified? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7. Does the change install or remove any plant structures or portions, thereof (e.g., walls, floors, doors, dampers)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8. Are fire barriers penetrated (e.g., walls, floors, or ceilings)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 9. Is there modification of any piping, HVAC duct, or electrical raceway configuration? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 10. Are any curbs, fire doors, fire dampers, drains, spray/drip shields, flame impingement barriers, protective wraps, cable coatings, or fire stops modified? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11. Are fire detection systems, subsystems, or components affected? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 12. Is there any modification to HVAC flow rates or direction? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 13. Will any combustible or flammable materials (e.g., cable insulation, lubrication oil, diesel fuel, wood, plastics) be introduced (or removed) by the change? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 14. Does the change modify any emergency lighting units, or install any potential obstructions to light paths? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 15. Does the change modify the status (locked/unlocked; card-reader) of any door or gate? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 16. Are fire suppression systems, subsystems, or components affected? | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Lead Engineer Brian E. Clark *B.E.C.*

If the response to all items noted above is "No", an "Appendix R" compliance review is not required.

ATTACHMENT 1

7/17/89
REV. 0
PAGE 19



PIECE MARKS-- ONE EACH REQ'D.			
BILL OF MATERIAL			
ITEM	QTY.	DESCRIPTION	
1	3	6" 150# FFWN, FLG (BORE 6.065")	
2	1	6" 90° ELBOW	
3	1	12-6 x 3/4" SOCKOLET	
4	2	10-6 x 1" SOCKOLET	
5	1	3/4" BALL VALVE, 150# S.W. MONEL SB-164 GR400, TAG: 1-SW-VI90	
6	1	6" BUTTERFLY VALVE, AL-BR, WAFER STYLE, LUG BODY, 150# MANUAL OPER, TAG: 1-SW-VII6	
7	1	6" BUTTERFLY VALVE, AL-BR, WAFER STYLE, LUG BODY, 150# LIMITORQUE OPER, TAG: 1-SW-VII7	
		CL 046	
10 LF		6" PIPE TO 30 CUN, ALLOY 715	6-467230WT
1 LF		3/4" PIPE:	SB-406, 735WT
		6" FGS:	SB-401, 6-4012X
		6" LGS:	SB-401, 6-4012X
		S.O.L.'s:	SB-402, 6-4022X
		GASKETS: 1/8" THK RUBBER (EPDM)	3000#, S.W.
4		6" 150# FULL FACE	
		BOLTING: MONEL SB-164 UNS No. 4400 or 4405	
2		3/4"-10 x 3" LG HEX HEAD CAP SCREW	
8		3/4"-10 x 2" LG	
20		3/4"-10 x 2" LG	
2		3/4"-10 x 2 3/8" LG	
		* INSTALL DIELECTRIC INSULATORS	
LINE SPEC. 248-117, CL. 046			GROUP II B
NUCLEAR SAFETY RELATED (Q-LIST)			
YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> PARTIAL <input type="checkbox"/>			
FP-Q <input type="checkbox"/> RW-Q <input type="checkbox"/>			
NDE - REQ'D. ASME SECT. III, CL. 3			
BASELINE		PWHT	IMPACT TEST
N/A		N/A	N/A
			CLEAN.
			O
CAROLINA POWER & LIGHT COMPANY			CP&L UNIT # 1
BRUNSWICK STEAM ELECTRIC PLANT			
PIPING ISOMETRIC - BLD'G.: REACTOR BUILDING			DWG. NO.
SYSTEM: SERVICE WATER			FSP-24060
ELEV.: (-) 17'-0"			
DRWN BY: CMEN CHECKED RLR APPROVED HJ2			DATE 4-14-88
SHT. 1			REV. 1

NOTES			
1. ALL WELDS PREFIXED BY "1-SW".			
2. ORIENT HANDWHEEL (ITEM 5) UP.			
3. BI-METALLIC WELD			
REV. NO.	DATE	DESCRIPTION	APPROVED
1	7/17/89	AS-BUILT PER PM-B2-221B	AK
2	3/3/89	FIRST ISSUE PER A: H. P. 221B	AK
REF. DWG.	D-25037 SH. 2 D-24060		

CAROLINA POWER & LIGHT COMPANY		CP&L	UNIT # 1
BRUNSWICK STEAM ELECTRIC PLANT		DWG. NO.	
PIPING ISOMETRIC - BLD'G.: REACTOR BUILDING		FSP-24060	
SYSTEM: SERVICE WATER			
ELEV.: (-) 17'-0"			
DRWN BY: CMEN CHECKED RLR APPROVED HJ2		DATE 4-14-88	
SHT. 1		REV. 1	

DMH-5P

SYSTEM #: 4060
TYPE : EXSEIS

ATTACHMENT 2

EER 93-0502
REV. 0
PAGE: 20

CAROLINA POWER & LIGHT COMPANY
P. O. BOX 1551
RALEIGH, NORTH CAROLINA 27602

1SW-0081

(ANALYSIS/CALCULATION #)

FOR

EVALUATION OF THROUGH-WALL LEAK

1-SW-117-6-157

(TITLE)

FOR

BRUNSWICK STEAM ELECTRIC PLANT UNIT 1

(PROJECT AND/OR PLANT NAME & APPLICABLE UNIT)

REACTOR BUILDING, UNIT 1/SW/PIPING

(STRUCTURE/SYSTEM/COMPONENT)

SEISMIC: YES NO
☒ ☐
SAFETY CLASS: Q CLASS A

Rev. No.	Prepared by/ Date	Verified by/ Date	Project Engineer/ Date	Prin. or Res. Eng./ Date
0	<i>Chris Patten</i> 7/31/93	<i>Don E. H.</i> 7/31/93	<i>D. Smith</i> 7/31/93	<i>Ed for W.G.</i> MONROE FOR TELECOM 7/31/93
Reason for Change				
Reason for Change				
Reason for Change				

ATTACHMENT 2 (cont)

EER 93-0502

REV. Ø

PAGE: 21

LIST OF EFFECTIVE PAGES

<u>Page</u>	<u>Revision</u>	<u>Page</u>	<u>Revision</u>	<u>Page</u>	<u>Revision</u>
0	0				
1	0				
2	0				
3	0				
4	0				
5	0				
6	0				
7	0				

APPENDICES

A1	0
A2	0
A3	0
A4	0
A5	0
A6	0
A7	0
A8	0
A9	0
B1	0
B2	0
B3	0

TOTAL NUMBER OF CALCULATION PAGES: 20

ATT. 2 (CONT)

EER 93-0502

REV. 0

PAGE: 22

TABLE OF CONTENTS

ITEM	SHEET NO.
COVER SHEET	0
LIST OF EFFECTIVE PAGES	1
TABLE OF CONTENTS	2
PURPOSE	3
REFERENCES	4
CALCULATIONS	5
CONCLUSIONS	7
APPENDICES	
A. INFORMATION ONLY	A1
B. DESIGN VERIFICATION RECORD	B1

ATT. 2 (CONT)

EER 93-0502

REV. 0

PAGE: 23

PURPOSE

To determine acceptability of the through-wall leak crack which has been identified on line 1-SW-117-6-157 in accordance with references 1 & 3.

ATT. 2 (CONT.)

EER 93-0502

REV. 0

PAGE: 24

REFERENCES

- 1 USAS B31.1 1967 EDITION POWER PIPING CODE
- 2 ANSI B31.1 1973 SUMMER ADDENDA POWER PIPING CODE -
APPENDIX A.
- 3 NRC GENERIC LETTER 90-05, "GUIDANCE FOR PERFORMING TEMPORARY
NON-CODE REPAIR OF ASME CODE CLASS 1, 2, AND 3 PIPING",
DATED 6/15/90.
- 4 CP&L UT REPORT DATED 7/31/93. SEE PAGES A3 THROUGH A9.
- 5 BSEP SPECIFICATION NO. 248-117, "SPECIFICATION FOR
INSTALLATION OF PIPING SYSTEMS", REV 9.
- 6 NAVCO PIPING DATALOG, EDITION 10, JUNE 1 1974.
- 7 CALCULATION, SA-SW-823, REV 0.
- 8 LOCATION AND DIAMETER OF THROUGH-WALL LEAK CRACK.
SEE PAGE A2.
- 9 PIPING DRAWINGS, D-25037 SHEET 2, R63.
1-FP-60879, RV.
D-28046 SHEET 823, R0

ATT 2 (CONT)

EER 93-0582
REV. 0

Computed by: <i>Ch. Pat</i>	Date: 7/31/93	CAROLINA POWER & LIGHT COMPANY	Calculation ID: 1SW-0081	
Checked by: <i>B. S. H.</i>	Date: 7/31/93		Pg. 5 of —	Rev. 0
PID No.:			File:	
		CALCULATION SHEET		
Project Title: BSEP UNIT 1				
Calculation Title: Evaluation of Through-Wall Leak, 1-SW-117-6-157				
Status: Prelim. <input type="checkbox"/> Final <input checked="" type="checkbox"/> Void <input type="checkbox"/>				

Determine actual pipe stresses:

The location of the through-wall leak is on the elbow to flange weld identified as node 30 on piping isometric D-28046 sheet 823, (ref. 8 and 9).

Deadweight	540 psi
Pressure	776 psi
Thermal (90 °F)	600 psi
Thermal (33 °F)	1069 psi
Thermal Range	1669 psi
Seismic (DBE)	3500 psi

Combined	6485 psi

Determine minimum wall thickness (t_m) per reference 1.

1-SW-117-6-157

6" sch 40, 6.625" O.D., $t = 0.280$ ", A106 GR B or A333 GR 6
design pressure = 150 psig, design temperature = 105 °F
 $S_h = 15000$ psi

$$t_m = (PD_o) / (2(SE + Py)) + A$$

P = Design Pressure, (psig)
D_o = Outside Diameter, (inch)
SE = Allowable Stress, (psi)
y = factor = 0.4
A = Additional thickness required by Code = 0.0"

$$t_m = (150 * 6.625) / (2(15000 + 150 * 0.4)) + 0.0 = 0.033 \text{ inch}$$

Note : The minimum wall thickness identified in the UT report is 0.100 inch. See pages A3 through A9.

ATT. 2 (CONT)

EER 73-0502
REV. 0

Computed by: J. P. J.	Date: 7/31/93	CAROLINA POWER & LIGHT COMPANY	Calculation ID: 1SW-0081	
Checked by: B. S. M.	Date: 7/31/93		Pg. 6 of —	Rev. 0
PID No.:			File:	
Project Title: BSEP UNIT 1			CALCULATION SHEET	
Calculation Title: Evaluation of Through-Wall Leak, 1-SW-117-6-157				
Status: Prelim. <input type="checkbox"/> Final <input checked="" type="checkbox"/> Void <input type="checkbox"/>				

Determine stress intensity, (K):

From page A4, the minimum wall thickness in the vicinity of the through-wall crack is 0.100 inch. Since the defect is a hair-line crack 1/8 inch long (page A1), it is reasonable to assume that the crack diameter at a depth of 0.033 inch (t_m) is less than 3/8 inch.

Therefore, $2a = 0.375$ inch and
 $a = 0.1875$ inch.

$R = \text{mean pipe radius} = (6.625 - 0.280)/2 = 3.1725$ inch

$c = a/(3.1416 \cdot R) = 0.1875/(3.1416 \cdot 3.1725) = 0.018813$

$r = R/t_m = 3.1725/0.033 = 96.13636$

$A = -3.26543 + 1.52784 \cdot r - 0.072698 \cdot r^2 + 0.0016011 \cdot r^3 = 894.32$

$B = 11.36322 - 3.91412 \cdot r + 0.18619 \cdot r^2 - 0.004099 \cdot r^3 = -2286.1$

$C = -3.18609 + 3.84763 \cdot r - 0.18304 \cdot r^2 + 0.00403 \cdot r^3 = 2255.7$

$F = 1 + A \cdot c^{1.5} + B \cdot c^{2.5} + C \cdot c^{3.5} = 3.199$

$s = 6.485$ KSI, from previous page

$K = 1.4 \cdot s \cdot F \cdot (3.1416 \cdot a)^{1/2} = 22.3$ KSI(IN)^{1/2}

Determine Acceptability:

Allowable stress intensity = 35 KSI(IN)^{1/2}

Actual stress intensity = 22.3 KSI(IN)^{1/2}

22.3 < 35 Acceptable

ATT. 2 (CONT')

EER 93-0502

REV. 0

PAGE: 27

CONCLUSIONS

The through-wall leak crack which has been identified on line 1-SW-117-6-157 satisfies the criteria of the "Through Wall Flaw" approach in accordance with reference 3. Structural integrity and flaw stability are acceptable.

Note that, per reference 3, a Code repair is still required during the current refueling outage.

ATT. 2 (CONT)

EER 93-0502

REV. 0

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APPENDIX A

INFORMATION ONLY

ATT. 2 (CONT)

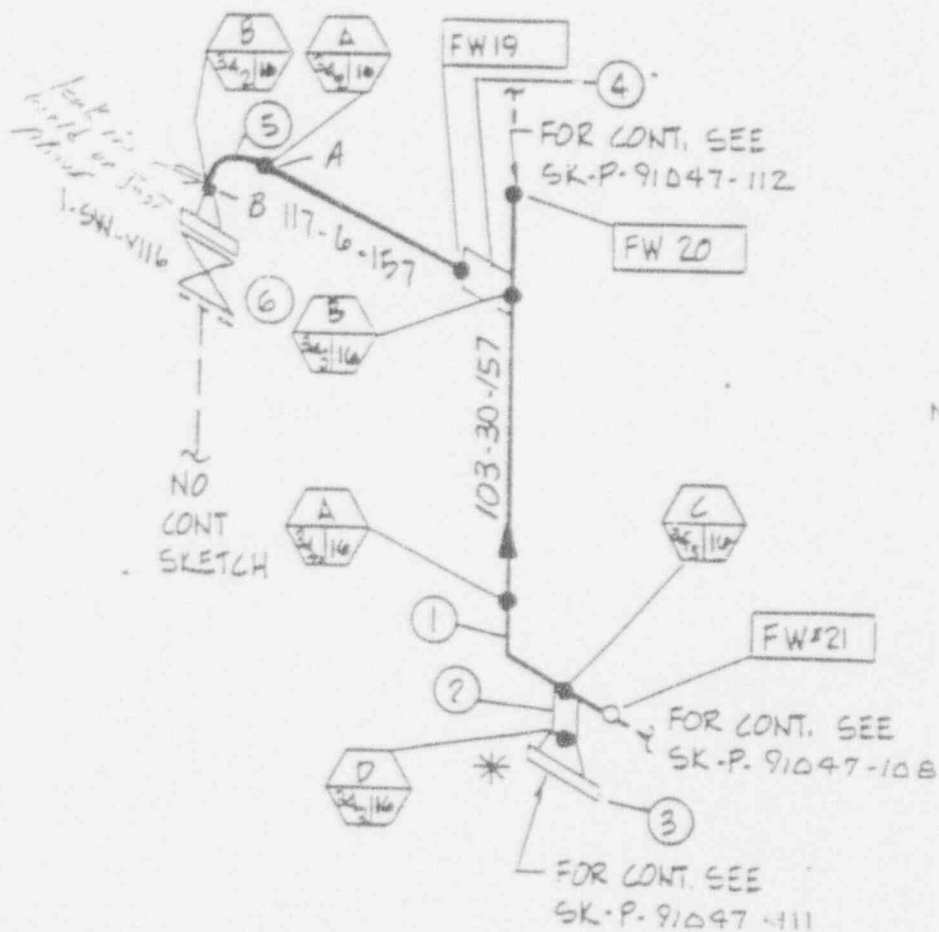
EER 93-0502
REV. 0

CALC I.D. ISW-0081 REV 0

PAGE 29
PAGE A2

THE DEFECT IN THE ELBOW TO FLANGE
WELD UPSTREAM OF VALVE 1-SW-VII6
IS A HAIR LINE CRACK APPROX.
 $\frac{1}{8}$ " LONG.

Paul Wenzel



* INSTALL DIELECTRIC
INSULATORS.
GASKET: 1/8" THK
FULL FACE, EDPM

MOO SKETCH NO SK-P-91047-110 SET 1

PROJECT BNP

JOB NO.

UNIT 1 ☒ 2 ☐ 3 ☐ 4 ☐

DATE 7-31-93

DRAWING
SK-P-91047-110

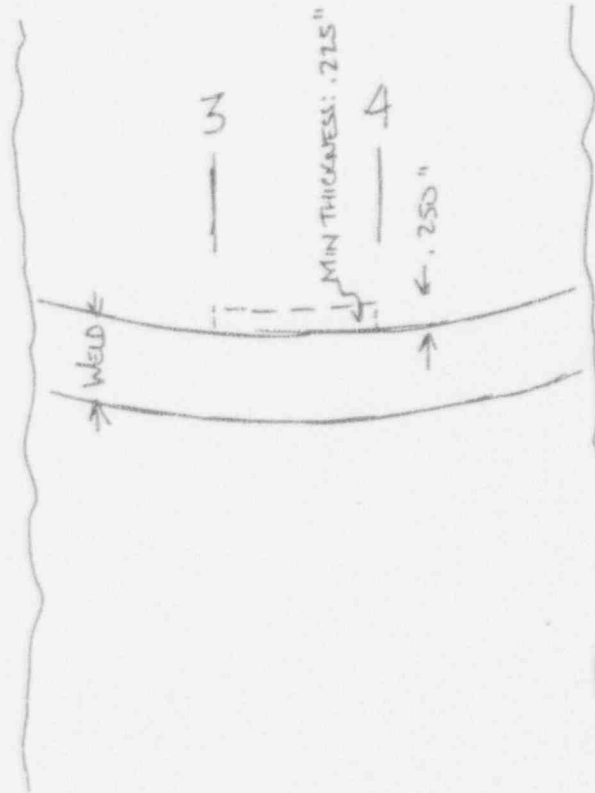
SYSTEM
SERVICE WATER

LINE
117-6-157

WELD/ITEM NUMBER
WELD A

A-SCAN UT RESULTS

FRONT VIEW



NOT TO SCALE

Black LIII

PROJECT BNP

JOB NO.

UNIT ☒ 1 ☐ 2 ☐ 3 ☐ 4

DATE 7-31-93

DRAWING
SK-P-91047-110

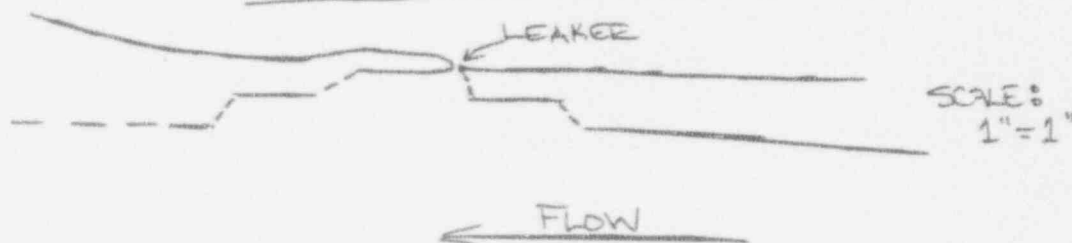
SYSTEM
SERVICE WATER

LINE
117-6-157

WELD/ITEM NUMBER
WELD B

A-SCAN UT RESULTS

CROSS SECTION AT LEAKER



FRONT VIEW (NOT TO SCALE)



Jack Buck LIII

ILLEGIBLE RECORD ACCEPTANCE FORM

Originator requests acceptance of this document and accepts responsibility for the illegible condition of this data.

Document Identity EER 93-0502 Rev 0 page(s)
33 thru 36.

NOTE: The identity of the illegible record or illegible page(s) within the record shall be provided by the originator of this form by identifying and inserting this form preceding the illegible data. In cases where the entire record is considered illegible, this form precedes the record. Please complete Part A or B.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

PART A

The attached record is suitable for microfilming because:

It is non-Q or nonvital records or the data which is relevant to the identification of the item is legible and/or the data can be provided from other sources.

Signed: [Signature]
Title: Lead Mechanic / 8/6/93
Date

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

PART B

The attached record is the most legible copy available and may be retained in the RFR.

	_____ Originating Supervisor	_____ Date
Reviewed:	_____ Supervisor - Project Services Data Processing/ Records Receipt	_____ Date

Notes

EEK 93-0502
 REV. 0
 PAGE 33

IDENTIFIER	THICKNESS	UNITS	FLAGS	SU #				
01								
SU #	VEL (/WS)	DIFF	LO-ALM	HI-ALM	EIT-BLANK	UNITS	TRANSDUCER	GAIN dB
1	0.2315	0.000	0.000	10.000	0.000	IN	D790/791	53
2	0.2315	0.000	0.000	10.000	0.000	IN	D790/791	56
3	0.2315	0.000	0.000	10.000	0.000	IN	D790/791	49
4	0.2315	0.000	0.000	10.000	0.000	IN	D790/791	47
5	0.2315	0.000	0.000	10.000	0.000	IN	D790/791	48

02
 Filename: TOP.TXT
 Operator: GEORGE LININGER, ED BLACE
 Location: -7' SOUTH BRB
 Date: 7/31/1993
 Time: 13:00
 Probe ID: D790/791 for SU# 1
 D790/791 for SU# 2
 D790/791 for SU# 3
 D790/791 for SU# 4
 D790/791 for SU# 5

Comments:
 CLOCK WISE WITH FLOW. BASE METAL CLEANED WAS 3" UP AND DOWN STREAM

"A" Weld

7-31-93

Main Section (0)

Row: 7 Cols: 21 Direction: Clockwise Offset: 0

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 REV. 0
 PAGE 34

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	0.272	0.277	0.245	0.231	0.222	0.249	0.250	0.253	0.245	0.264	0.300	0.272	0.373	0.282	0.282	0.292	0.318	0.285	0.305	0.290	0.274
2	0.269	0.276	0.247	0.236	0.236	0.237	0.258	0.261	0.259	0.269	0.281	0.279	0.293	0.293	0.299	0.288	0.311	0.289	0.289	0.283	0.255
3	0.255	0.266	0.274	0.255	0.230	0.248	0.257	0.252	0.286	0.263	0.290	0.290	0.274	0.295	0.301	0.290	0.304	0.276	0.262	0.286	0.261
4	0.307	0.338	0.345	0.306	0.320	0.315	0.320	0.334	0.312	0.315	0.334	0.343	0.359	0.350	0.363	0.332	0.357	0.320	0.334	0.330	0.267
5	0.320	0.317	0.305	0.283	0.299	0.306	0.323	0.301	0.321	0.337	0.333	0.334	0.329	0.332	0.324	0.363	0.302	0.312	0.324	0.315	0.302
6	0.324	0.324	0.312	0.285	0.255	0.310	0.314	0.311	0.314	0.336	0.336	0.326	0.332	0.328	0.323	0.306	0.305	0.322	0.331	0.317	0.305
7	0.330	0.330	0.322	0.315	0.290	0.342	0.326	0.329	0.321	0.323	0.330	0.331	0.335	0.338	0.316	0.309	0.323	0.332	0.312	0.305	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
ColMx	0.330	0.338	0.345	0.315	0.320	0.342	0.326	0.334	0.321	0.337	0.339	0.343	0.359	0.350	0.363	0.363	0.357	0.323	0.324	0.330	0.265
ColMn	0.255	0.266	0.245	0.231	0.222	0.235	0.257	0.252	0.249	0.263	0.281	0.272	0.273	0.282	0.282	0.288	0.302	0.276	0.262	0.283	0.261
Delta	0.075	0.070	0.100	0.084	0.098	0.105	0.069	0.082	0.072	0.074	0.058	0.071	0.066	0.068	0.081	0.075	0.055	0.047	0.051	0.047	0.044
Ave	0.297	0.304	0.293	0.273	0.265	0.287	0.294	0.292	0.295	0.301	0.313	0.311	0.313	0.316	0.319	0.312	0.315	0.304	0.314	0.305	0.285

RowMx RowMn Delta Ave

1	0.318	0.222	0.096	0.271
2	0.311	0.236	0.075	0.272
3	0.304	0.230	0.074	0.273
4	0.323	0.287	0.076	0.330
5	0.363	0.283	0.080	0.318
6	0.336	0.255	0.081	0.315
7	0.342	0.290	0.052	0.323

Section Summary

Maximum Reading = 0.363 (4, O) Average = 0.306
 Minimum Reading = 0.222 (1, E) Standard Deviation = 0.03
 Total Readings = 145

A WELD

Notes

EER 93-0502
 REV. 0
 PAGE: 35

IDENTIFIER	THICKNESS	UNITS	FLAGS	SU #				
OE								
SU #	VEL(/US)	DIFF	LO-ALM	HI-ALM	EXT-BLANK	UNITS	TRANSDUCER	GAIN dB
1	0.2316	0.000	0.000	10.000	0.000	IN	D790/791	53
2	0.2316	0.000	0.000	10.000	0.000	IN	D790/791	55
3	0.2316	0.000	0.000	10.000	0.000	IN	D790/791	54
4	0.2316	0.000	0.000	10.000	0.000	IN	D790/791	50
5	0.2316	0.000	0.000	10.000	0.000	IN	D790/791	52
6	0.2316	0.000	0.000	10.000	0.000	IN	D790/791	51
7	0.2316	0.000	0.000	10.000	0.000	IN	D790/791	56
8	0.2316	0.000	0.000	10.000	0.000	IN	D790/791	57

OE

Filename: BOTTOM.TXT
 Operator: GEORGE LININGER, ED BLACE
 Location: -7'SOUTH RHR
 Date: 7/31/1993
 Time: 16:46

Probe ID: D790/791 for SU# 1
 D790/791 for SU# 2
 D790/791 for SU# 3
 D790/791 for SU# 4
 D790/791 for SU# 5
 D790/791 for SU# 6
 D790/791 for SU# 7
 D790/791 for SU# 8

C. 1181
 BOTTOM WELD 8 LEAK AT COL 15 UPPER WELD TOR

B - WELD

Black III 7-3493

Main Section (0)

Rows : 5 Cols : 21 Direction : Clockwise Offset : 0

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	0.315	0.311	0.312	0.290	0.314	0.314	0.308	0.332	0.295	0.310	0.311	0.315	0.311	0.310	0.361	0.299	0.294	0.232	0.250	0.312	0.284
2	0.312	0.298	0.286	0.294	0.333	0.321	0.299	0.296	0.303	0.314	0.307	0.309	0.308	0.322	0.308	0.255	0.278	0.278	0.273	0.273	0.288
3	0.295	0.271	0.320	0.296	0.320	0.327	0.321	0.298	0.282	0.294	0.315	0.316	0.332	0.318	0.183	0.176	0.220	0.285	0.281	0.282	0.300
4	0.333	0.295	0.308	0.335	0.291	0.304	0.315	0.344	0.343	0.318	0.319	0.370	0.343	0.320	0.175	0.201	0.276	0.337	0.374	0.339	0.352
5	0.331	0.310	0.317	0.315	0.324	0.305	0.317	0.301	0.259	0.312	0.359	0.430	0.410	0.405	0.365	0.318	0.345	0.382	0.382	0.390	0.389
RowMx	0.333	0.311	0.320	0.335	0.335	0.327	0.321	0.344	0.349	0.318	0.359	0.430	0.410	0.405	0.369	0.318	0.345	0.382	0.382	0.390	0.389
ColMn	0.295	0.271	0.285	0.290	0.291	0.304	0.299	0.296	0.259	0.294	0.307	0.309	0.308	0.310	0.175	0.178	0.220	0.276	0.278	0.273	0.288
Delta	0.038	0.039	0.034	0.045	0.042	0.023	0.022	0.046	0.090	0.024	0.052	0.101	0.101	0.095	0.182	0.140	0.125	0.105	0.115	0.115	0.105
Ave	0.317	0.295	0.309	0.306	0.316	0.314	0.313	0.314	0.298	0.310	0.322	0.348	0.342	0.332	0.275	0.250	0.233	0.219	0.224	0.302	0.323

ant 7.
Ewe
weld

FLANGE

* Leak

1" x 1" CRID

RowMx	RowMn	Delta	Ave
0.351	0.284	0.077	0.308
0.313	0.255	0.078	0.299
0.331	0.178	0.154	0.288
0.374	0.176	0.198	0.315
0.430	0.259	0.171	0.347

Section Summary

M: Max Reading = 0.430 (5, L) Average = 0.311
M: Min Reading = 0.175 (4, O) Standard Deviation = 0.041
Total Readings = 115

B Weld

ATT 2 (CONT)

APPENDIX B

DESIGN VERIFICATION

EER 93-0502

REV. 0

PAGE: 37

DISCIPLINE DESIGN VERIFICATION RECORD

Sheet 1 of 2

EER 93-0502

REV. 0

PAGE: 38

I. Instructions to Verification Personnel

Plant BRUNSWICK STEAM ELECTRIC PLANT Q Level: ☒ Q (Class A)
 Project _____ ☐ Seismic (Class B)
 File No. _____ ☐ FP-Q (Class D)
 Document No. LSW-0081 Rev. 0 ☐ Other

Design verification should be done in accordance with ANSI N45.2.11, Section 6 as amended by Regulatory Guide 1.64, Rev. 2.

Special Instructions:

Discipline Project Engineer *D. S. Wilson*

II. Verification Documentation

Applicable Discipline:

Mechanical	<input checked="" type="checkbox"/>	Civil Structural	<input type="checkbox"/>
HVAC	<input type="checkbox"/>	Seismic Equip. Qual.	<input type="checkbox"/>
Electrical	<input type="checkbox"/>	Civil Stress	<input type="checkbox"/>
I&C	<input type="checkbox"/>	Fire Protection	<input type="checkbox"/>
		Environmental Qualification	<input type="checkbox"/>
		Human Factors	<input type="checkbox"/>
		Materials	<input type="checkbox"/>
		Other: _____	<input type="checkbox"/>

Verification Methods Used:

☒ Design Review ☐ Alternate Calculations ☐ Qualification Testing

Design Document Acceptable: Yes ☒ No ☐ (comments attached)

Design Verifier: *B. S. Wilson* Date 7/31/93

Acknowledgement of Verification:

(DPE) *D. S. Wilson* Date 7/31/93

III. Resolution of Comments:

Comments Resolved (See Attached):

(RE) _____ Date _____

Action taken makes Design Documents Acceptable:

Design Verifier: _____ Date _____

(DPE) _____ Date _____

