Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

July 20, 2009

L-2009-169
10 CFR 50.4
10 CFR 50.55a

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Re: St. Lucie Unit 1
Docket No. 50-335
Response to Request for Additional Information
Unit 1 Third Interval Relief Request 32

On February 6, 2009, FPL submitted relief request 32 for the St. Lucie Unit 1 Third ISI Interval. The relief request dealt with the impracticality to meet the code required volume coverage of some piping and vessel welds as required by the ASME Code, 1989 Edition, no addenda, as clarified by Code Case N-460 due to configuration and/or the presence of permanent attachments. Relief is requested in accordance with 10CFR50.55a(g)(5)(iii). The NRC requested additional information via emails that were subsequently posted in ADAMS as ML091590627 and ML091800277.

The responses to the RAI questions are within Attachment 1. Attachment 2 contains the revised relief request.

Sincerely,

Eric S. Katzman
Licensing Manager
St. Lucie Plant

Attachments

ESK/KWF

A047
NRR

2.2 Request for Relief 32, All Examination Categories

Specific inspection techniques used to examine the subject welds are unclear. The figures included in the licensee's submittal show that various angle beam transducers were used and note the areas applied. However, the wave mode (shear or refracted longitudinal), and actual beam propagation angle, have not been identified. In addition, materials of construction and thickness of components have not been provided.

FPL Response: The wave mode, actual beam propagation angle, materials of construction and thickness of each component has been added to Tables 1 through 7.

2.2.1 Summarize the inspections techniques (e.g., 0-degree longitudinal, and/or 30-, 45- and 60-degree shear wave; etc.) for each of the welds included in RR-32.

FPL Response: The inspection techniques for each weld have been added to Tables 1 through 7.

2.2.2 Clarify, if not specifically noted in the licensee's Table 1[1], whether the examinations listed in the Table were conducted prior to, or after, implementation of ASME Code, Section XI, Appendix VIII requirements.

FPL Response: All examinations identified in Tables 3 (B-J/R-A), 6 (C-F-1), and 7 (C-F-2) were performed utilizing personnel qualified and procedures demonstrated in accordance with the ASME Section XI, Appendix VIII, Supplement 2 or 3 as applicable and the PDI program.

[1] Table 1 is not included in this Technical Letter Report (TLR) and can be found in the licensee's submittal dated February 6, 2009.

2.2.3 Prior to the requirement to implement ASME Code, Section XI, Appendix VIII, state to what ASME Code inspection requirements were used to examine the subject welds in all the ASME Code, Section XI, Examination Categories listed in RR-32.

FPL Response: All examinations identified in Tables 3 (B-J/R-A), 6 (C-F-1), and 7 (C-F-2) were performed utilizing personnel qualified and procedures demonstrated in accordance with the ASME Section XI, Appendix VIII, Supplement 2 or 3 as applicable and the PDI protocol.

2.2.4 State the materials of construction, wall thickness, and schedule (for piping) for each of the components in RR-32. Note any specific features, such as cladding on the inside diameter (ID) of any of the carbon steel components, etc. If not already described, list the system and/or specific component, as applicable, to which each of the subject welds is associated.

FPL Response: The materials of construction, wall thickness, and schedule (for piping) for each of the components has been added to Tables 1 through 7. Cladding, when present, is identified in the "Materials" column of Tables 1 through 7 and shown on the figures. Each specific component is described in the "ASME Code Component" column.

The licensee lists examination coverage for certain welds as 100% from one side (e.g., pipe), and lists varied coverage from the opposite side of the weld. However, if these welds were examined after implementation of ASME Code, Section XI, Appendix VIII requirements, it is unclear how the licensee can credit the full volume (100%) from only one side, as qualifications for detecting flaws on the far-side of austenitic welds has not been demonstrated.

2.2.5 Please clarify the volumetric coverage(s) obtained (and claimed) for all of the subject welds.

FPL Response: The coverage(s) credited has been clarified in Tables 1 through 7 as discussed during the telecon May, 20, 2009 between FPL and the NRC.

2.3 Request for Relief 32, ASME Code, Section XI, Examination Category B-J, Items B9.11 and B9.21, Austenitic Stainless Steel Piping Welds

In Attachment 2, Page 1 of 45, under Section 3.0, *Applicable Code Requirement*, of the licensee's letter dated February 6, 2009, a Table is included containing certain ASME Code references and requirements. However, for certain ASME Code, Section XI, Examination Category B-J welds, the licensee states that a Risk-Informed Inservice Inspection (RI-ISI) program was approved by the NRC on March 25, 2004 (ADAMS ML040850587), for St. Lucie, Unit 1. It is unclear how this affects the current request for relief. A review of the Safety Evaluation for the RI-ISI program notes that the Westinghouse Owners Group Topical Report WCAP-14572, *Westinghouse Owners Group Application of Risk-Informed Methods to Piping Inservice Inspection Topical Report*, Revision 1-NP-A, February 1999, was used as a basis for the RI-ISI program. This method invokes ASME Code Case N-577, *Risk-Informed Requirements for Class 1, 2, and 3 Piping, Method A*, Section XI, Division 1, for revised Examination Categories.

2.3.1 State whether any of the piping welds in RR-32 were examined in accordance with the RI-ISI program, and if so, why these welds have not been designated as Examination Category R-A per ASME Code Case N-577, with specific Item numbers associated with potential degradation mechanisms.

FPL Response: With the exception of the three welds examined in 2005 (RC-109-FW-2003, RC-103-FW-2000, RC-103-FW-2002), the figures in ASME Section XI, 1989 Edition, No Addenda, define the examination volume. For the welds examined in 2005, the required examination volume was extended to include, as a minimum, the lower 1/3 weld volume and base material for a distance of 1/2 inch beyond each weld toe as required by FPL's approved alternative risk informed program (TAC NO. MC0244).

All of the piping welds included in Table 3 of this relief request are included in the risk informed population, but not selected for examination. The applicable code requirement column in Table 3 includes both the ASME Section XI, 1989 Edition, No Addenda examination category and item number and FPL's approved alternative risk informed examination category and item number.

2.3.2 State whether new examination volumes, based on risk, have been applied to these welds, and whether the current limited examinations apply to these new inspection volumes.

FPL Response: With the exception of the three welds examined in 2005 (RC-109-FW-2003, RC-103-FW-2000, RC-103-FW-2002), the figures in ASME Section XI, 1989 Edition, No Addenda, define the examination volume because they were examined prior to the approval of FPL's alternative risk informed program. For the welds examined in 2005, the required examination volume was extended to include, as a minimum, the lower 1/3 weld volume and base material for a distance of 1/2 inch beyond each weld toe as required by FPL's approved alternative risk informed program (TAC NO. MC0244).

2.3.3 **As revised by NRC e-mail dated June 29, 2009 (ADAMS#ML091800277) Attachment 3**

Describe all nondestructive examinations that were performed on the subject welds during the replacement process, including examinations for construction code acceptance and/or pre-service inspection in accordance with ASME Section XI.

FPL Response: For welds RC-109-FW-2003, RC-103-FW-2000, and RC-103-FW-2002, examinations performed during the replacement process included in-process and final surface examinations, and final radiography (RT) in accordance with the requirements of the 1992 Edition of ASME Section III. The surface and radiographic examinations were not limited. Final RT and surface examinations performed during the installation of the welds revealed no recordable or reportable flaws in the examination zone or adjacent to any UT limitations. The acceptable surface and RT results were obtained prior to the preservice UT examinations being performed. The UT examinations did not reveal any recordable or reportable flaws in the examination zone or adjacent to any limitations in accordance with ASME Code Section XI, 1989 Edition, No Addenda.

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# Relief Request
# In Accordance with 10 CFR50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

## 1. ASME Code Component(s) Affected

Class 1 and 2 pressure retaining welds in vessel and piping

## 2. Applicable Code Edition and Addenda

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Rules for Inservice Inspection of Nuclear Power Plant Components, Section XI, 1989 Edition, No Addenda as amended by 10CFR50.55a, is the code of record for the St. Lucie Unit 1, 3rd 10-year interval. ASME Section XI, 1995 Edition with Addenda through 1996, as modified by 10CFR50.55a, was utilized for Appendix VIII.

## 3. Applicable Code Requirement

| Exam Cat. | Item No. | Examination Requirements |
|---|---|---|
| B-B | B2.31 | Essentially 100% volumetric examination of weld length. |
| B-D | B3.130 | Essentially 100% volumetric examination of weld length. |
| B-J | B9.11 | Essentially 100% volumetric and surface examination of circumferential welds for ≥4" nominal pipe size.<br><br>On March 25, 2004, FPL received approval (TAC NO. MC0244) to implement an alternative risk informed program that requires essentially 100% volumetric examination for butt welds in class 1 systems. PSI volumetric examination of essentially 100% of piping welds. |
| B-J | B9.21 | Essentially 100% surface examination of circumferential welds for <4" nominal pipe size.<br><br>On March 25, 2004, FPL received approval (TAC NO. MC0244) to implement an alternative risk informed program that requires essentially 100% volumetric examination for butt welds in class 1 systems. PSI volumetric examination of essentially 100% of piping welds. |
| C-A | C1.10<br>C1.30 | Essentially 100% volumetric examination of the weld length. |

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| Exam Cat. | Item No. | Examination Requirements |
|---|---|---|
| C-B | C2.21 | Essentially 100% volumetric and surface examination of nozzle to shell welds |
| C-F-1 | C5.11 | Essentially 100% volumetric and surface examination of circumferential welds ≥3/8" nominal wall thickness for piping >4" nominal pipe size. |
| C-F-1 | C5.21 | Essentially 100% volumetric and surface examination of circumferential welds >1/5" nominal wall thickness for piping ≥2" and ≤4" nominal pipe size. |
| C-F-2 | C5.51 | Essentially 100% volumetric and surface examination of circumferential welds ≥3/8" nominal wall thickness for piping >4" nominal pipe size. |
| R-A | R1.11 | PSI volumetric examination of essentially 100% of piping welds. On March 25, 2004, FPL received approval (TAC NO. MC0244) to implement an alternative risk informed program that requires essentially 100% volumetric examination for butt welds in class 1 systems. |

As defined by ASME Code Case N-460, essentially 100% means more than 90% of the examination volume of each weld where reduction in coverage is due to interference by another component or part geometry.

**4. Impracticality of Compliance**

Due to the configuration of the welds included within this relief request, it is not possible to meet the examination coverage requirements of the ASME Code, Section XI, 1989 Edition, No Addenda, as clarified by Code Case N-460. Relief is requested in accordance with 10 CFR 50.55a(g)(5)(iii). These areas were found during the 3rd 10-year inservice inspection interval.

When a component has conditions, which limit the examination volume, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This Relief Request has been written to address areas where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

When examined, the welds listed within this request did not receive the required code volume coverage due to their configuration and/or the presence of permanent attachments. These scanning limitations prohibit essentially 100% ultrasonic examination coverage of the required examination volume.

The Tables included in this Relief Request summarize the percent of coverage credited and references specific figures that show the extent of coverage.

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Relief is requested from the ASME Boiler and Pressure Vessel Code required volume as identified in Figure IWB-2500-3, 7, and 8 and IWC-2500-1, 2, 4 and 7, as applicable.

**5. Burden Caused by Compliance**

It is not possible to obtain ultrasonic interrogation of greater than 90% of the required examination volume due to interference caused by configuration and/or permanent attachments. Examinations are performed to the maximum extent possible. The Ultrasonic (UT) techniques for each weld were reviewed to determine if additional coverage could be achieved. For the welds listed in the attached Tables, FPL determined that removal of the obstruction was not possible without significant work, increased radiation exposure, and/or damage to the plant. Additional weld preparation by welding or metal removal is a modification of the examination area requiring significant engineering and construction personnel support. Increased radiation exposure and cost would be incurred in order to perform these modifications.

Radiography is impractical due to the amount of work being performed in the areas on a 24-hour basis. This would result in numerous work-related stoppages and increased exposure due to the shutdown of and startup of other work in the areas. The water must be drained from systems where radiography is performed, which increases the radiation dose rates over a much broader area than the weld being examined. There would be significant burden associated with the performance of weld or area modifications or radiography in order to increase the examination coverage.

**6. Proposed Alternative and Basis for Use**

**Proposed Alternative**

1) Periodic system pressure tests in accordance with ASME Section XI Category B-P, Table IWB-2500-1.

2) Conduct ultrasonic examinations to the maximum extent possible.

3) Regular walkdowns by operations personnel and system engineers are performed on Class 2 systems to check for leakage, piping configuration, and/or damage. During outages, system engineers walkdown Class 1 and 2 systems inside containment. This walkdown is performed to look for system anomalies that could affect plant performance.

**Basis**

When a component has conditions which limit the examination volume, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This Relief Request has been written to address areas where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

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It is not possible to obtain ultrasonic interrogation of greater than 90% of the required examination volume due to interference caused by configuration and/or permanent attachments. Configuration, permanent attachments and/or structural interferences prohibit 100% ultrasonic examination of Code required volume. Additional ultrasonic techniques are employed where practical to achieve the code-required volume. The attached Tables provide the percent of coverage credited and references specific figures that illustrate the extent of coverage for each weld. The thickness and material is identified for each item within the Tables. The angles, Ultrasonic wave modes (Shear-S or Longitudinal-L) that were employed for examination, and impracticality of compliance are listed for each weld. Arrows and lines on the figures illustrate the UT transducer beam direction and extent of the area examined.

10 CFR 50.55a(g)(4) recognizes that throughout the service life of a nuclear power facility, components which are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements set forth in the ASME Code to the extent practical within the limitations of design, geometry and materials of construction of the components.

FPL performed the examinations to the extent possible. Operations personnel and system engineers perform walk downs of every system on a periodic basis looking for leakage or other abnormal conditions. The extent of examination volumes achieved via surface and/or volumetric examinations, combined with the system pressure tests and system walkdowns, provide assurance of an acceptable level of quality and safety.

Category B-B (Table 1)

The figures in ASME Section XI, 1989 Edition, No Addenda, define the examination volume. The examinations were performed in accordance with ASME Section XI, 1989 Edition, No Addenda, Appendix I. The coverage credited identified in Table 1 is based upon the requirements of ASME Section XI, Appendix I.

The UT techniques for each weld were reviewed to determine if additional coverage could be achieved. FPL's procedure requires the examiner to make an attempt to achieve complete coverage by using alternative techniques such as using a smaller wedge thus reducing the distance from the exit point to the front of the wedge, changing angles or reducing the search unit element size. Any alternative equipment is required to be in compliance with the limits specified in the procedure. Alternate techniques were investigated at the time of discovery. The coverage obtained was the maximum practical.

The volumetric examinations of the items listed in Table 1 did not reveal any recordable or reportable flaws in the examination zone or adjacent to any volumetric limitations in accordance with the ASME Code Section XI, 1989 Edition, No Addenda.

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Category B-D (Table 2)

The figures in ASME Section XI, 1989 Edition, No Addenda, define the examination volume. The examinations were performed in accordance with ASME Section XI, 1989 Edition, No Addenda, Appendix I. The coverage credited identified in Table 2 is based upon the requirements of ASME Section XI, Appendix I.

The UT techniques for each weld were reviewed to determine if additional coverage could be achieved. FPL's procedure requires the examiner to make an attempt to achieve complete coverage by using alternative techniques such as using a smaller wedge thus reducing the distance from the exit point to the front of the wedge, changing angles or reducing the search unit element size. Any alternative equipment is required to be in compliance with the limits specified in the procedure. Alternate techniques were investigated at the time of discovery. The coverage obtained was the maximum practical.

The volumetric examinations of the items listed in Table 2 did not reveal any recordable or reportable flaws in the examination zone or adjacent to any volumetric limitations in accordance with the ASME Code Section XI, 1989 Edition, No Addenda.

Category B-J (Table 3)

Category B-J items, with the exception of weld RC-115-FW-3-500E, were examined in accordance with ASME Section XI, Appendix VIII, 1995 Edition with Addenda through 1996 as modified by 10CFR50.55a. Appendix VIII, UT examinations were performed utilizing personnel qualified and procedures demonstrated in accordance with the Performance Demonstration Initiative (PDI) program. Weld RC-115-FW-3-500E (cast material) was examined in accordance with ASME Section XI, 1989 Edition, No Addenda, Appendix I.

With the exception of the three welds examined in 2005 (RC-109-FW-2003, RC-103-FW-2000, RC-103-FW-2002), the figures in ASME Section XI, 1989 Edition, No Addenda, define the examination volume. For the welds examined in 2005, the required examination volume was extended to include, as a minimum, the lower 1/3 weld volume and base material for a distance of 1/2 inch beyond each weld toe as required by FPL's approved alternative risk informed program (TAC NO. MC0244).

The preservice UT examinations of the three welds in 2005 (RC-109-FW-2003, RC-103-FW-2000, RC-103-FW-2002) were performed to satisfy the requirements of ASME Section XI, 1989 Edition, No Addenda, Paragraph IWB-2200. One of the welds (RC-109-FW-2003), does not require volumetric examination by the 1989 Edition, No Addenda, of ASME Section XI. However, this weld is included in FPL's approved alternative risk informed program (TAC NO. MC0244) Class 1 population. FPL's alternative risk informed program only requires volumetric examinations of welds. The risk informed program does not provide guidance for preservice examinations. Therefore, FPL performed a preservice UT examination of weld RC-109-FW-2003.

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All of the piping welds included in Table 3 of this relief request are included in the risk informed population, but not selected for examination. The applicable code requirement column in Table 3 includes both the ASME Section XI, 1989 Edition, No Addenda examination category and item number and FPL's approved alternative risk informed examination category and item number.

The Ultrasonic Testing (UT) techniques for each weld were reviewed to determine if additional coverage could be achieved. FPL's procedure requires the examiner to make an attempt to achieve complete coverage by using alternative techniques such as using a smaller wedge thus reducing the distance from the exit point to the front of the wedge, changing angles or reducing the search unit element size. Any alternative equipment is required to be in compliance with the limits specified in the qualified procedure. Alternate techniques were investigated at the time of discovery.

In cases where austenitic materials were examined in accordance with Appendix VIII, the coverage credited identified in Table 3 is limited when access can only be obtained from one side. It should be noted that UT was performed through the maximum possible of the Code examination volume; however, the PDI Appendix VIII procedure used is not qualified for the detection of flaws on the far side of the single sided access examinations of austenitic piping welds. The techniques employed for the single sided examinations provided for a best effort examination. The coverage obtained was the maximum practical.

For Weld RC-115-FW-3-500E (cast material) examined in accordance with ASME Section XI, 1989 Edition, No Addenda, Appendix III, the coverage credited identified in Table 3 is limited because access can only be obtained from one side. Appendix III, Paragraph III-4420 requires "the examination shall be performed using sufficiently long examination beam path coverage of the required examination volume in two-beam path directions." The coverage credited identified in Table 3 for weld RC-115-FW-3-500E is based upon the requirements of Appendix III, Paragraphs III-4420 and III-4430.

Because the inservice examinations of the welds included in this relief request were performed prior to the approval of FPL's alternative risk informed program for Class 1 piping, surface examinations were performed as required by ASME Section XI, 1989 Edition, No Addenda. In all cases the surface examinations were not limited and 100 percent of the Code required surface area was examined.

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For welds RC-109-FW-2003, RC-103-FW-2000, and RC-103-FW-2002, examinations performed during the replacement process included in-process and final surface examinations, and final radiography (RT) in accordance with the requirements of the 1992 Edition of ASME Section III. As allowed by IWB-2200, the ASME Section III final surface examination was used to satisfy the preservice surface examination requirement. The surface and radiographic examinations were not limited. Final installation RT and surface examinations of the welds revealed no recordable or reportable flaws in the examination zone or adjacent to any UT limitations. The acceptable surface and RT results were obtained prior to the preservice UT examinations being performed. The preservice UT examinations did not reveal any recordable or reportable flaws in the examination zone or adjacent to any limitations in accordance with ASME Code Section XI, 1989 Edition, No Addenda.

The inservice surface examinations of the items listed in Table 3 did not reveal any recordable or reportable flaws in the examination zone or adjacent to any volumetric limitations in accordance with the ASME Code Section XI, 1989 Edition, No Addenda. The inservice UT examinations of the items listed in Table 3 did not reveal any recordable or reportable flaws in the examination zone or adjacent to any limitations in accordance with ASME Code Section XI, 1989 Edition, No Addenda.

Categories C-A and C-B (Tables 4 and 5)

The figures in ASME Section XI, 1989 Edition, No Addenda, define the examination volume. The examinations were performed in accordance with ASME Section XI, 1989 Edition, No Addenda, Appendix I. Appendix I, Paragraph I-2200, directs that the examination of vessels less than or equal to 2 inches thick be performed in accordance with Appendix III. Appendix III, Paragraph III-4420 requires "the examination shall be performed using sufficiently long examination beam path coverage of the required examination volume in two-beam path directions." The coverage credited identified in Tables 4 and 5 is based upon the requirements of Appendix III, Paragraph III-4420 and III-4430

The UT was performed utilizing personnel qualified and procedures demonstrated in accordance with the PDI program. The PDI generic procedure for ferritic piping welds has been qualified for the detection and length sizing of circumferentially oriented flaw indications where single or dual side access is available and the detection of axially oriented flaws where dual side access is available or if the flaw indications are located on the near side of a single side access configuration. In all cases, only one side of the weld was accessible for examination.

The UT techniques for each weld were reviewed to determine if additional coverage could be achieved. FPL's procedure requires the examiner to make an attempt to achieve complete coverage by using alternative techniques such as using a smaller wedge thus reducing the distance from the exit point to the front of the wedge, changing angles or reducing the search unit element size. Any alternative equipment is required to be in compliance with the limits specified in the procedure. Alternate techniques were

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investigated at the time of discovery. The coverage obtained was the maximum practical.

The volumetric examinations of the items listed in Tables 4 and 5 did not reveal any recordable or reportable flaws in the examination zone or adjacent to any volumetric limitations in accordance with the ASME Code Section XI, 1989 Edition, No Addenda.

Categories C-F-1 and C-F-2 (Tables 6 and 7)

Category C-F-1 and C-F-2 items were examined in accordance with ASME Section XI, Appendix VIII, Supplements 2 and 3, 1995 Edition with Addenda through 1996. Appendix VIII, Supplement 2 and 3 UT examinations were performed utilizing personnel qualified and procedures demonstrated in accordance with the PDI program.

The examination figures of ASME Section XI, 1989 Edition, No Addenda, define the examination volume required.
The UT techniques for each weld were reviewed to determine if additional coverage could be achieved. FPL's procedures require the examiner to make an attempt to achieve complete coverage by using alternative techniques such as using a smaller wedge thus reducing the distance from the exit point to the front of the wedge, changing angles or reducing the search unit element size. Any alternative equipment is required to be in compliance with the limits specified in the qualified procedure. Alternate techniques were investigated at the time of discovery.

In cases where austenitic materials were examined, the coverage credited in Table 6 is limited when access can only be obtained from one side. It should be noted that UT was performed through the maximum possible of the Code examination volume; however, the PDI Appendix VIII procedure used is not qualified for the detection of flaws on the far side of the single sided access examinations of austenitic piping welds. The techniques employed for the single sided examinations provided for a best effort examination. The coverage obtained was the maximum practical.

Surface examinations were performed of all the items listed in Tables 6 and 7 and were not limited. In all cases, 100 percent of the Code required surface area was examined.

The surface and volumetric examinations of all the items listed in Tables 6 and 7 did not reveal any recordable or reportable flaws in the examination zone or adjacent to any volumetric limitations in accordance with the ASME Code Section XI, 1989 Edition, No Addenda.

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## 7. Duration of Proposed Alternative

Third Inservice Inspection Interval
February 11, 1998 to February 10, 2008

## 8. References

10CFR50.55a

ASME Section III, "Rules For Construction of Nuclear Power Plant Components," 1992 Edition, No Addenda

ASME Section XI, "Rules For Inservice Inspection of Nuclear Power Plant Components," 1989 Edition, No Addenda

ASME Section XI, "Rules For Inservice Inspection of Nuclear Power Plant Components," Appendix VIII, 1995 Edition with Addenda through 1996.

ASME Section XI, Division 1, Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1"

ASME Section V, "Nondestructive Examination," 1989 Edition, No Addenda

NRC SER Dated March 25, 2005, "St. Lucie Nuclear Plant, Unit No. 1-Relief Request No. 19 Regarding Risk-Informed Inservice Inspection Program (TAC NO. MC0244)

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Table 1

| Category B-B | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID<br>Thickness<br>Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Head to Stay Cylinder, Steam Generator 1A Primary Side | 1-SGA-W4<br>7"<br>Carbon Steel with Stainless Steel Clad | 2005 | Exam Category B-B<br>Item No. B2.31<br>Fig. IWB 2500-3<br><br>58% volume coverage | 0L<br>30S<br>45S<br>60S | 1,2 | Inservice examination limited along length of weld due to one side configuration. |

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Table 2

| Category B-D | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID, Thickness, Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Inlet Nozzle to Shell, Steam Generator 1B Primary Side | 1-SGB-W5<br>6"<br>Carbon Steel with Stainless Steel Clad | 2001 | Exam Category B-D<br>Item No. B3.130<br>Fig. IWB 2500-7(c)<br><br>85% volume coverage | 0L<br>30S<br>45S<br>60S | 1,3 | Inservice examination limited along length of weld due to one side configuration. |
| Inlet Nozzle to Shell, Steam Generator 1A Primary Side | 1-SGA-W5<br>6"<br>Carbon Steel with Stainless Steel Clad | 2005 | Exam Category B-D<br>Item No. B3.130<br>Fig. IWB 2500-7(c)<br><br>85% volume coverage | 0L<br>30S<br>45S<br>60S | 1,3 | Inservice examination limited along length of weld due to one side configuration. |

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Table 3

| Category B-J/R-A | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID<br>Diameter-Schedule<br>Material | Year<br>Of<br>Exam | Applicable Code<br>Requirement and<br>Coverage Credited | Angle(s)/<br>Wave<br>Mode | Fig. | Impracticality of Compliance |
| Tee to Pipe | SI-112-1-SW-5<br>(6"-160)<br>Stainless Steel | 1999 | Exam Category B-J/R-A<br>Item No. B9.11/R1.11<br>Fig. IWB-2500-8<br><br>81.5% volume coverage | 45S<br>60S<br>45L<br>60L | 4 | Inservice examination limited by configuration. Examination complete of the pipe side and access is limited from tee side in area of radius. |
| Reducer to Tee | SI-112-1-SW-6<br>(6"-160)<br>Stainless Steel | 1999 | Exam Category B-J/R-A<br>Item No. B9.11/R1.11<br>Fig. IWB-2500-8<br><br>81.5% volume coverage | 45S<br>60S<br>45L<br>60L | 5 | Inservice examination limited by configuration. Examination complete of the reducer side and access is limited from tee side in area of radius. |
| Pipe to Tee | SI-148-2-SW-4<br>(6"-160)<br>Stainless Steel | 1999 | Exam Category B-J/R-A<br>Item No. B9.11/R1.11<br>Fig. IWB-2500-8<br><br>50% volume coverage | 45S<br>60S<br>45L<br>60L | 6 | Inservice examination limited by configuration. Examination complete of the pipe side and access is not available for examination from tee side due to weld crown and tee configuration. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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Table 3

| Category B-J/R-A | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID<br>Diameter-Schedule<br>Material | Year<br>Of<br>Exam | Applicable Code<br>Requirement and<br>Coverage Credited | Angle(s)/<br>Wave<br>Mode | Fig. | Impracticality of Compliance |
| Elbow to Valve | SI-148-FW-5<br>(12"-160)<br>Stainless Steel | 1999 | Exam Category B-J/R-A<br>Item No. B9.11/R1.11<br>Fig. IWB-2500-8<br><br>50% volume coverage | 45S<br>45L | 7 | Inservice examination limited by configuration. Examination is complete of the elbow side and access is not available from valve side due to taper. Scanning was performed across weld from elbow side. |
| Valve to Elbow | RC-151-FW-1<br>(12"-160)<br>Stainless Steel | 1999 | Exam Category B-J/R-A<br>Item No. B9.11/R1.11<br>Fig. IWB-2500-8<br><br>50% volume coverage | 45S<br>45L | 8 | Inservice examination limited by configuration. Examination is complete of the elbow side and access is not available from valve side due to taper. Scanning was performed across weld from elbow side. |
| Valve to Pipe | SI-148-FW-1<br>(12"-160)<br>Stainless Steel | 1999 | Exam Category B-J/R-A<br>Item No. B9.11/R1.11<br>Fig. IWB-2500-8<br><br>50% volume coverage | 45S<br>45L | 9 | Inservice examination limited by configuration. Examination is complete of the pipe side and access is not available from valve side due to taper. Scanning was performed across weld from pipe side. |

**St. Lucie Unit 1**
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Table 3

| Category B-J/R-A | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID Diameter-Schedule Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Pump (Cast) to Safe-end (Cast) | RC-115-FW-3-500E (30"-3.5") Cast Stainless Steel | 2002 | Exam Category B-J/R-A Item No. B9.11/R1.11 Fig. IWB-2500-8<br><br>50% volume coverage | 45L | 10 | Inservice examination limited by configuration. Examination complete from the safe-end side and no access from pump side due to pump configuration. Circumferential scan not limited. |
| Valve to Pipe | RC-109-FW-2003 (3"-160) Stainless Steel | 2005 | Exam Category B-J/R-A Item No. B9.21/R1.11 Fig. IWB-2500-8<br><br>50% volume coverage | 45S<br>60S<br>70S | 11 | PSI examination limited by configuration. Examination complete of the pipe side including best effort examination of valve side through weld material. No access for scanning of the valve side due to weld crown and taper. |
| Tee to Nozzle | RC-103-FW-2000 (4"-160) Stainless Steel | 2005 | Exam Category B-J/R-A Item No. B9.11/R1.11 Fig. IWB-2500-8<br><br>84.5% volume coverage | 45S<br>60S<br>60L | 12 | PSI examination limited by configuration. Examination complete of the nozzle side and scanning limited from the tee side in area of radius. Best effort examination of tee side in area of radius performed through weld material. |

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Table 3

| Category B-J/R-A | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID<br>Diameter-Schedule<br>Material | Year<br>Of<br>Exam | Applicable Code<br>Requirement and<br>Coverage Credited | Angle(s)/<br>Wave<br>Mode | Fig. | Impracticality of Compliance |
| Tee to Pipe | RC-103-FW-2002<br>(4"-160)<br>Stainless Steel | 2005 | Exam Category B-J/R-A<br>Item No. B9.11/R1.11<br>Fig. IWB-2500-8<br><br>84.5% volume coverage | 45S<br>60S<br>60L | 13 | PSI examination limited by configuration. Examination complete of the pipe side and scanning limited from the tee side in area of radius. Best effort examination of tee side in area of radius performed through weld material. |

**St. Lucie Unit 1**
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Table 4

| Category C-A | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID Thickness Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Flange to Shell, Shutdown Cooling Heat Exchanger | 2-2701<br>1.4"<br>Carbon Steel with Stainless Steel Clad | 2004 | Exam Category C-A<br>Item No. C1.10<br>Fig. IWC 2500-1<br><br>36% volume coverage | 45S<br>60S | 14 | Inservice examination limited by weld crown, taper, and flange configuration. Axial scan from the shell side only. Circumferential scan limited by weld crown, taper, and flange configuration. |
| Body to Tubesheet, Shutdown Cooling Heat Exchanger | 2-2702<br>1.4"<br>Carbon Steel with Stainless Steel Clad | 2004 | Exam Category C-A<br>Item No. C1.30<br>Fig. IWC 2500-2<br><br>40% volume coverage | 45S<br>60S | 15 | Inservice examination limited by weld crown and tubesheet configuration. Axial scan from the body side only. Circumferential scan limited by weld crown and tubesheet configuration. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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Table 5

| Category C-B | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID Thickness Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Outlet Nozzle to Vessel, Shutdown Cooling Heat Exchanger | 2-2742-1<br>1.4"<br>Carbon Steel with Stainless Steel Clad | 2004 | Exam Category C-B<br>Item No. C2.21<br>Fig. IWC 2500-4(b)<br><br>50% volume coverage | 45S<br>60S | 16 | Inservice examination limited to one sided access due to nozzle configuration. Axial scan from the shell side only. Circumferential scan limited by weld taper. |
| Inlet Nozzle to Vessel, Shutdown Cooling Heat Exchanger | 2-2741-1<br>1.4"<br>Carbon Steel with Stainless Steel Clad | 2004 | Exam Category C-B<br>Item No. C2.21<br>Fig. IWC 2500-4(b)<br><br>50% volume coverage | 45S<br>60S | 16 | Inservice examination limited to one sided access due to nozzle configuration. Axial scan from the shell side only. Circumferential scan limited by weld taper. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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Table 6

| Category C-F-1 | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID Diameter-Schedule Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Tee to Reducer | SI-213-1-SW-2<br>(6"-120)<br>Stainless Steel | 2001 | Exam Category C-F-1<br>Item No. C5.11<br>Fig. IWC-2500-7(a)<br><br>50% volume coverage | 45S<br>70S<br>70L | 17 | Inservice examination limited by configuration. Examination complete of the reducer side and best effort examination of tee side performed through weld material. No access for scanning from tee side due to weld crown, taper, and tee configuration. |
| Pipe to Valve | SI-210-FW-5<br>(4"-80)<br>Stainless Steel | 2001 | Exam Category C-F-1<br>Item No. C5.21<br>Fig. IWC-2500-7(a)<br><br>50% volume coverage | 45S<br>70S<br>70L | 18 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of valve side performed through weld material. No access for scanning from valve side due to weld crown, taper, and valve configuration. |
| Valve to Pipe | SI-129-FW-1<br>(6"-160)<br>Stainless Steel | 2002 | Exam Category C-F-1<br>Item No. C5.11<br>Fig. IWC-2500-7(a)<br><br>50% volume coverage | 45S<br>60S<br>60L | 19 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of valve side performed through weld material. No access for scanning from valve side due to valve taper, and valve configuration. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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Table 6

| Category C-F-1 | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID Diameter-Schedule Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Pipe to Valve | SI-113-FW-9<br>(6"-160)<br>Stainless Steel | 2002 | Exam Category C-F-1<br>Item No. C5.11<br>Fig. IWC-2500-7(a)<br><br>50% volume coverage | 45S<br>60S<br>60L | 20 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of valve side performed through weld material. No access for scanning from valve side due to valve taper, and valve configuration. |
| Tee to Pipe | SI-212-FW-1A<br>(6"-160)<br>Stainless Steel | 2002 | Exam Category C-F-1<br>Item No. C5.11<br>Fig. IWC-2500-7(a)<br><br>50% volume coverage | 45S<br>60S<br>60L | 21 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of tee side performed through weld material. No access for scanning from tee side due to taper, and tee configuration. |
| Pipe to Valve | SI-212-FW-1<br>(6"-160)<br>Stainless Steel | 2002 | Exam Category C-F-1<br>Item No. C5.11<br>Fig. IWC-2500-7(a)<br><br>50% volume coverage | 45S<br>60S<br>60L | 22 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of valve side performed through weld material. No access for scanning from valve side due to valve taper, and valve configuration. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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Table 6

| Category C-F-1 | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID Diameter-Schedule Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Valve to Pipe | SI-105-FW-1 (6"-160) Stainless Steel | 2002 | Exam Category C-F-1 Item No. C5.11 Fig. IWC-2500-7(a) 50% volume coverage | 45S 60S 60L | 23 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of valve side performed through weld material. No access for scanning from valve side due to valve taper, and valve configuration. |
| Valve to Pipe | SI-213-FW-2 (6"-120) Stainless Steel | 2004 | Exam Category C-F-1 Item No. C5.11 Fig. IWC-2500-7(a) 50% volume coverage | 45S 60S 60L | 24 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of limited amount of valve side performed through weld material. No access for scanning from valve side due to weld crown, valve taper, and valve configuration. |
| Valve to Pipe | SI-210-FW-4 (4"-80) Stainless Steel | 2004 | Exam Category C-F-1 Item No. C5.21 Fig. IWC-2500-7(a) 50% volume coverage | 45S 70S | 25 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of limited amount of valve side performed through weld material. No access for scanning from valve side due to weld crown, valve taper, and valve configuration. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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Table 6

| Category C-F-1 | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID<br>Diameter-Schedule<br>Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Valve to Pipe | SI-209-FW-2<br>(3"-160)<br>Stainless Steel | 2007 | Exam Category C-F-1<br>Item No. C5.21<br>Fig. IWC-2500-7(a)<br><br>50% volume coverage | 45S<br>60S<br>70S | 26 | Inservice examination limited by configuration. Examination complete of the pipe side and best effort examination of limited amount of valve side performed through weld material. No access for scanning from valve side due to valve taper and valve configuration. |
| Reducer to Tee | SI-210-FW-8<br>(4"-80)<br>Stainless Steel | 2007 | Exam Category C-F-1<br>Item No. C5.21<br>Fig. IWC-2500-7(a)<br><br>77% volume coverage | 45S<br>60S<br>70S | 27 | Inservice examination limited by configuration. Examination complete of the reducer side and limited of the tee side in area of radius. Best effort examination of tee side in area of radius performed through weld material. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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Table 6

| Category C-F-1 | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID Diameter-Schedule Material | Year Of Exam | Applicable Code Requirement and Coverage Credited | Angle(s)/ Wave Mode | Fig. | Impracticality of Compliance |
| Pipe to Elbow | SI-211-11-SW-2<br>(3"-160)<br>Stainless Steel | 2007 | Exam Category C-F-1<br>Item No. C5.21<br>Fig. IWC-2500-7(a)<br><br>68% volume coverage | 45S<br>60S<br>70S | 28 | Inservice examination limited by configuration . Examination limited of the elbow side in area of intrados. Examination limited of the pipe side in area of welded vent line. Best effort examination from pipe side in area of elbow intrados and from elbow side in area of welded vent line performed through weld material. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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Table 7

| Category C-F-2 | | | | | | |
|---|---|---|---|---|---|---|
| ASME Code Component | Component ID<br>Diameter-Schedule<br>Material | Year<br>Of<br>Exam | Applicable Code<br>Requirement and<br>Coverage Credited | Angle(s)/<br>Wave<br>Mode | Fig. | Impracticality of Compliance |
| Weldolet to Pipe | MS-1-1-SW-18<br>(8"-160)<br>Carbon Steel | 2002 | Exam Category C-F-2<br>Item No. C5.51<br>Fig. IWC-2500-7(a)<br><br>75% volume coverage | 45S<br>60S<br>70S | 29 | Inservice examination limited by configuration. Examination from the pipe side not limited and no access for scanning from weldolet side due to weld crown and taper. Coverage credited of weldolet side from pipe side through weld material. |

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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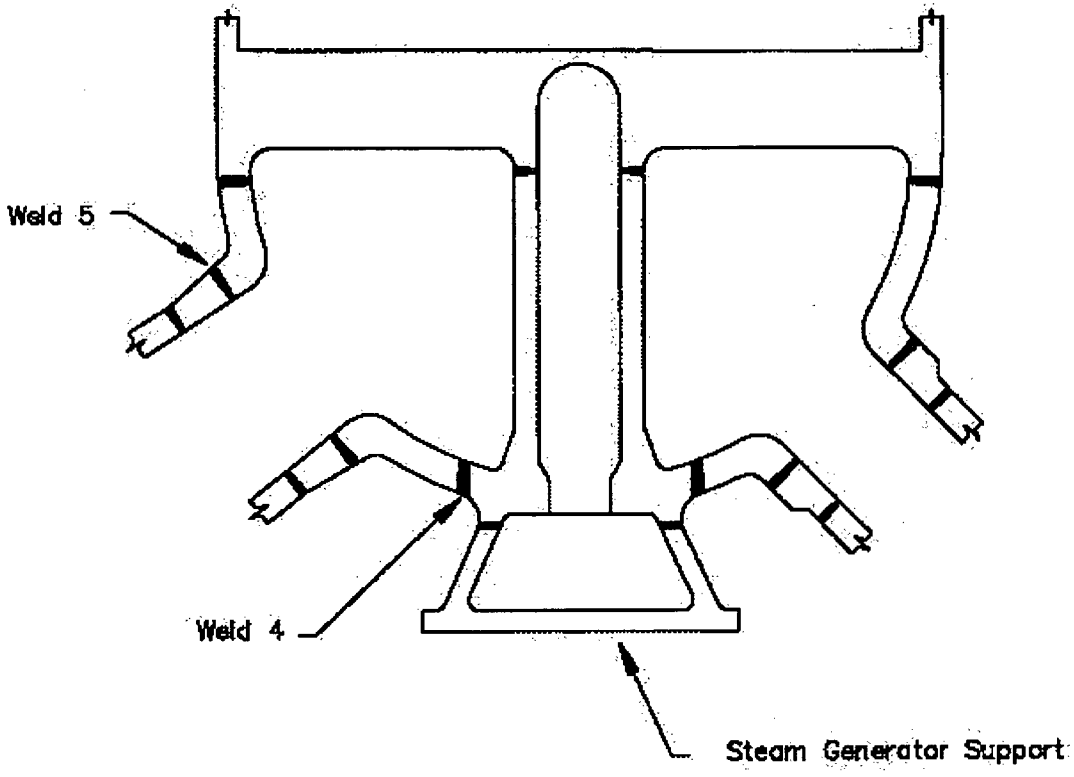
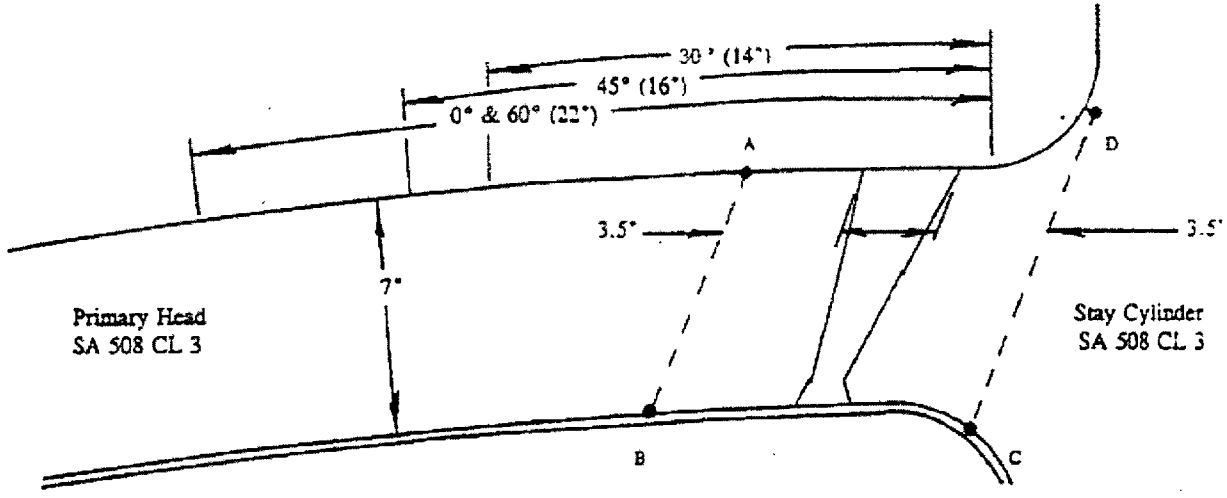


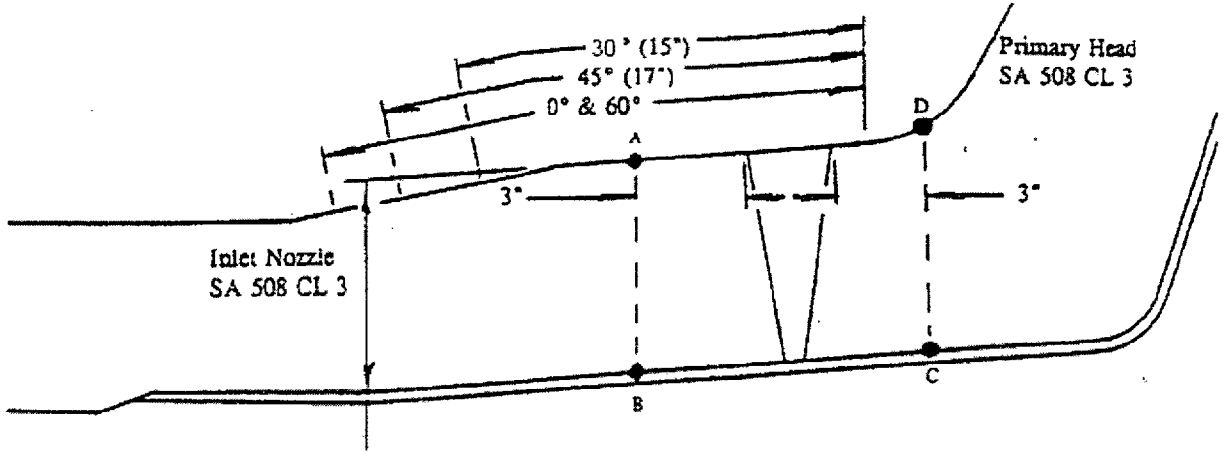

Steam Generator Primary Side
Figure 1

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



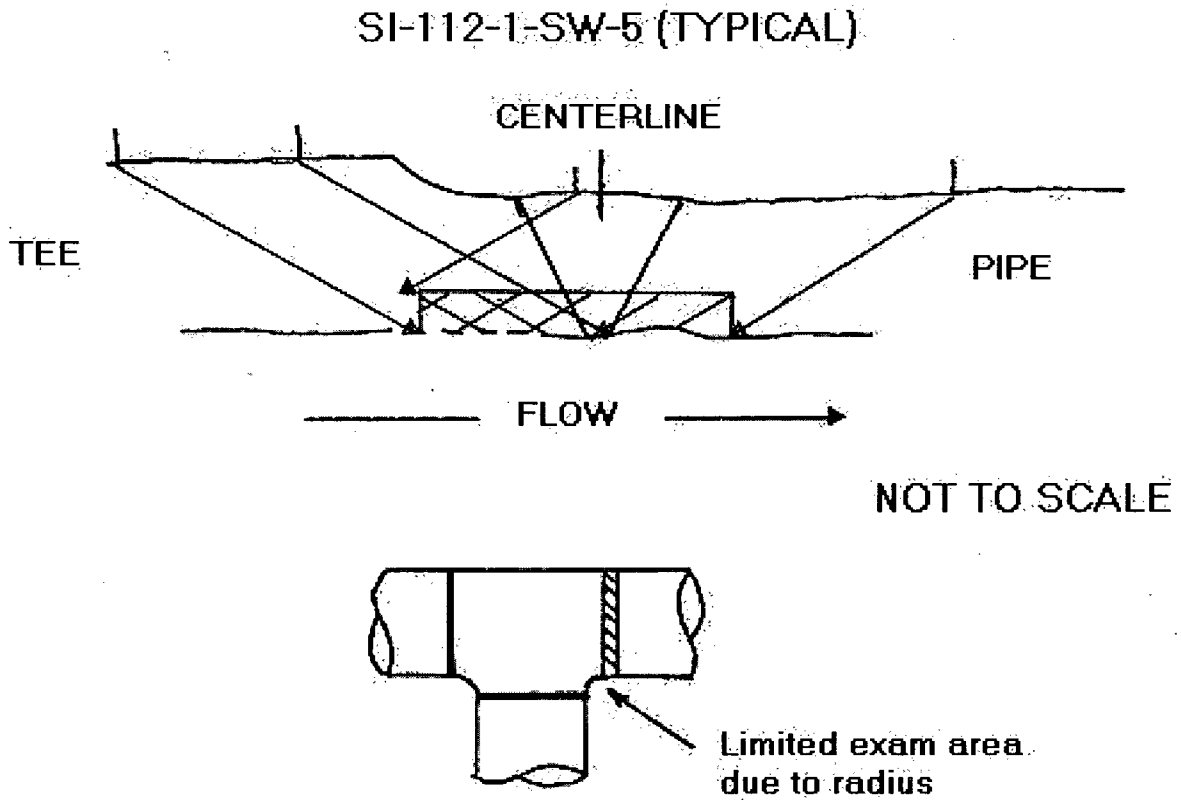

1-SGA-W4
Figure 2

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




1-SGA-W5/1-SGB-W5
Figure 3

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




SI-112-1-SW-5
Figure 4

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
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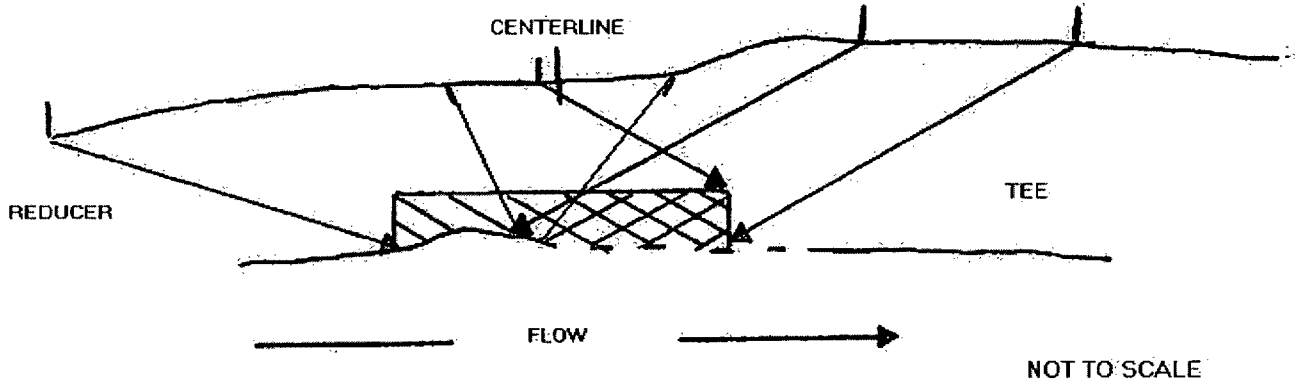
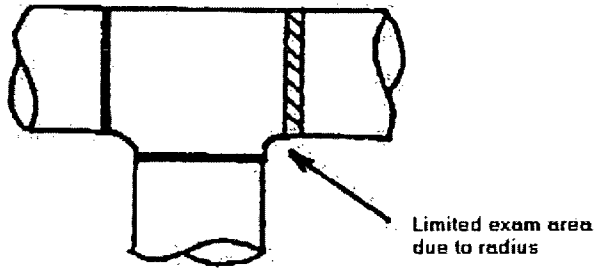
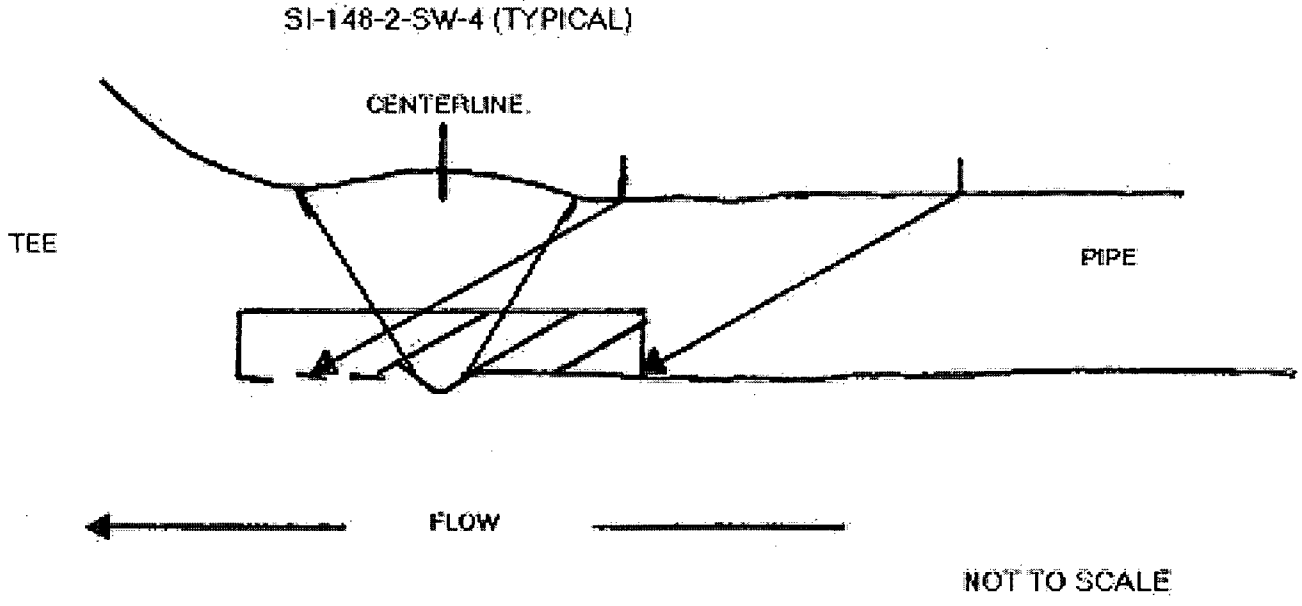
SI-112-1-SW-6 (TYPICAL)



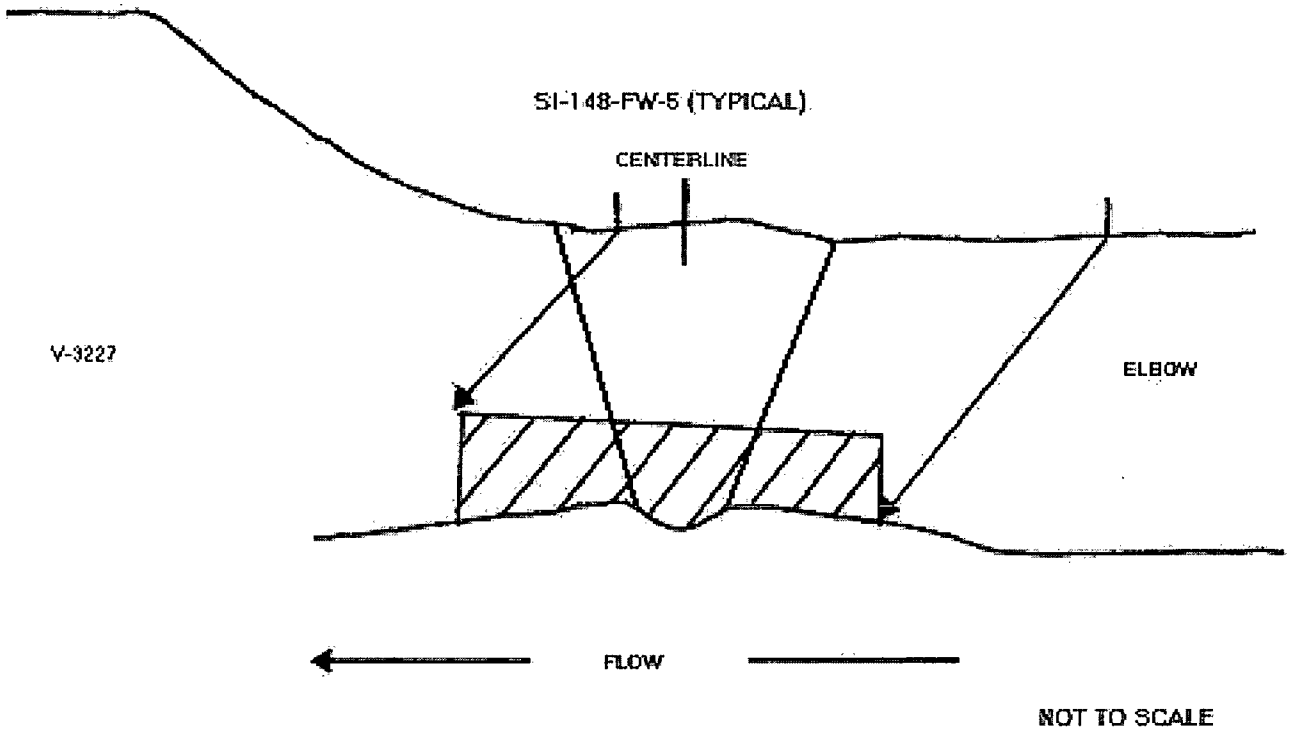

SI-112-1-SW-6
Figure 5

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



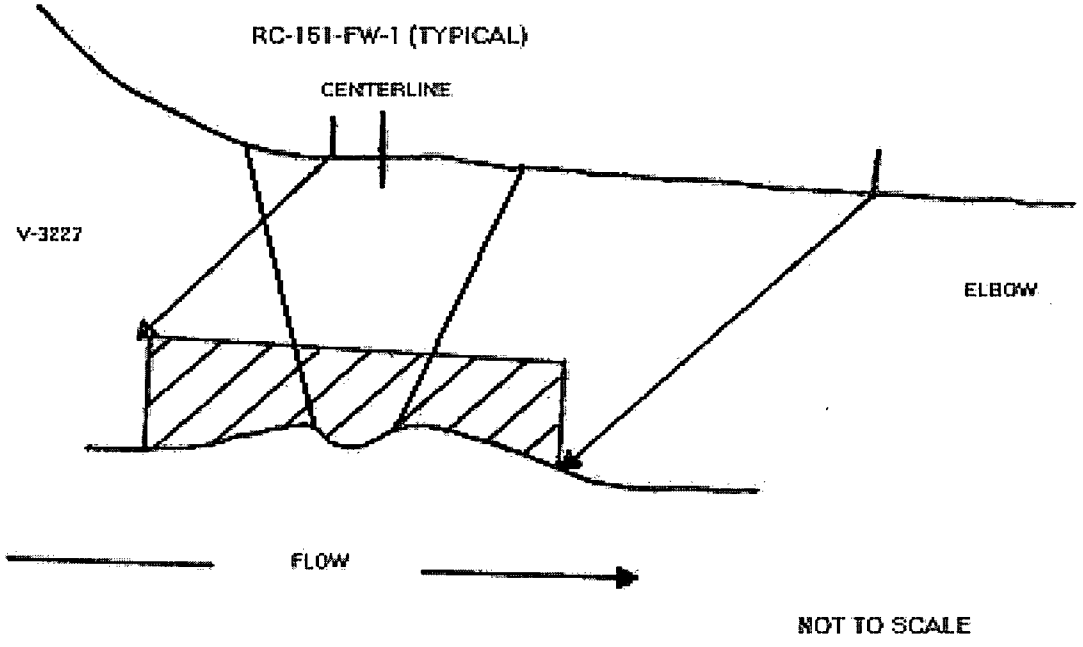

SI-148-2-SW-4
Figure 6

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



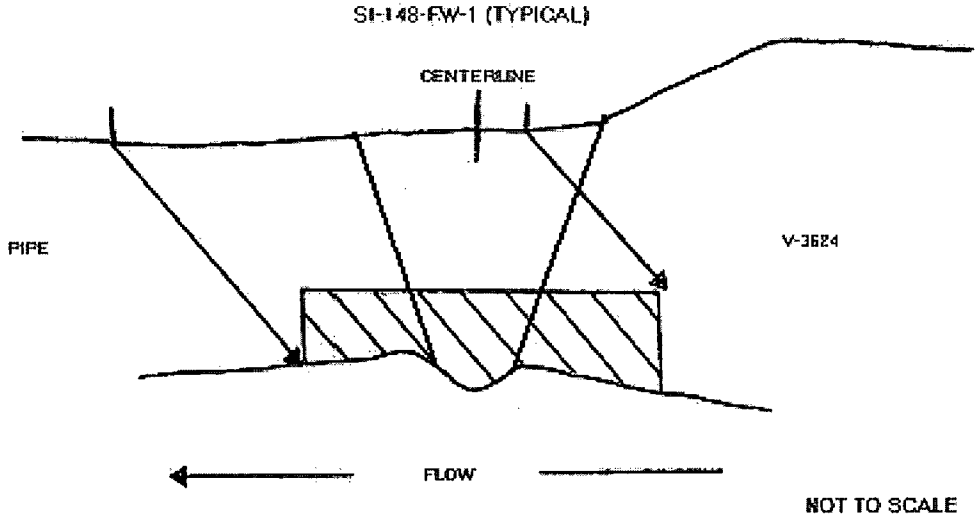

SI-148-FW-5
Figure 7

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



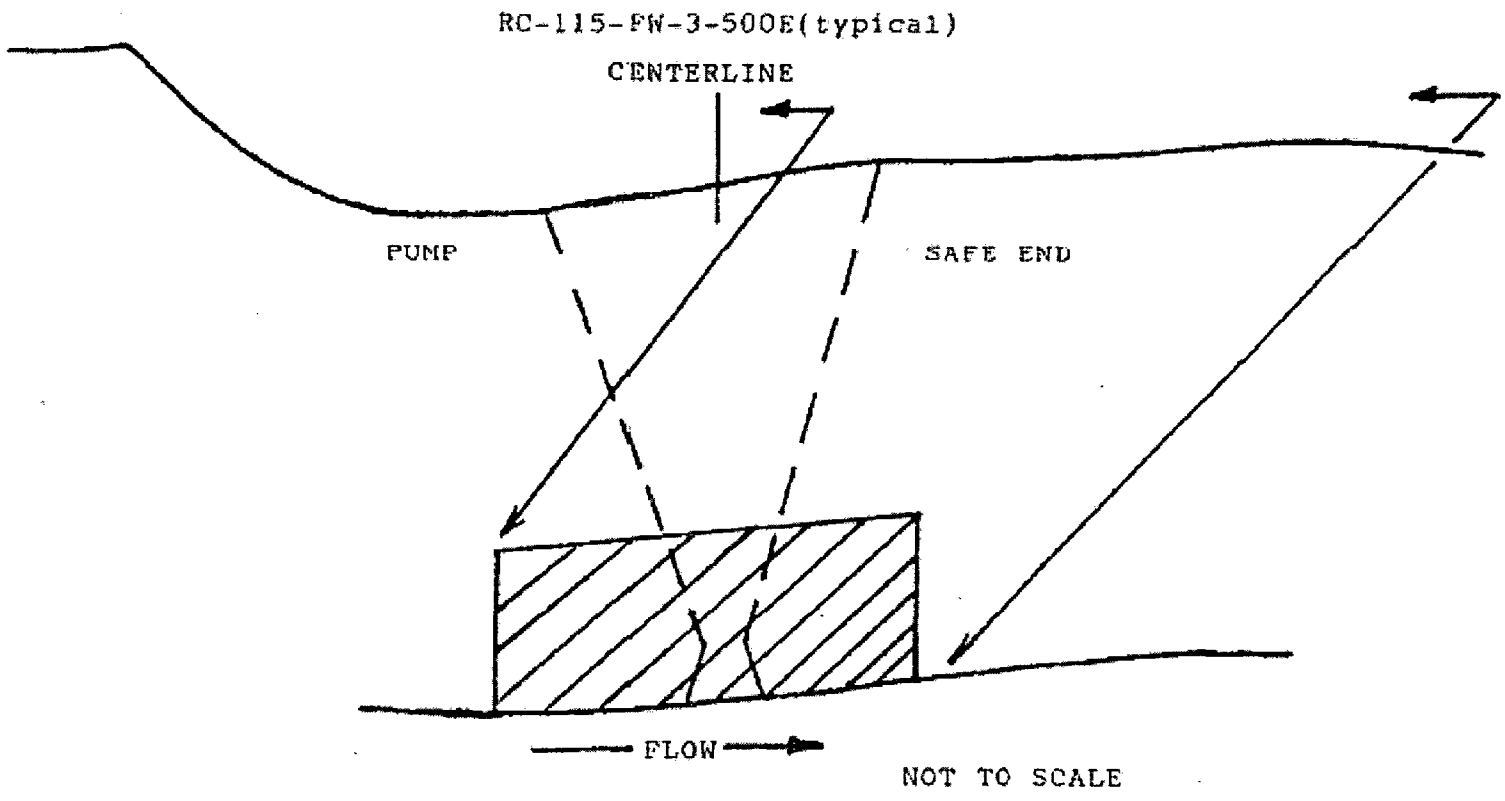

RC-151-FW-1
Figure 8

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



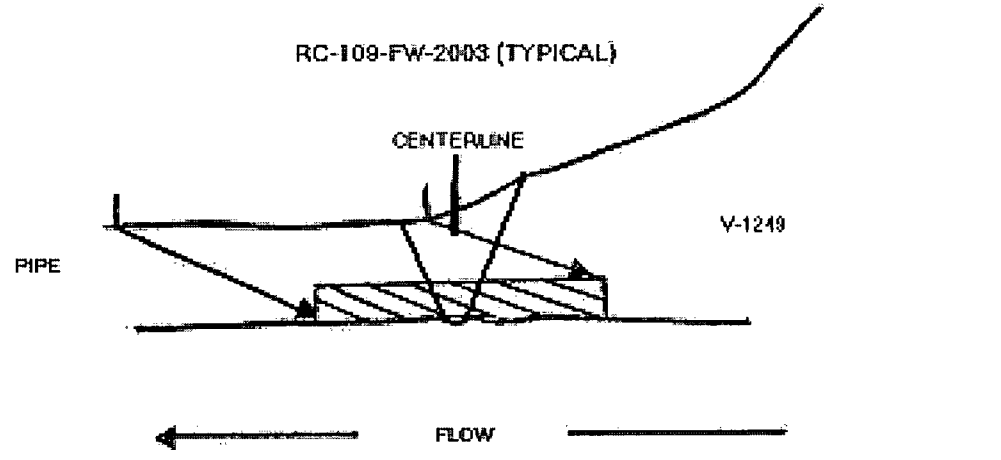

SI-148-FW-1
Figure 9

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




RC-115-FW-3-500E
Figure 10

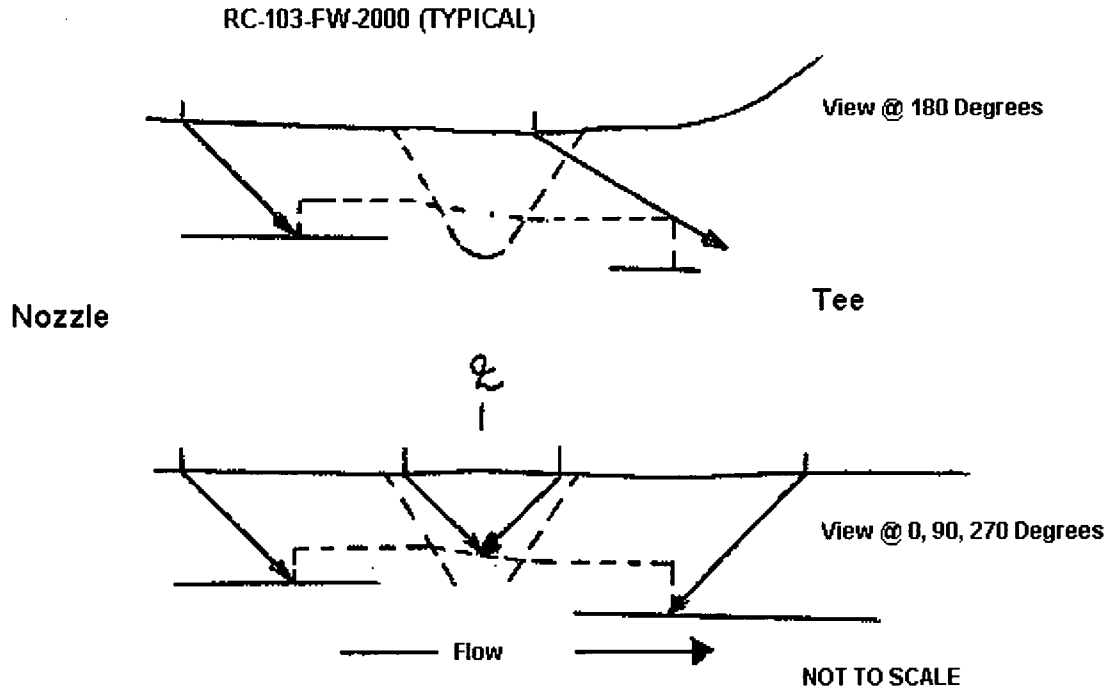
**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




NOT TO SCALE

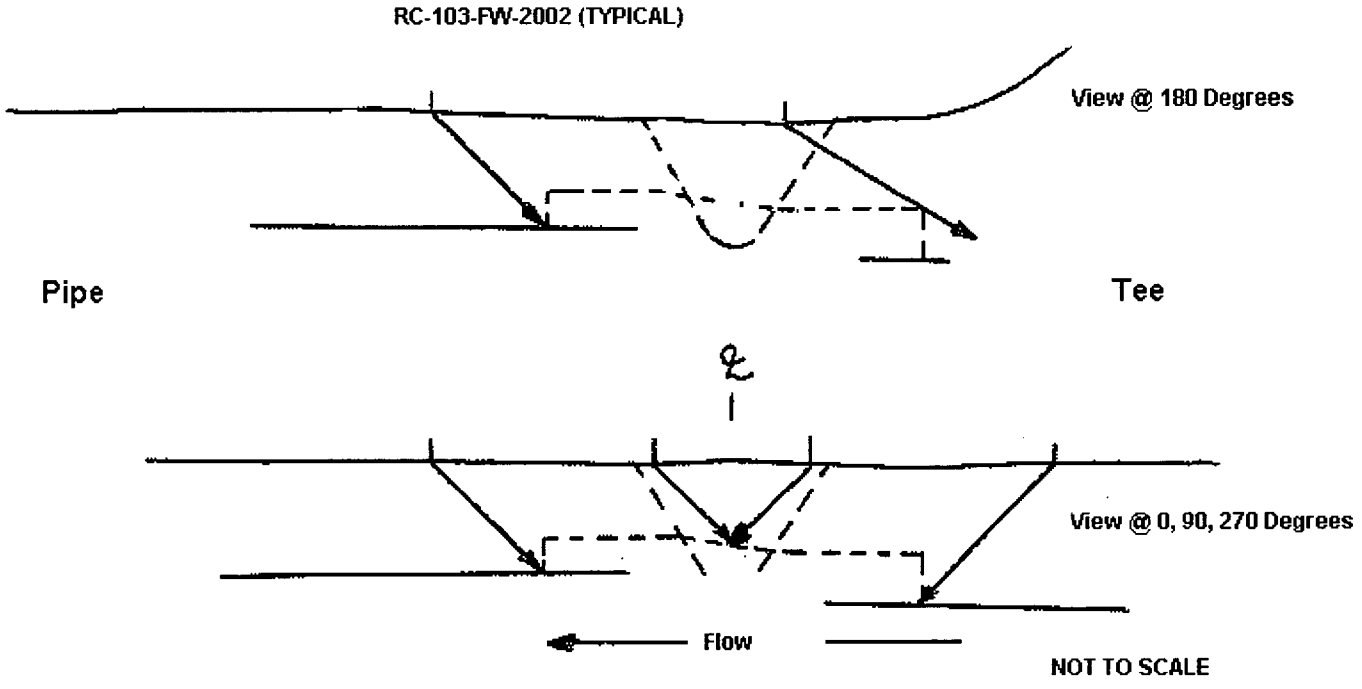
RC-109-FW-2003
Figure 11

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



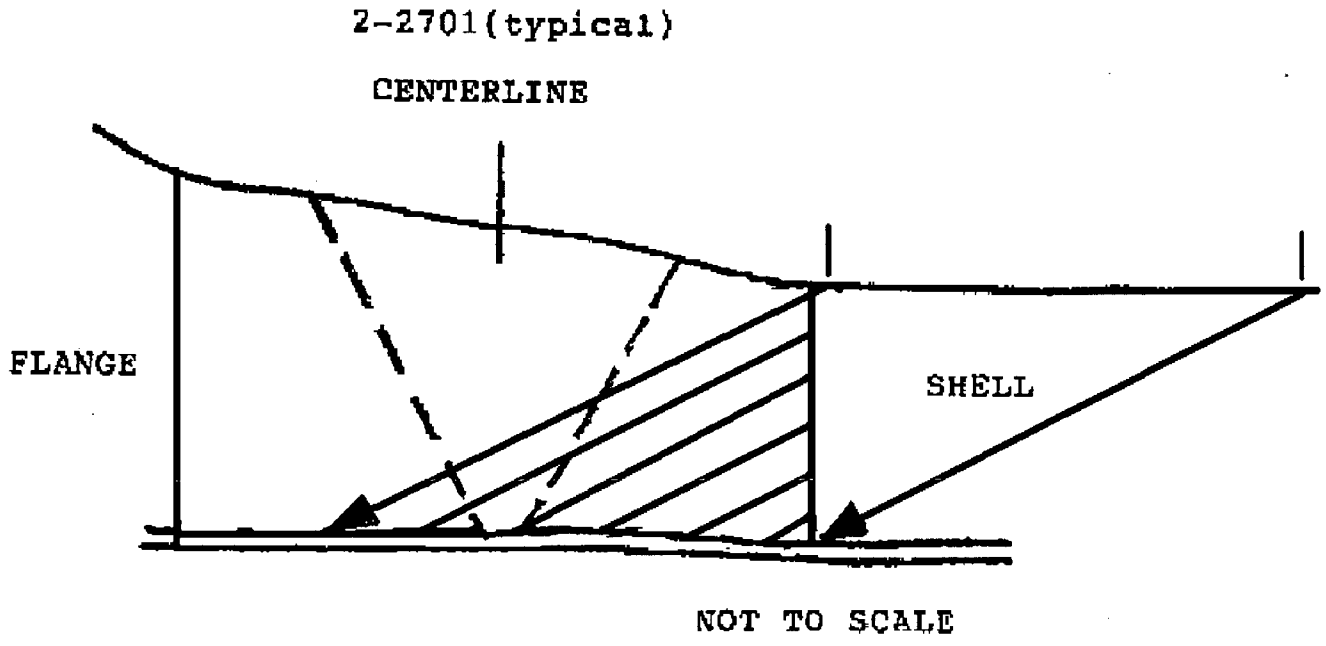

RC-103-FW-2000
Figure 12

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



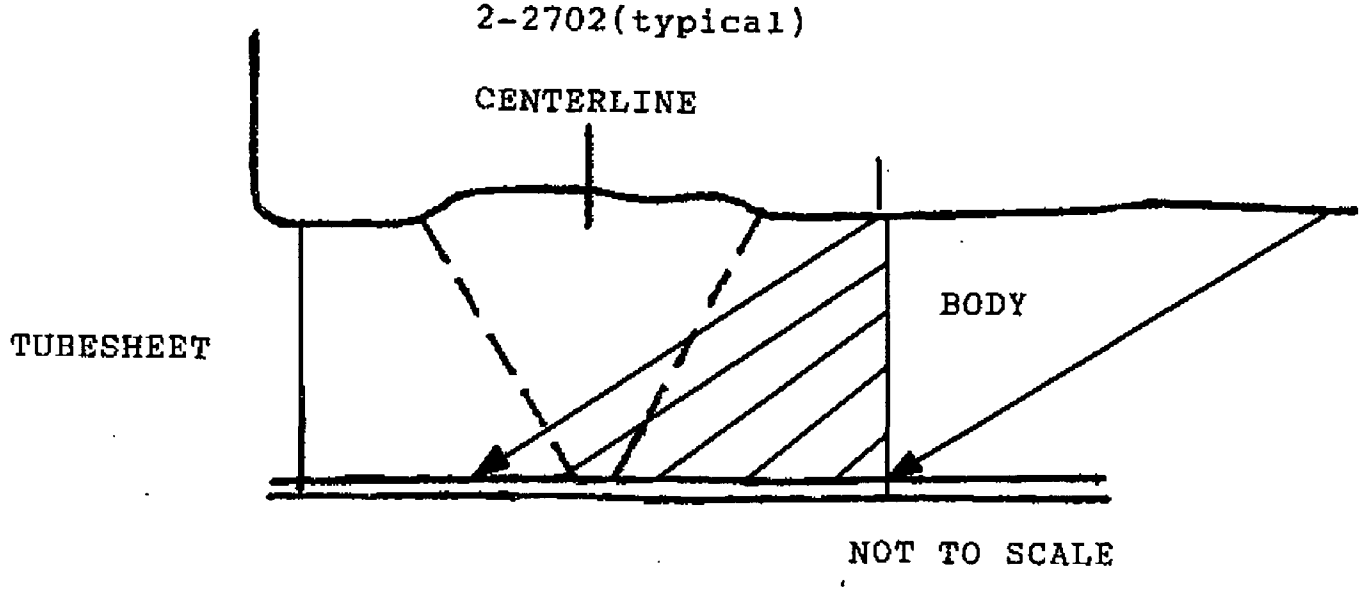

RC-103-FW-2002
Figure 13

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



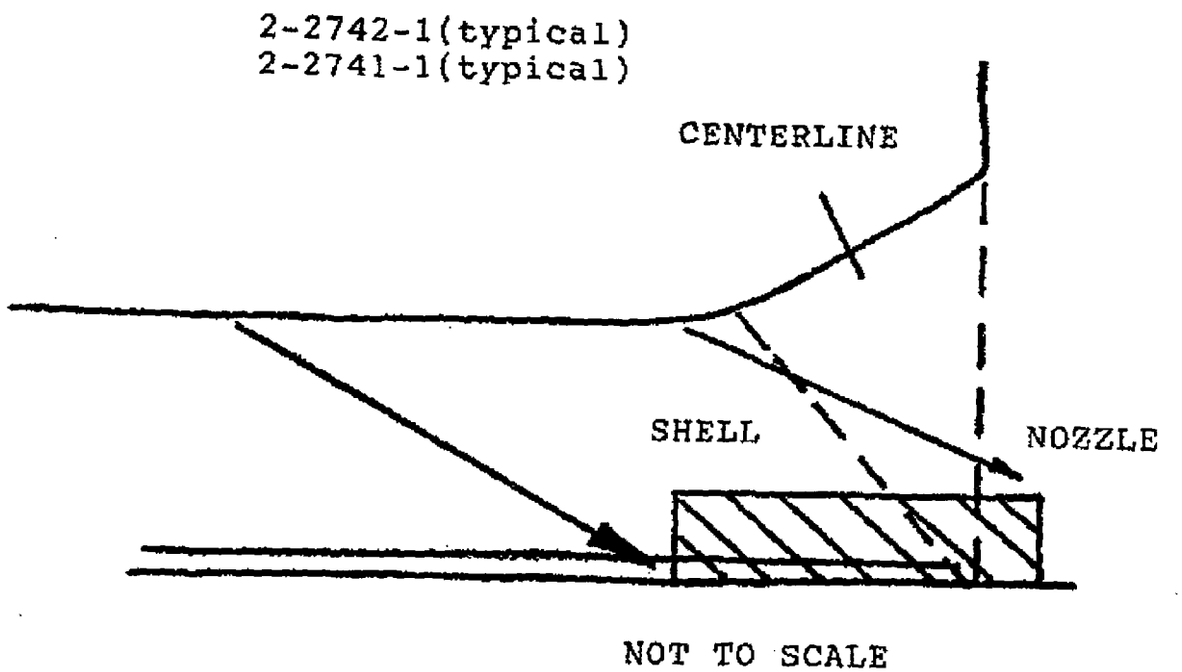

2-2701
Figure 14

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



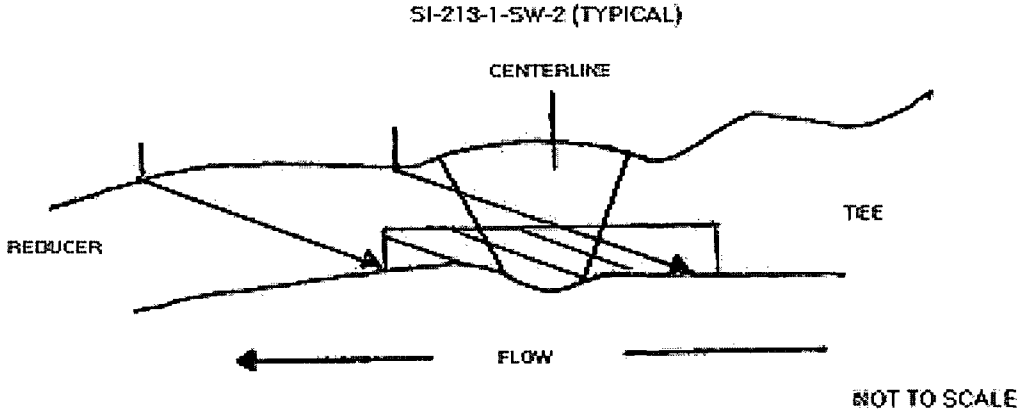

2-2702
Figure 15

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



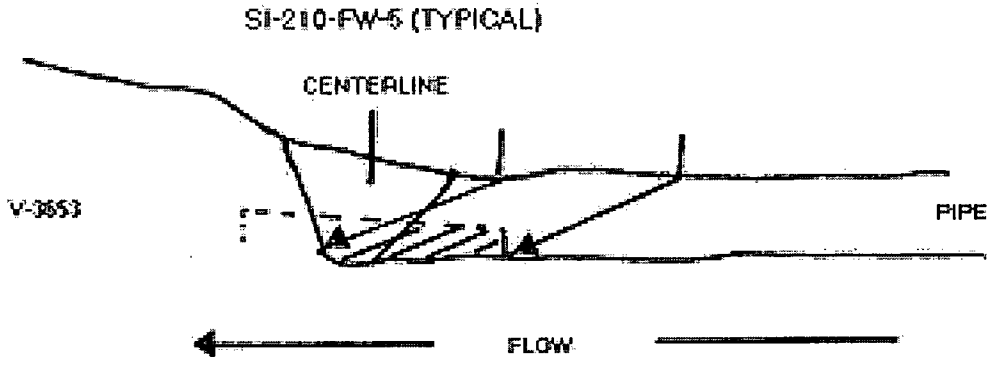

2-2742-1/2-2741-2
Figure 16

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



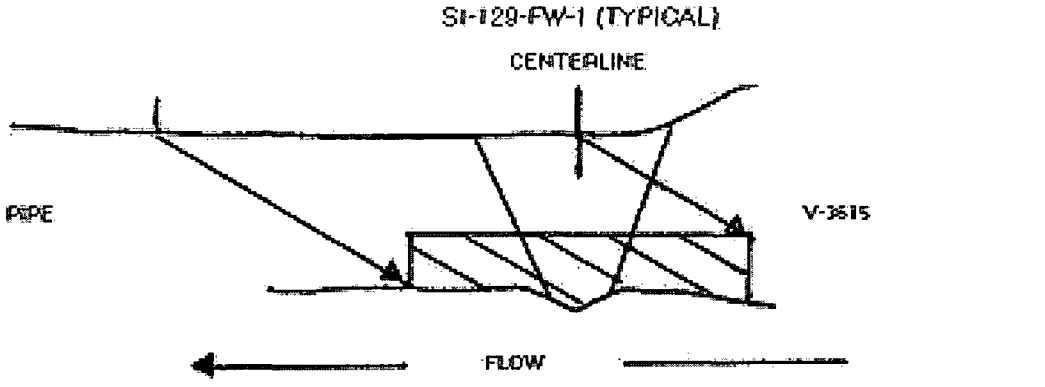

SI-213-1-SW-2
Figure 17

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




SI-210-FW-5
Figure 18

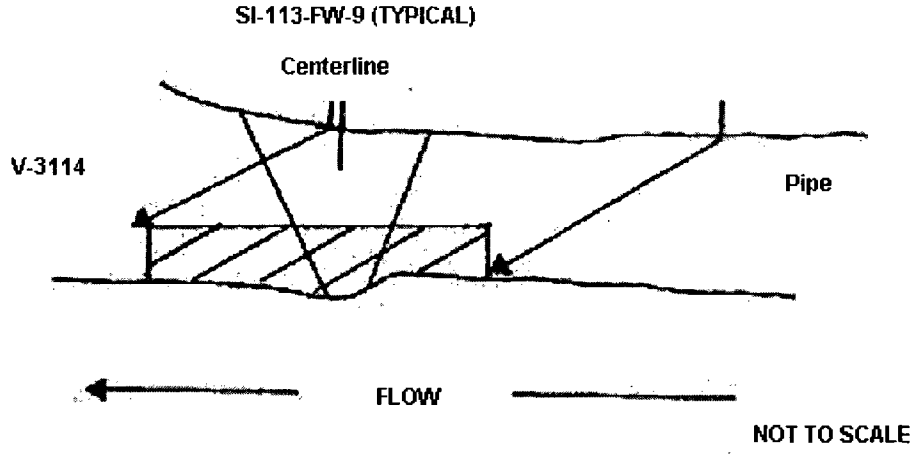
**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




NOT TO SCALE

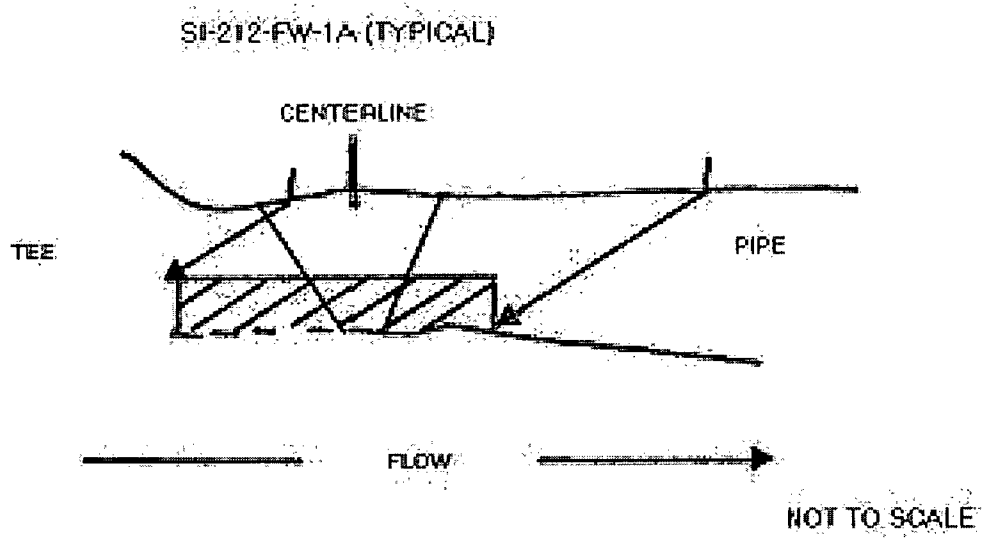
SI-129-FW-1
Figure 19

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




SI-113-FW-9
Figure 20

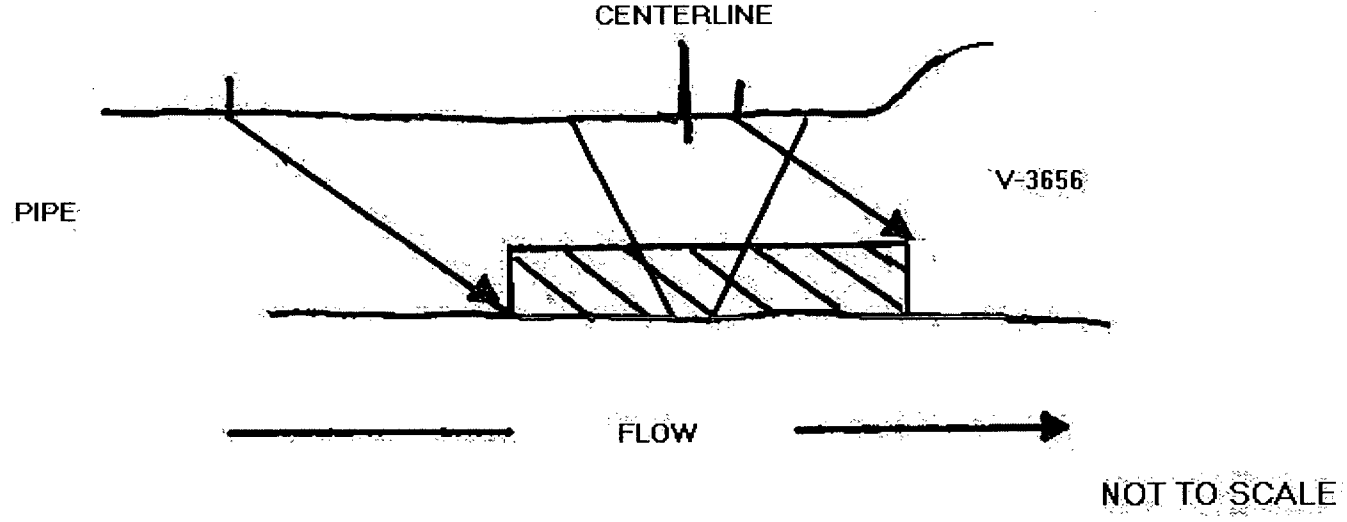
**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




SI-212-FW-1A
Figure 21

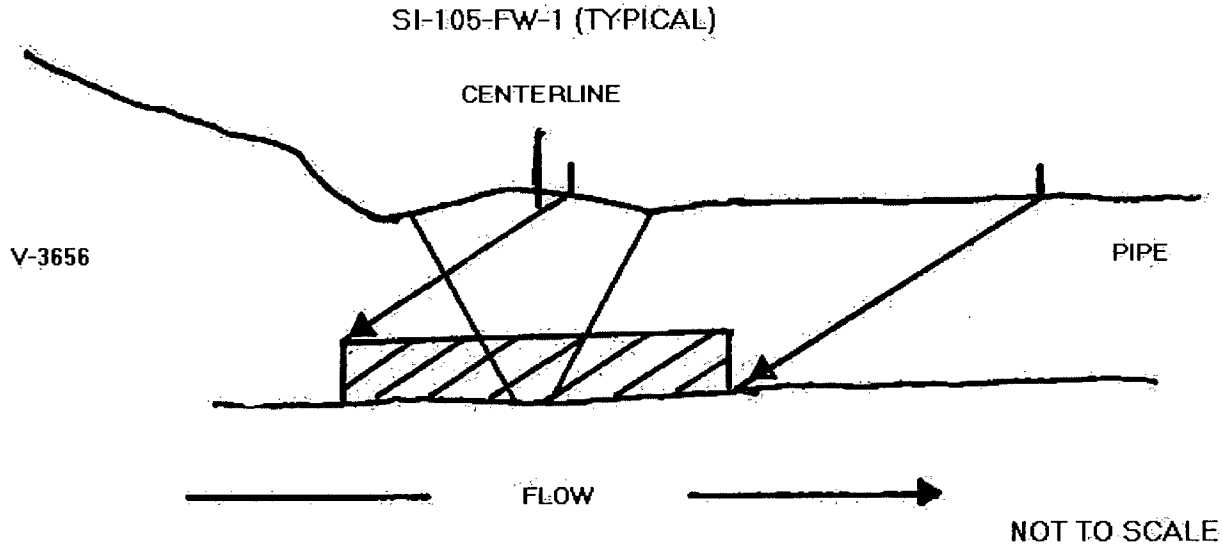
**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**

SI-212-FW-1 (TYPICAL)



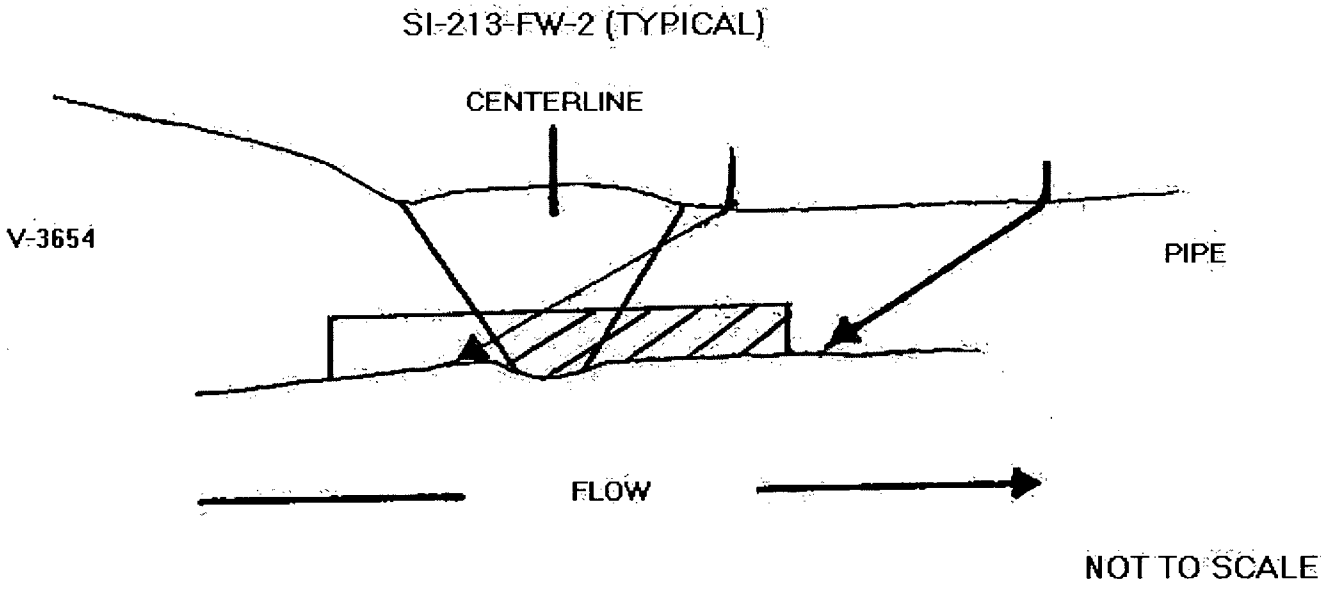

SI-212-FW-1
Figure 22

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



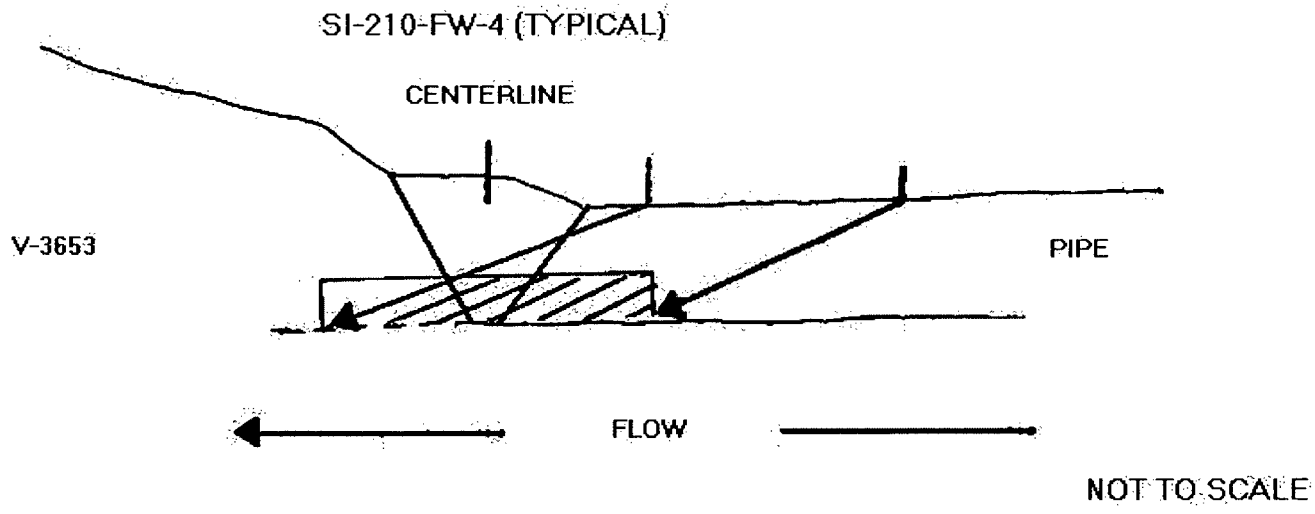

SI-105-FW-1
Figure 23

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**



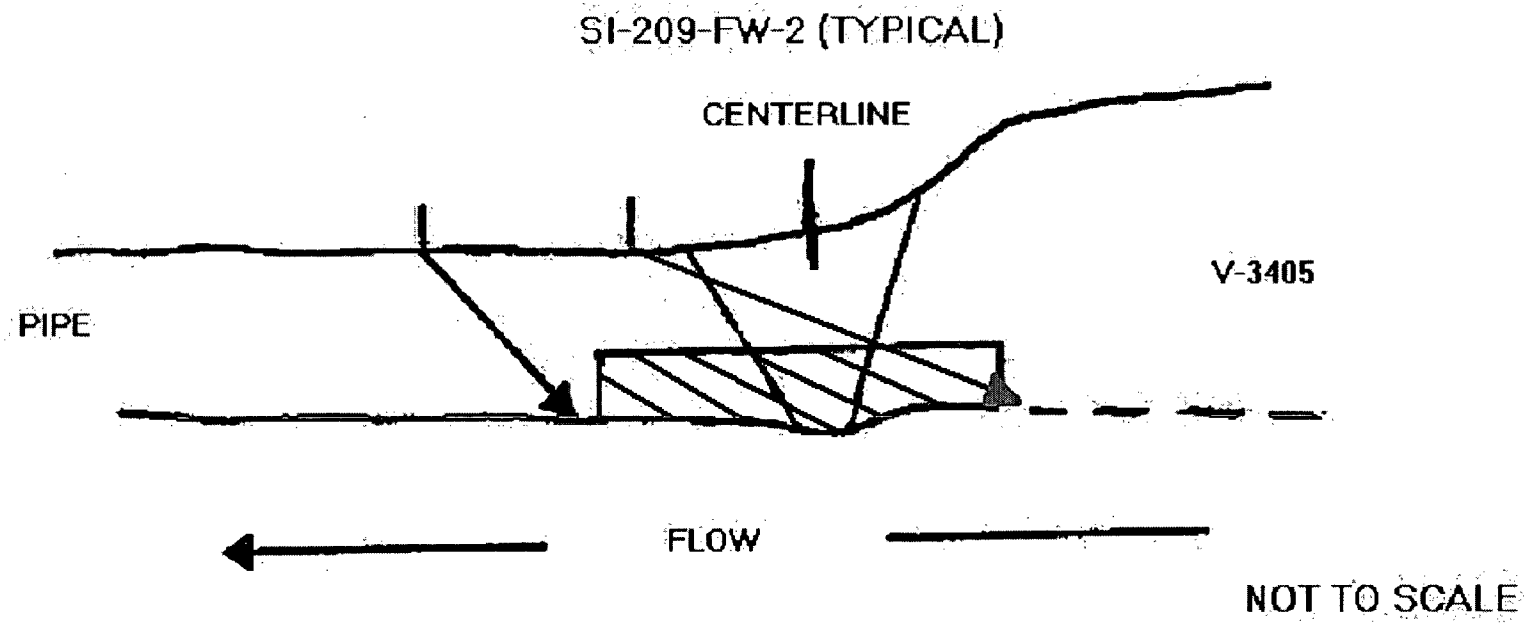

SI-213-FW-2
Figure 24

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




SI-210-FW-4
Figure 25

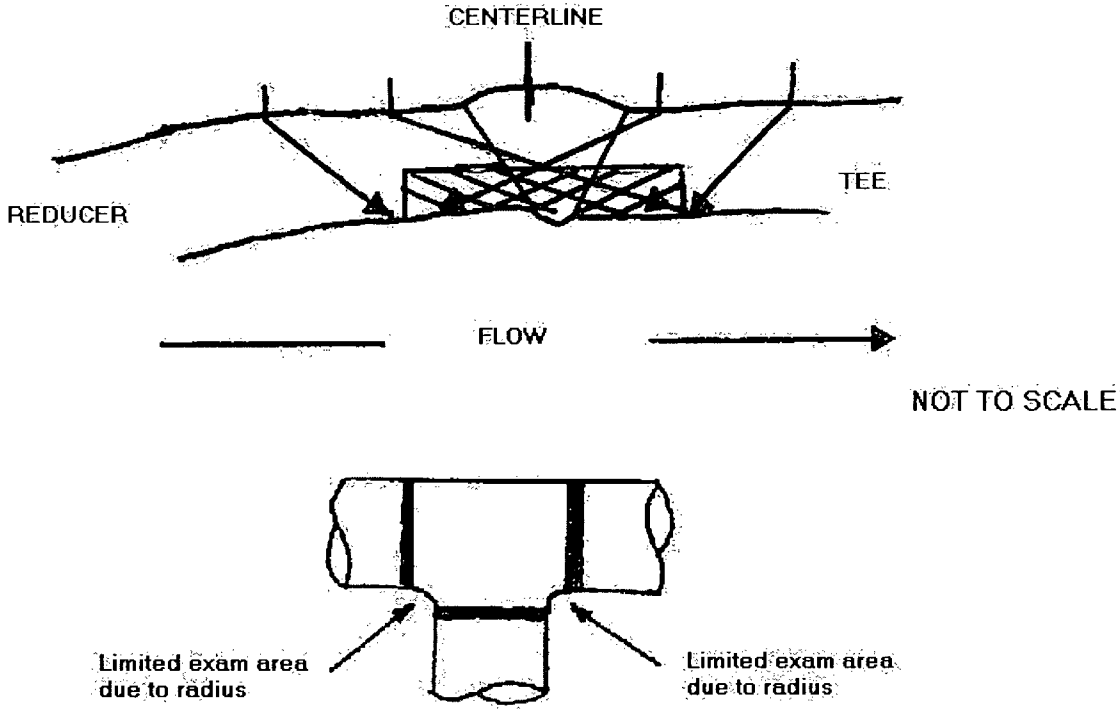
**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




SI-209-FW-2
Figure 26

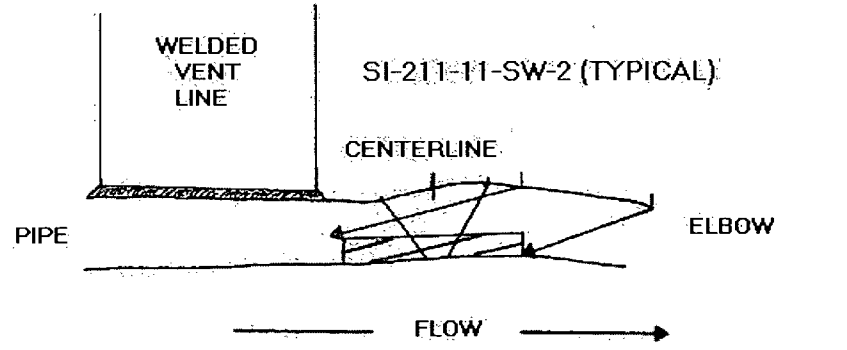
**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**

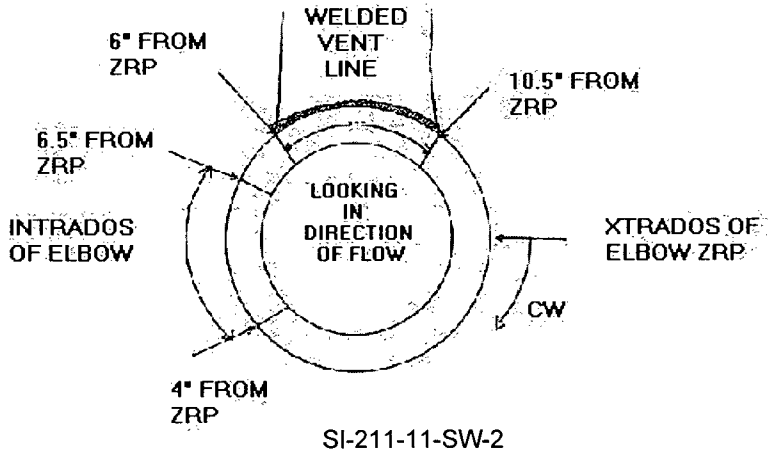
SI-210-FW-8 (TYPICAL)




SI-210-FW-8
Figure 27

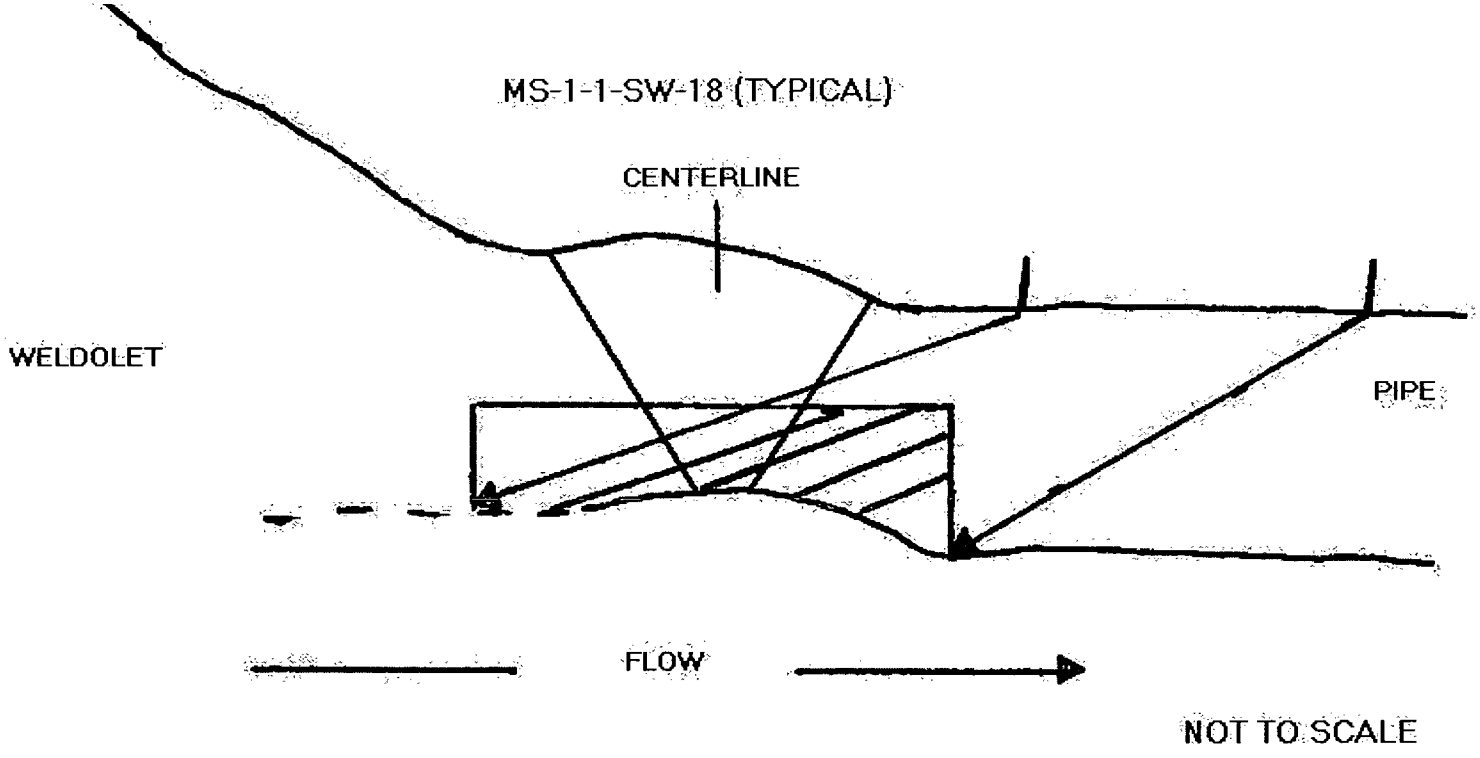
**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




SI-211-11-SW-2
Figure 28

**St. Lucie Unit 1**
**THIRD INSPECTION INTERVAL**
**RELIEF REQUEST NUMBER 32, REVISION 1**




MS-1-1-SW-18
Figure 29