

# CATEGORY 1

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FACIL: 50-335 St. Lucie Plant, Unit 1, Florida Power & Light Co.      05000335  
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RECIP. NAME      RECIPIENT AFFILIATION  
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SUBJECT: Requests approval of interim relief 17, main feed isolation valve bypass line repair for temporary non-code repair to install engineered mechanical clamp to encl steam leak.

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March 2, 1998

L-98-068  
10 CFR 50.4  
10 CFR 50.55a

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

RE: St. Lucie Unit 1  
Docket No. 50-335  
In-Service-Inspection Plan  
Third Ten-Year Interval  
Interim Relief Request 17

Pursuant to 10 CFR 50.55a (a) (3) and 50.55a (g) (5) (iii), Florida Power and Light Company (FPL) requests approval of interim relief request 17, *Main Feed Isolation Valve Bypass Line Repair*, for a temporary non-code repair to install an engineered mechanical clamp to enclose a steam leak at a socket welded elbow fitting on the one inch bypass line for MV-09-7, main feed isolation valve.

On February 27, 1998, a small steam leak was noted on a one inch socket welded elbow fitting located on the downstream side of the bypass line. The leak is characterized as a feedwater leak creating a visible jet of steam about 2 feet long creating a moist area on the adjacent lagging and scaffold. The leak is considered minor in nature (approximately three gallons per hour based on collection of the mist). The leak is unisolable and is subject to full main feedwater header pressure during plant operation. FPL has determined that an ASME code repair is not practical in that the affected piping is unisolable. A plant shutdown and cooldown would be required to perform a code repair on the leaking pipe which would unnecessarily cycle plant systems and components.

Relief request 17 approval is requested to support the use of an engineered clamp for the temporary repair of pressure boundary leakage on the 1A main feed isolation valve bypass piping. Use of the relief request would allow the temporary repair of the piping with Unit 1 in service. The clamping device, constructed in accordance with this relief request, will remain in service only until the next scheduled cold shutdown or the next refueling outage (SL1-16), at which time the defect will be repaired or replaced in accordance with IWA-4000.

9803040475 980302  
PDR ADCK 05000335  
PDR



A047 1/1



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Docket No. 50-335  
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Please contact us if there are any questions about this submittal.

Very truly yours,



J. A. Stall  
Vice President  
St. Lucie Plant

JAS/KWF/GRM

Attachments

cc: Regional Administrator, Region II, USNRC  
Senior Resident Inspector, USNRC, St. Lucie Plant

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Relief Request No. 17  
Main Feed Bypass Line Repair

Component Identification:

1A main feed isolation valve bypass 1 inch line  
Class 2

Code Requirement:

Section XI 1989 Edition IWC-4000 which refers to IWA-4000  
Repair procedures - Requires that repairs be performed in accordance with this Article.

Code Requirement from Which Relief is Requested:

During operation, leakage was detected on the 1A main feed isolation valve bypass line.

Relief is requested from the repair requirement of the ASME Boiler and Pressure Vessel Code Section XI 1989 Edition, Articles IWC/IWA-4000.

Basis for Relief:

See Attachment

Alternate Repair:

FPL will perform a temporary non-code repair on the 1A main feed bypass line as described in the basis for relief. This repair will perform the function of leakage prevention and will remain in place no later than the next scheduled cold shutdown or the next scheduled refueling outage (SL1-16). At that time a Code Repair/Replacement will be performed.

Implementation Schedule:

St. Lucie Unit 1 Cycle 15, until next scheduled cold shutdown or the next scheduled refueling outage (SL1-16).

Attachments:

Engineering basis for performing a temporary non-code repair.

## 1.0 Background/Purpose

Operational leakage was discovered in the socket weld joint for the downstream elbow of the MV-09-7, main feed isolation valve (MFIV), bypass line. This elbow is adjacent to V09188. The leak is characterized as a feedwater leak creating a visible jet of steam about 2 feet long creating a moist area on the adjacent lagging and scaffolding below. The leak is considered minor in nature (approximately three gallons per hour based on collection of the mist) but needs to be stopped to minimize further steam cutting of the MV-09-7 bypass line elbow weld. This evaluation addresses the temporary clamping of the steam leak with a leak repair enclosure to encapsulate the elbow and a clamp to absorb the axial loading adjacent to the affected socket weld. Generic Letter (GL) 90-05 states that for code Class 1 and 2 piping, a licensee is required to perform code repairs or request NRC to grant relief for temporary non-code repairs on a case-by-case basis regardless of pipe size. This evaluation provides the technical basis for making a non-code repair.

## 2.0 Basis for Relief

### Structural Integrity

The leak repair enclosure and clamp is considered a non-code repair to stop the leakage to prevent further steam cutting of the MV-09-7 bypass line elbow weld. The leak is located in an oval pinhole in a socket weld near the fitting edge. In accordance with GL 90-05, the overall design of the leak repair enclosure will assume a postulated full circumferential severance of the socket weld at the defect location.

The design pressure and temperature of the subject piping is 1100 psig and 500°F which is consistent with the Feedwater (FW) system piping downstream of the MFIV. As the enclosure design meets or exceeds these design requirements, the leak repair enclosure is capable of withstanding design conditions consistent with FW system pressure boundary components. The system fluid is demineralized condensate which is compatible with the enclosure and clamp materials.

### Enclosure and Clamp Design

Figure 1 provides the design details for the temporary leak repair enclosure and clamp. The enclosure is designed for the conditions specified above. The enclosure completely envelopes the elbow fitting and weld and therefore the clamping device size will accommodate any projected growth of the flaw.

The materials of construction are acceptable for the application. The enclosure is made



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of SA 516 Gr. 70 carbon steel with SA-193 Gr B7 studs and SA-194 Gr. 2H nuts. A friction clamp provides a means of absorbing the axial load in the extremely remote possibility that the flaw propagates circumferentially around the weld joint. The enclosure design is based on stress limits in Table NC-3321-1 and meets Level A Service Limits of Section III using normal system operating conditions, and assuming postulated full circumferential severance of the pipe at the defect location. The enclosure is mechanically clamped to the pipe with a friction factor not exceeding 0.3 and designed to produce a friction load five times the slippage load.

Review of the enclosure design has been performed to ensure the enclosure meets the intent of GL 90-05. Based on this review, it has been concluded that the subject temporary leak repair enclosure and clamp is suitable for the intended application and capable of performing the design functions specified. As the defect is located in a weld zone, the repair enclosure completely surrounds the subject fitting and the enclosure design will accommodate full circumferential severance of the socket weld at the defect location, a plan for monitoring defect growth in the area immediately adjacent to the clamping device is not required.

#### Pipe Stress/Support Analysis

The bypass line is depicted on Drawing 8770-G-125 Sheet BF-M-6. Engineering walkdown has shown that the perpendicular stub connections to the process line is approximately 6" long. The distance (parallel direction to the process line) between the two stub connections is 34" as per EMDRAC 8770-7002. The proposed leak repair enclosure will be installed over the leaking elbow downstream of valve V09188. The weight of the leak repair enclosure is less than 40 lbs and the clamp weighs 10 lbs (Figure 1). A stress analysis of the bypass line and the affected process line with the additional weight of the leak repair enclosure and clamp has been performed in calculation BF-0659A. The results show that the additional weight does not adversely affect the Code pipe stress requirements and no additional supports are required.





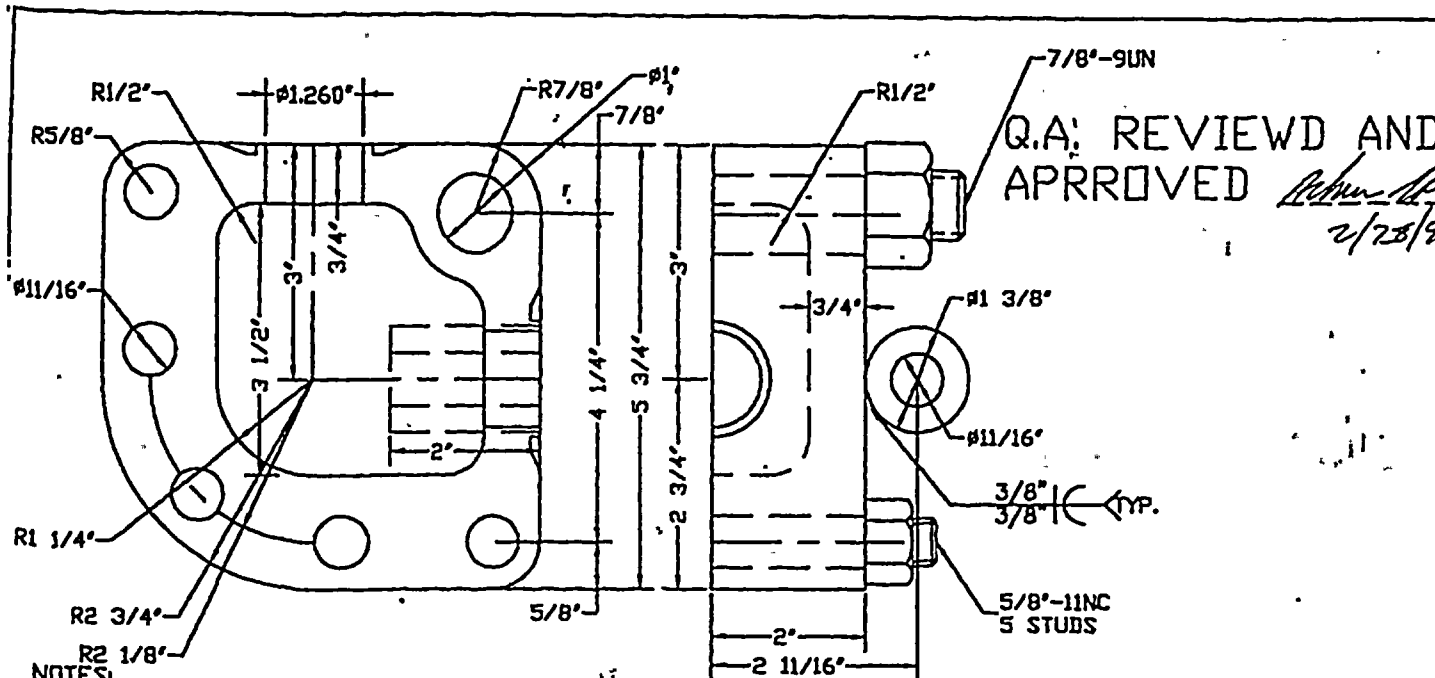
### Temporary Clamp Sealing Compound

The sealant used will be FSC-N-3B, or better. The sealant is thermal setting and is injected while the system is at operating pressure and temperature. The volume of injected sealant is based on the calculated volume of the leak repair enclosure. The maximum volume and the maximum injection pressure, which includes the extrusion pressure (pressure required to push the sealant into the mold), plus the molding pressure (the pressure required to fill the mold) and the operating pressure (pressure that must be overcome to fill the leak repair enclosure), ensures that the sealant does not overcome the system pressure and enter the system. This injection method precludes "mainlining" of the sealant into the system. These leak repair methods have proven effective in sealing leaks on similar components with similar failures.

### 3.0 Summary

The installation of the temporary leak repair enclosure will not introduce any new failure modes for the Main Feedwater System. The leak repair enclosure is a passive device and does not perform any active safety function. In addition, the temporary leak repair enclosure has been designed for the appropriate loading conditions and as such its failure is not assumed. Structural integrity of the affected piping system is not affected by the installation. The injection material and injection pressures have been analyzed to ensure that no contaminants are introduced into the system and that system operation is not adversely affected. Based on the above, the temporary clamping of a feedwater leak at an elbow in the one inch bypass line for MV-09-7 does not alter or jeopardize any of the design described in the FSAR.

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NOTES:

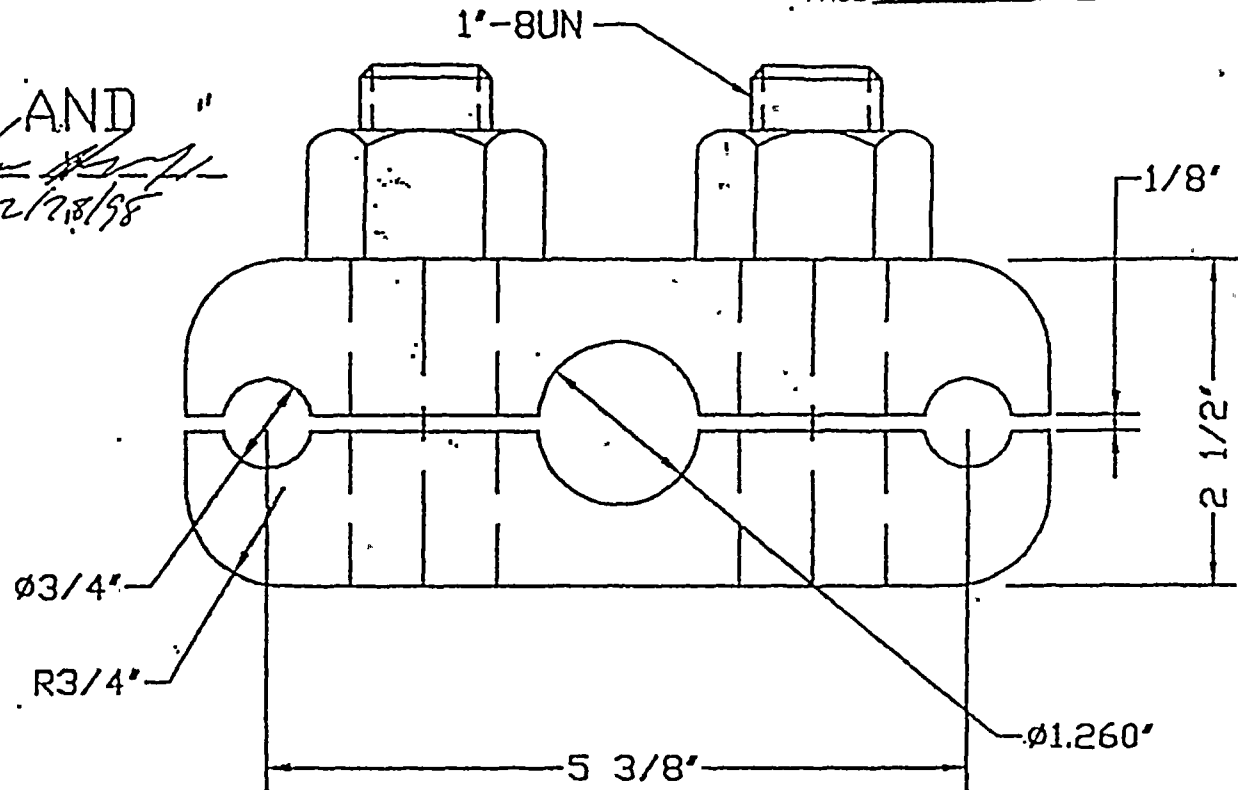
1. SAFETY RELATED;
2. PROCEDURE NUMBER: N-98086.
3. COMPONENT DESIGNATION: V09188.
4. INJECTION POINTS: DRILL THRU Ø3/16". DRILL AND TAP FOR 3/8"-16NC X 3/8" DEEP, 2/HALF.
5. PEENING GROOVE: 1/8" X 1/8" X 60°.
6. ALL DIMENSIONS ARE TYPICAL UNLESS SPECIFIED.
7. TUBE LUGS WILL BE WELDED AT THE CUSTOMER WELDING SHOP.

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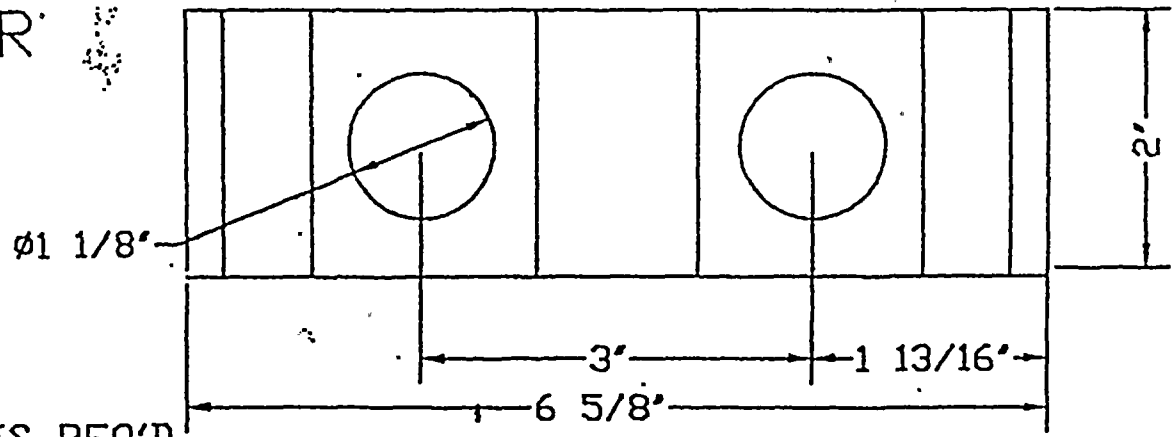
MATERIAL LIST: (CARBON STEEL)	
PLATE:	SA-516 GR.-70
FITTING:	N/A
PIPE:	N/A
STUDS:	SA-193 GR.-B7
NUTS:	SA-194 GR.2H
TUBE LUGS:	SA-516 GR.-70
PACKING:	N/A

WEIGHT ESTIMATE	35 LBS	COMPOUND ESTIMATE	25-5 STEEL	COMPOUND TYPE	FSC-N-38/6B
		<b>TOLERANCES UNLESS SPECIFIED</b> MACHINED SURFACES ✓ X.X (1 DECIMAL) ± 0.100 X.XX (2 DECIMAL) ± 0.030 X.XXX (3 DECIMAL) ± 0.010 FRACTIONAL ± 1/16 FRACTIONAL "BURN" ± 1/8 -0		THIS DRAWING IS THE PROPERTY OF FURMANITE ENGINEERING AND MUST NOT BE USED OR COPIED WITHOUT THE EXPRESS WRITTEN PERMISSION OF A COMPANY OFFICER.	
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Q.A. REVIEWED AND APPROVED  
*[Signature]*  
 2/28/98



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NOTES:

- ONE FRICTION CALMP IS REQ'D.
- (2) 5/8"-11NC X 12" LONG
- Torque Clamping studs to 184 ft-lbs.  
*Mar 31/98*

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