UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 3, 2008

Mr. J. A. Stall
Senior Vice President, Nuclear and
Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

SUBJECT: ST. LUCIE, UNIT 1 - SAFETY EVALUATION OF RELIEF REQUEST TO USE STRUCTURAL WELD OVERLAY AND ALTERNATIVE EXAMINATION TECHNIQUES ON SAFE END DISSIMILAR METAL WELDS (TAC NO. MD9256)

Dear Mr. Stall:

By letter dated April 29, 2008, Florida Power & Light Company (FPL) submitted Relief Request Number 2 (RR-2) as an alternative to the repair requirements of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, for St. Lucie, Unit 1. In response to the U.S. Nuclear Regulatory Commission's (NRC) request for additional information dated September 18, 2008, FPL revised RR-2 as Revision 1 (RR-2, Rev. 1) in a letter dated September 25, 2008. FPL proposed the use of a full structural weld overlay with temper bead welding for repair and the Performance Demonstration Initiative program for inspection as alternatives to the requirements of ASME Code, Section XI.

The NRC staff has evaluated the information provided by FPL and concludes that the proposed alternatives provide an acceptable level of quality and safety. Therefore, pursuant to Title 10 of the *Code of Federal Regulations* Section 50.55a(a)(3)(i), the proposed alternatives in RR-2, Rev. 1, are authorized for the repair and examination of the subject welds for the fourth 10-year Inservice Inspection interval at SL-1, which ends on February 10, 2018.

Further details on the bases for the NRC staff's conclusions are contained in the enclosed safety evaluation. If you have any questions regarding this issue, please feel free to contact the St. Lucie Project Manager, Brenda Mozafari, at (301) 415-2020.

Sincerely,

Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No.: 50-335

Enclosure: Safety Evaluation

cc w/enclosure: See next page

cc:

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NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELIEF REQUEST NUMBER 2, REVISION 1
FULL STRUCTURAL WELD OVERLAY AND ALTERNATIVE EXAMINATION TECHNIQUES
ON HOT LEG NOZZLE DISSIMILAR METAL WELDS
FLORDIA POWER & LIGHT COMPANY
ST. LUCIE, UNIT 1
DOCKET NUMBER 50-335

1.0 INTRODUCTION

By letter dated April 29, 2008, Florida Power & Light Company (FPL) submitted Relief Request Number 2 (RR-2) as an alternative to the repair requirements of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (BPV) Code, Section XI, for St. Lucie, Unit 1 (SL-1). In response to the U.S. Nuclear Regulatory Commission's (NRC's) request for additional information (RAI) dated September 18, 2008, FPL revised RR-2 as Revision 1 (RR-2, Rev. 1) in a letter dated September 25, 2008. FPL proposed the use of a full structural weld overlay with temper bead welding for repair and the Performance Demonstration Initiative program for inspection as alternatives to the requirements of ASME Code, Section XI.

The alternatives will be used in lieu of the requirements of ASME Code, Section XI, IWA-4410(a), IWA-4611.1(a) and Appendix VIII, Supplement 11 of the 2001 Edition through 2003 Addenda (2001A03 Edition) at SL-1. The alternatives will be used to perform full structural weld overlays (SWOLs) on two safe end-to-hot leg shutdown cooling outlet nozzle welds and one safe end-to-hot leg surge nozzle weld. The SWOLs will also extend outward from the nozzle across the adjacent stainless steel pipe/elbow-to-safe end similar metal welds (SMWs).

2.0 REGULATORY EVALUATION

Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The ASME Code of record (COR) for the current,

ENCLOSURE

fourth 10-year ISI interval at SL-1 is the ASME Code, Section XI, 2001A03 Edition. This is also the COR for the Repair/Replacement Program.

Section 50.55a(b)(2)(xxiv) of 10 CFR prohibits the use of Appendix VIII and the supplements to Appendix VIII and Article I-3000 of Section XI of the ASME BPV Code, 2002 Addenda and later Addenda. The ultrasonic examination of the completed SWOLs will be accomplished with personnel and procedures qualified in accordance with ASME Code, Section XI, 2001 Edition (2001E) for Appendix VIII, Supplement 11 with alternatives used for complying with the Performance Demonstration Initiative (PDI) Program.

Pursuant to 10 CFR 50.55a(a)(3), alternatives to requirements may be authorized by the NRC if the licensee demonstrates that: (i) the proposed alternatives provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

FPL submitted RR-2, Rev 1, as alternatives to the implementation of the ASME Code, Section XI, IWA-4410(a), IWA-4611.1(a) and Appendix VIII Supplement 11. FPL will use the PDI Program implementation of Appendix VIII, Supplement 11 for ultrasonic testing (UT) qualification requirements and RR-2, Rev 1, for the deposition of full SWOL utilizing the ambient temperature gas tungsten arc welding (GTAW) process.

3.0 FPL PROPOSED ALTERNATIVE REQUEST

3.1 Reason for Request

Dissimilar metal welds (DMW), primarily consisting of Alloy 82/182 weld metal, are frequently used in pressurized-water reactor construction to connect stainless steel (SS) pipe and safe ends to vessel and pipe nozzles, generally constructed of carbon or low alloy ferritic steel. These welds have shown a propensity for primary water stress corrosion cracking (PWSCC) degradation, especially in components subjected to higher operating temperatures.

For the upcoming SL-1-22 refueling outage, three DMWs located on the reactor coolant system hot leg piping are currently scheduled to have SWOL applied. Repair/replacement activities associated with SWOL repairs are required to address the materials, welding parameters, radiation dose concerns, operational constraints, examination techniques and procedure requirements for repairs.

ASME Code, Section XI, IWA-4410(a) and IWA-4611.1(a), 2001A03 Edition does not address all the needed requirements for this type of repair since potential existing defects will not be removed or reduced in size, and weld overlay of potential existing flaws in DMWs will be performed. Also, comprehensive and generic NRC-approved criteria are not currently available for application of SWOL repairs to DMWs constructed of Alloy 82/182 weld material for mitigation of potential PWSCC. In addition, ASME Code, Section XI, Appendix VIII, Supplement 11, 2001A03 Edition cannot be implemented as written for UT examination of a SWOL repair. Attachment 1 of RR-2, Rev 1, includes a discussion of the PDI Program and basis with respect to Appendix VIII, Supplement 11, requirements.

3.2 Code Requirements

SL-1 is currently in the fourth 10-year ISI interval (February 11, 2008, to February 10, 2018). The ASME COR for the current 10-year ISI interval is Section XI, 2001A03 Edition. This is also the version used for the Repair/Replacement Program.

The ASME Code, Section XI, IWA-4000 does not address all the necessary requirements for this type of repair. The Code requirements for which the relief is requested are contained in the following:

1. ASME Code, Section XI, IWA-4410(a) and IWA 4611.1(a) of the 2001A03 Edition for the Repair/Replacement Program.

2. ASME Code Section XI, Appendix VIII, Supplement 11 of the 2001 Edition.

3.3 System/Components Requested

FPL states that ASME Code components associated with this request are three Class 1 safe end-to-nozzle DMWs with Alloy 82/182 weld metal that are susceptible to PWSCC. Preemptive SWOLs are planned to be applied to the DMWs and extend across the three adjacent SS pipe/elbow-to-safe end SMWs. The welds are scheduled to have SWOLs applied during the upcoming SL-1-22 refueling outage.

The examination categories are R-A* and the welds are included in the Risk-Informed Inservice Inspection Program. The three DMWs scheduled for full SWOL at SL-1 are listed as follows:

*Note: As submitted by SL-1, and approved for fourth 10-year ISI Program Relief Request 1.

ST. LUCIE - UNIT 1 Apply SWOL on three Class 1 safe end-to-nozzle DMWs extending across the adjacent SS [stainless steel] pipe/elbow-to-safe end SMWs.			
ITEM	LOCATION	NOZZLE-to-SAFE END WELD	SAFE END-to-PIPE/ELBOW
1	Surge Line to Hot leg B Pipe Nozzle	RC-6-509	RC-108-FW-3
2	Shutdown Cooling Outlet to Hot Leg "A" Pipe Nozzle	10-509-B	RC-162-FW-1
3	Shutdown Cooling Outlet to Hot Leg "B" Pipe	10-509-A	RC-147-FW-1

ST. LUCIE - UNIT 1 Apply SWOL on three Class 1 safe end-to-nozzle DMWs extending across the adjacent SS pipe/elbow-to-safe end SMWs.					
MATERIALS					
ITEM/LOCATION	NOZZLE	SAFE END	PIPE/ELBOW	DMW & BUTTERING	SMW WELD
1/Surge Line to Hot leg B Pipe Nozzle	P-No. 1 Group 2 Carbon Steel SA-105 Grade II	P-No.8 Cast SS SA-351 CF8M	P-No.8 Cast SS SA-351 CF8M	F-No. 43 Alloy 82/182	SS E308L or ER308L
2/Shutdown Cooling Outlet to Hot Leg "A" Pipe	P-No. 1 Group 2 Carbon Steel SA-105 Grade II	P-No.8 Cast SS SA-351 CF8M	P-No. 8 SA-312 TP 304 SS		SS E308 or E308L or ER308 or ER308L
3/Shutdown Cooling Outlet to Hot Leg "B" Pipe	P-No. 1 Group 2 Carbon Steel SA-105 Grade II	P-No.8 Cast SS SA-351 CF8M	P-No. 8 SA-312 TP 304 SS		SS E308 or E308L or ER308 or ER308L

3.4 Proposed Alternatives and Basis

FPL proposes the use of the alternative requirements shown in Attachment 2 of RR-2, Rev. 1, for implementing the three scheduled SWOLs for potentially PWSCC susceptible safe end-to-nozzle welds of the reactor coolant hot leg piping. The SWOLs will include the three adjacent SS pipe/elbow-to-safe end welds. This request applies to each of the welds listed in Section 3.3 above and generally depicted in Figure 1 of RR-2, Rev. 1. The proposed alternative is scheduled to be performed during the SL-1-22 Fall 2008 refueling outage.

The proposed alternative is the result of industry experience with weld overlay modification for flaws suspected or confirmed to be caused by PWSCC and directly applies to the Alloy 52/52M weld material that is primarily being used for the SWOLs. UT examination of the completed SWOLs will be performed by procedures and personnel qualified to the PDI Program, which is an alternative to the requirements of ASME Code, Section XI, Appendix VIII, Supplement 11 of the 2001 Edition.

3.4.1 SWOL Design

FPL states that the details surrounding the design analysis for the SWOLs are being developed to support the SL-1 Fall 2008 Refueling Outage. The analysis will be available at the plant for NRC review at the beginning of the SL-1-22 refueling outage.

The SWOLs will satisfy all the structural design requirements of the pipe as specified in the RR-2, Rev. 1, for the original safe end-to-nozzle welds and the pipe/elbow-to-safe end welds. The SWOLs will completely cover the existing Alloy 82/182 weld and will extend around the entire circumference of the nozzle and onto the ferritic nozzle and austenitic SS material on each end of the weld, including the adjacent pipe/elbow-to-safe end weld. Alloy 52/52M filler metals are compatible with all the wrought and cast base materials and the DMWs and SMWs that will be covered by the SWOLs.

FPL will assume a postulated 100 percent through-wall flaw for SWOL length and thickness sizing. Because no UT examination will be performed prior to SWOL application, and the post-SWOL UT examination is not qualified for flaw detection and sizing in cast SS base material on some of the nozzles, for flaw growth evaluations, postulated 100 percent through

wall flaws will be assumed for the welds on all nozzle location where SWOLs will be applied. Planar flaws detected in the SWOLs during the acceptance examination will be characterized and flaw growth calculations will be performed using the flaw(s) detected in the SWOLs plus the postulated 100 percent through-wall flaws in the base metal. FPL states that for planar indications outside this examination volume, the nominal wall thickness shall be "t_2" as shown in Figure 1(c) of Attachment 2 to RR-2, Rev. 1, for volumes "A-E-H-D" and "F-B-C-G." For the cast SS material, UT is not currently qualified to examine the base metal following SWOL installation. Initial 100 percent through wall axial and circumferential flaws are assumed for both SWOL design and flaw growth evaluation at all nozzle locations where SWOLs will be installed. "t_2" is pipe/weld wall thickness plus SWOL thickness measured from 1/2 inch beyond the toe of the PWSCC susceptible DMW. The portion of the pipe, safe end or nozzle material beyond the PWSCC susceptible material is assumed unflawed. These volumes are also outside any other ASME Code Section XI ISI volume other than that associated with the original weld ISI as shown in ASME Code, Section XI, Figure IWB-2500-8(c), so service-related flaws therein are not expected to occur. Surface examination is also performed on these areas before the SWOLs are applied to verify absence of surface flaws. The volume of the overlay, which is more than 1/2 inch from the susceptible region, is treated as a cross section, which is the SWOL thickness plus the original underlying base metal wall thickness. The acceptance standard for a flaw in the SWOLs from ASME Code, Section XI, Table IWB-3514-2 is thus based on "t_2." The approach is consistent with other examinations in ASME Code Section XI including pipe-to-pipe welds where the examination volume does not include the entire thickness but the acceptance criteria does. Furthermore, indications in the overlay are required to be sized. This requirement will assure that the indications that may extend into the base metal are not excluded from evaluation.

3.4.2 Welding

Welding will be performed in accordance with Attachment 2 of RR-2, Rev. 1, using a machine GTAW process and using the ambient temperature temper bead method with ERNiCrFe-7A (Alloy 52M) weld metal. Manual GTAW, using ERNiCrFe-7 (Alloy 52) or Alloy 52M will be used if local repairs of weld defects are necessary or additional weld metal is required locally to form the final SWOL contour in locations at least 3/16 inch away from the low alloy or carbon steel nozzles. During recent DMW overlay activities where use of Alloy 52/52M has been used for the filler metal, flaws in the first layer have occurred in the portion of the overlay deposited on the austenitic SS portions (safe ends, pipe etc.) of the assemblies in some cases.

The flaw characteristics observed above are indicative of hot cracking. This phenomenon has not been observed on the ferritic steel or ENiCrFe-3 (Alloy 182) DMW portions of the assemblies when welding Alloy 52M thereon. Further studies have determined that this problem may occur when using Alloy 52M filler metal on austenitic SS materials with high sulfur content. Extensive tests and field experience from FPL's vendor, Welding Services, Inc. (WSI), indicate that hot cracking can be a concern when the sulfur and phosphorus content in the diluted weld puddle equals or exceeds 0.014 percent. The impurity hot cracking threshold level is a function of both the composition of the weld filler materials and the welding parameters that are used because these two factors control the dilution of the solidified weld deposit. This suggests that a combined sulfur plus phosphorus content of the base material of approximately 0.046 percent will represent a threshold for hot cracking with the welding parameters WSI will use at SL-1. On all the SS items prior to weld overlay, SL-1 will use the barrier layer, which will use ER308L or ER309L on the SS and may incorporate Alloy 82 on the SS near the DMW-to-SS fusion zone

only. The barrier layer will not be credited in the structural analysis or in the crack growth analysis. The inside diameter (ID) of the portion of the SWOLs over the barrier layer will be the outside diameter (OD) of the barrier layer that is applied over the SS material beneath the SWOLs.

FPL's vendor performed a mockup and the chromium (Cr) content of the first layer was verified by direct measurement of weld deposition on an ASTM A-106, Grade B mockup. Welding was performed using double-up progression (starting at the bottom and welding upward to the top on each side) for 5G and 6G mockups and orbital progression for 2G mockups. The Cr was measured at 90-degree intervals. All welding parameters were recorded and the 24 percent minimum Cr value specified in Section 1(e) of Attachment 2 to RR-2, Rev. 1, was attained in all cases. The same heat of wire, or wire heat with equal or greater Cr content than that used in qualification, will be used in situ for the first layer and the same welding parameters will be specified in the welding procedure specification as were used in the mockup for the first layer.

The thickness of the SWOLs may exceed 1/2 the carbon and low alloy ferritic steel nozzle base metal thickness as specified in ASME Code Case N-638-1. The requirement therein applies to excavated cavities in the ferritic steel base material that are subsequently welded flush. This requirement is not applicable to SWOLs since they are applied to the nozzle surface and limited to 3/8 inch depth into the ferritic steel as specified in Section I-1(d) of Attachment 2, RR-2, Rev. 1.

3.4.3 Examination

FPL will not perform UT examination in accordance with ASME Code, Section XI, Appendix VIII, Supplement 10 on the DMW prior to the SWOLs being applied. FPL states that since the structural integrity at the DMW locations will be restored by the SWOLs, the UT examination of the DMW prior to SWOL application is unnecessary and the increased personnel dose that would be incurred performing the examinations is also undesirable and not consistent with good ALARA, as low as reasonably achievable, practice. All welds have postulated 100 percent through-wall cracks for both the SWOL design and for the flaw growth evaluations.

FPL will perform the UT and surface examinations on the temper bead portion of the SWOLs no sooner than 48 hours after completion of the third temper bead layers as specified in Sections 3(a)(2) and 3(a)(3) of Attachment 2, RR-2, Rev. 1. The 48-hour delay is intended to provide time for delayed hydrogen cracking occurrence. The alternative requires the machine or automatic GTAW process to be used for temper bead welding thereby eliminating the use of welding processes requiring flux for arc shielding. The machine GTAW temper bead process uses a welding process that is inherently free of hydrogen. The GTAW process relies on bare welding electrodes and bare wire filler metal with no flux to absorb moisture. An inert gas blanket provides shielding for the weld and surrounding metal, which protects the region during welding from the atmosphere and the moisture it may contain and typically produces porosity free welds. In accordance with the weld procedure qualification, welding grade argon is used for the inert gas blanket. To further reduce the likelihood of any hydrogen effects, specific controls will be used to ensure the welding electrodes, filler metal and weld region are free of all sources of hydrogen. In addition, the use of the machine GTAW temper bead process provides precise control of heat input, bead placement, bead size and contour. The very precise control over these factors afforded by the machine GTAW process provides effective tempering of the nozzle

ferritic steel heat-affected zone (HAZ) resulting in achievement of lower hardness and tempered martensite. This further reduces susceptibility to hydrogen induced cracking.

The Electric Power Research Institute (EPRI) Report 1013558, "Temperbead Welding Applications, 48 Hour Hold Requirements for Ambient Temperature Temperbead Welding, Technical Update, December 2006" provides justification for reducing the 48 hour hold time on P-No. 3, Group No. 3 ferritic steel base material to start after completion of the third temper bead layer, Attachment 2. EPRI Report 1013558 addresses microstructural issues, hydrogen sources, tensile stress and temperature, and diffusivity and solubility of hydrogen in steels. The base materials studied in the EPRI report are primarily P-No. 3. The pressurizer nozzle base materials at SL-1 are P-No. 3, Group No. 3 and the hot leg piping nozzle base materials are P-No. 1, Group No. 2. The concerns associated with hydrogen assisted cracking are generally more significant for P-No. 3 than P-No. 1 base materials due to the P-No. 3 base material's increased hardenability. Also, post-weld heat treat exemptions shown in ASME Code, Section III, Table NB-4622.7(b)-1 are provided for P-No. 1, Group No. 2 materials, including temper bead welding, whereas no post-weld heat treat exemptions, other than temper bead welding, are permitted for P-No. 3, Group No. 3 materials. Past industry experience with the use of the machine or automatic GTAW process has resulted in no detection of hydrogen induced cracking after the 48-hour hold nondestructive examination or subsequent ISIs.

FPL states that all examinations will meet the requirements of RR-2, Rev. 1, Attachment 2. UT examination of the completed SWOLs will be performed by procedures and personnel qualified to the PDI Program, which is an alternative to the requirements of ASME Code, Section XI, Appendix VIII, Supplement 11 of the 2001 Edition. See Attachment 1of RR-2, Rev. 1, for the PDI Program alternatives to ASME Code, Section XI, Appendix VIII, Supplement 11. ISI will be performed as specified in Attachment 2 of RR-2, Rev. 1, with the following exceptions:

1. the limitations associated with the cast SS safe end material will adversely affect the examinations and

2. UT examination procedures and personnel will be qualified in accordance with the PDI program, an alternative to the requirements of ASME Code, Section XI, Appendix VIII, Supplement 11 of the 2001 Edition, as specified in Attachment 1 of RR-2, Rev. 1.

FPL states that the cast SS base material of the applicable safe ends and the surge line pipe at the surge line elbow at the hot leg B surge nozzle are not currently within the scope of PDI qualified UT examination procedures. Qualified representative mockups are not currently available and examination procedures and personnel have not yet been demonstrated for the cast material. In these cases, an ASME Code, Section XI, Appendix III UT examination will be performed, using the existing PDI qualified personnel and procedures as shown in Attachment 1 of RR-2, Rev. 1. As stated previously, 100 percent through-wall flaws are assumed for both the SWOL design and the flaw growth evaluations at all nozzle locations where SWOLs are being applied.

The UT examination requirements specified in NRC Regulatory Guide 1.147, Revision 15, as conditional acceptance of Code Case N-638-1 are not applicable to SWOLs. UT of the SWOLs will be performed in accordance with ASME Code, Section XI, Appendix VIII, Supplement 11 qualified procedures and personnel as modified by PDI and the limitations due to the underlying

cast SS base material. Supplement 11 was prepared to be specifically applicable to weld overlays. The UT examination requirements in Section 3 of Attachment 2, RR-2, Rev. 1, are similar to the UT examination requirements provided in ASME Code, Section XI, Nonmandatory Appendix Q, which have been developed specifically for austenitic weld overlays. The UT examination to be performed, in conjunction with the surface examinations to be performed, as specified in Section 3 of Attachment 2, RR-2, Rev. 1, are based on the latest industry experience and practice.

3.5 Duration of Proposed Alternative

The alternative requirements of this request will be applied for the duration of up to and including the last outage of the current fourth 10-year ISI interval which includes inservice examination requirements of Attachment 2 of RR-2, Rev. 1, for any applied SWOL. Future inservice examinations of SWOLs at SL-1 beyond this inspection interval will be as required by the NRC in the regulations.

4.0 STAFF EVALUATION

RR-2, Rev. 1, contains three Attachments: (1) Attachment 1, "PDI Program Modifications to Appendix VIII, Supplement 11," (2) Attachment 2, "Alternative Requirements for Dissimilar Metal Weld Overlays," which includes "Mandatory Appendix I-Ambient Temperature Temper Bead Welding," and (3) Attachment 3, "Barrier Layer to Prevent Hot Cracking in High Sulfur Stainless Steel." Currently, the staff has endorsed the use of Code Cases N-504-3, "Alternative Rules for Repair of Class 1, 2, and 3 Austenitic Stainless Steel Piping Section XI, Division 1," and N-638-1, "Similar and Dissimilar Metal Welding Using Ambient Temperature Machine GTAW [gas tungsten arc welding] Temper Bead Technique Section XI, Division 1." The staff has not endorsed the use of Code Cases N-740, N-740-1, or N-638-2. Therefore, the staff used the requirements of Code Cases N-504-3 and N-638-1 to aid in evaluation of Alternative RR-2, Rev. 1, as NRC-approved criteria associated with similar full SWOL applications.

Attachment 2 of RR-2, Rev. 1, is based on ASME Code Case N-740-1 "Dissimilar Metal Weld Overlay for Repair of Class 1, 2, and 3 Items Section XI, Division 1," with modifications. Code Case N-740-1 was developed as the result of industry's need to repair (reduce or mitigate) flaws (suspected or confirmed) generated from PWSCC via application of weld overlay. Also, the code case offers relief from post-weld heat treatment, preheat and a post-weld soak by allowing the use of an ambient temperature temper-bead weld process. Code Case N-740-1 is essentially a combination of Code Cases N-504-2 and N-638-2.

FPL's request is intended as an alternative repair method to mitigate potential effects of PWSCC by means of a full SWOL and to fulfill the examination requirements of ASME Code, Section XI, Appendix VIII, Supplement 11 with the use of a PDI qualified UT examination. The full SWOLs will be applied to the DMW (Alloy 82/182) between low alloy steel (LAS)/carbon steel (CS) nozzles and wrought/cast SS safe ends. Nickel base Alloy 82/182 filler metal has been discovered to be susceptible to environmentally assisted stress corrosion cracking when exposed to reactor plant primary water. In general, some damaging factors that may possess a strong influence on the stress-corrosion cracking behavior of nickel-based alloys have been identified as primary water hydrogen partial pressure, alloy Cr content, carbide precipitation, grain-boundary properties and temperature. Structural weld overlays have been used for several

years on piping of both boiling and pressurized-water reactors to inhibit the growth of flaws while establishing a new structural pressure boundary. The SWOLs will control growth in PWSCC flaws and maintain weld integrity by producing compressive stress in the DMW. The full SWOLs will be sized to meet all structural requirements independent of the existing weld and will produce a favorable surface for UT examination. Due to their close proximity adjacent SS safe end-to-piping SMW will be incorporated into the area of the weld overlay.

4.1 General Requirements

ASME Code Case N-504-3 and Nonmandatory Appendix Q (a contingent requirement of Code Case N-504-3 in accordance with RG 1.147, Revision 15) of ASME Code Section XI, require certain specification and surface conditions of the applicable base metal (LAS, CS, SS, and Alloy 82/182), the weld overlay filler metal (Alloy 52M) and the Cr content of weld overlay deposits. Section 1 of Attachment 2 to RR-2, Rev. 1, provides corresponding requirements, with modifications. FPL will deposit a barrier layer of ER308L or ER309L SS filler metal on the base metal prior to weld overlay as a contingency for preventing possible hot cracking, which may result from high sulfur content in austenitic SS base material. The tendency of certain metals to exhibit hot cracking is caused by the segregation at grain boundaries of low-melting constituents (e.g., sulfur) in the weld metal. This may result in grain-boundary tearing under thermal contraction stresses. Hot cracking may be minimized by employing low impurity welding metals.

FPL stated that a SS barrier layer of alloy ER308L or ER309L, will be utilized over the appropriate base materials due to the uncertainty in establishing impurity thresholds for successful Alloy 52M SWOLs. FPL also stated that the proposed SWOL design does not take structural credit for the buffer/barrier weld layer. FPL will install the barrier layer on the austenitic SS pipe and safe end only and stop short of the Alloy 82/182 weld material. The final tie-in to the existing nickel Alloy 82/182 weld may be performed with nickel Alloy 82 weld metal. Welding over the nickel base ENiCrFe-3 (Alloy 182) joint with an iron based ER308L or ER309L electrode may cause cracking in the SS barrier layer.

FPL stated further that the SS barrier layer will be deposited with a welding procedure that has been qualified in accordance with the ASME Code, Section IX. Liquid penetrant (PT) examinations will be performed on the barrier layer surface and its volume will be included in the final UT of the overlay.

Delta ferrite (FN) measurements are not required per Attachment 2 of RR-2, Rev. 1, for weld overlay repairs made of Alloy 52/52M weld metal. Welds of Alloy 52/52M are 100 percent austenitic and contain no delta ferrite due to their high nickel composition (approximately 60 percent nickel). The staff notes that weld filler material ER308L or ER309L, to be used as a non-structural barrier layer, promotes primary solidification of the weld metal as ferrite in lieu of austenite. FPL's vendor performed a mockup and the chromium (Cr) content of the first overlaid layer was verified at the 24 percent minimum Cr value specified in accordance with Section 1(e) of Attachment 2 to RR-2, Rev. 1. Furthermore, FPL states that the same heat number of weld wire and welding parameters used in qualification welding for the mockup first overlaid layer will be used for the first overlaid layer of the production SWOLs.

4.2 Crack Growth Consideration and Design

ASME Code Case N-504-3 and Nonmandatory Appendix Q of the ASME Code, Section XI, provide requirements for the weld overlay design and crack growth calculations. Section 2 of Attachment 2 to RR-2, Rev. 1, provides the corresponding requirements, with modifications. The proposed full SWOLs are designed to contain the assumed flaw in the underlying base material or weld and is based on the limiting case of the two as follows: (a) 100 percent through-wall for the entire circumference or (b) 100 percent through-wall for 1.5 inches or the combined width of the weld plus buttering, whichever is greater, in the axial direction for the entire circumference.

Section 2(a) of Attachment 2 to RR-2, Rev. 1, requires that flaw characterization and evaluation requirements be based on the postulated flaw, if UT examination of the weld and base material is not performed. Section 5.1 of RR-2, Rev. 1, states that FPL will not perform UT examination on the DMW prior to weld overlay installation. The staff observes that the condition of the DMW and adjacent base metal may not be known without conducting a UT examination of the DMW prior to weld overlay installation. Because UT examination is qualified to detect only the outer 25 percent of the original weld and base metal, following installation of the SWOLs, the condition of the remaining inner 75 percent of DMW and adjacent base metal would not be known. However, Section 2(a)(1) of Attachment 2 to RR-2, Rev. 1, states that for repair overlays, the initial flaw size for crack growth in the original weld or base metal shall be based on the postulated flaw if no pre-overlay UT examination is performed. In addition, Section 2(a)(2)(a) of Attachment 2 to RR-2, Rev. 1, states if no examination is performed prior to application of the overlay, initial inside-surface-connected planar flaws equal to 100 percent through the original wall thickness shall be assumed, in both the axial and circumferential directions. FPL continues that the SWOL design assumes a 360 degree circumferential flaw and an axial flaw length of the entire face width of the underlying DMW or 1.5 inches, whichever is greater. The staff also notes that FPL states previous examinations of the subject welds required by ASME Section XI identified no indications of flaws.

The NRC staff finds FPL's preceding flaw assumptions acceptable because the assumed flaw size in the base metal for the crack growth calculation is a conservative assumption, which cannot be exceeded by any actual flaw. Any actual flaw would not exceed the depth of these assumptions and would be detectable by the qualified post-weld overlay UT examinations.

As part of the weld overlay design, FPL will perform the following analyses. FPL will perform nozzle-specific stress analyses to establish a residual stress profile in each subject nozzle. Post-weld overlay residual stresses at normal operating conditions will be shown to result in beneficial compressive stresses on the inside surface of the components, assuring that further crack initiation due to PWSCC is unlikely.

FPL will also perform fracture mechanics analyses to predict crack growth for postulated flaws. Crack growth due to PWSCC and fatigue will be analyzed for the original DMW. The analyses will demonstrate that the postulated cracks will not grow beyond the design basis for the weld overlays. FPL will demonstrate that applying the weld overlay does not impact the conclusions of the existing stress reports. The stress and fatigue criteria of ASME Code, Section III, will be met for regions of the overlays remote from the assumed cracks.

FPL will measure shrinkage after the overlay application. Shrinkage stresses at other locations in the piping systems arising from the weld overlays will be demonstrated not to have an adverse effect on the systems. Clearances of affected pipe support and restraints will be checked after the overlay repair, and will be reset within the design ranges as required. FPL will evaluate the total added weight on the piping systems due to the overlays for potential impact on piping system stresses and dynamic characteristics. The as-built dimensions of the weld overlays will be measured and evaluated to demonstrate that they meet or exceed the minimum design dimensions of the overlays.

The staff finds that the proposed analyses and shrinkage measurement are consistent with paragraph (g) of Code Case N-504-3 and are, therefore, acceptable.

4.3 Examination and Inspection

Code Case N-504-3 allows the use of weld overlay repair by deposition of weld reinforcement on the outside surface of the pipe. Code Case N-504-3 and Nonmandatory Appendix Q of the ASME Code, Section XI require specific acceptance, preservice and inservice examinations of the installed weld overlay. Section 3 of Attachment 2 to RR-2, Rev. 1, provides corresponding requirements with the following exceptions.

4.3.1 Acceptance Examination

Sections 3(a)(2) and 3(a)(3) of Attachment 2 to RR-2, Rev. 1, require surface examination and UT examination, respectively. Section 3(a)(2) requires a PT examination of the installed weld overlay and adjacent base material in accordance with the acceptance criteria of the Construction Code, or NB-2500 and NB-5300 of ASME code, Section III, respectively. Section 3(a)(3) requires UT examinations of the installed weld overlay to assure adequate fusion/bond with base metal and to detect welding flaws. The required examination surface, volume and thickness are defined in Figure 1(a) of Attachment 2. In addition, planar flaws detected in the weld overlay shall meet the preservice examination standards of Table IWB-3514-2 of ASME Code, Section XI.

The requirements of the acceptance examination are acceptable because they are consistent with N-504-3 and Appendix Q to the ASME Code, Section XI.

4.3.2 Preservice Inspection

Section 3(b) of Attachment 2 to RR-2, Rev. 1, requires a preservice UT examination of the installed weld overlay and the upper/outer (i.e., measured from the OD toward the ID) 25 percent of the original pipe wall thickness. The required examination volume is defined in Figure 2 of Attachment 2. The current UT examination is qualified only to detect flaws in the outer 25 percent of the pipe base metal after a weld overlay is applied. With the limited UT qualification, the condition of the inner 75 percent of the pipe base metal would not be known. The NRC staff does not believe this is a conservative assumption for crack growth calculation if the original weld was not examined prior to installing the SWOLs. FPL states that since no pre-SWOL will be performed, the SWOL design assumes a 100 percent through-wall, 360 degree, circumferential flaw and a 100 percent through-wall axial flaw with a length of the entire underlying weld or 1.5 inches, whichever is greater. Based on this design assumption, the

NRC staff finds that the preservice examinations adequately address the flaw size to be used in the crack growth calculation.

Section 3(b)(1) of Attachment 2 to RR-2, Rev. 1, states "the examination volume in Figure 2 shall be UT examined, except that cast SS base material within the examination volume shall be UT examined to the extent practicable." Section 3(b)(3) states that flaws in the SWOLs that do not comply with the preservice examination acceptance standards of ASME Code, Section XI, Table IWB-3514-2 shall not be evaluated using IWB-3640. The staff finds that the preservice examination requirements are acceptable because they are consistent with N-504-3 and the ASME Code, Section XI, Appendix Q.

4.3.3 Inservice Inspection

Section 3(c) of Attachment 2 to RR-2, Rev. 1, provides requirements for UT inservice examinations with the examination volume defined in Figure 2 of Attachment 2. Section 3(c)(2) discusses UT requirements of the cast SS base material. FPL states that Subarticle Q-4300 of ASME Code, Section XI, will be used with exceptions as noted in RR-2, Rev. 1. FPL states that the cast SS volume beneath the SWOLs will be UT examined on a "best effort" basis since qualified UT examination of cast SS is not achievable at this time. FPL continued that qualified procedures and personnel will be used in accordance with ASME Code, Section XI, Appendix VIII, Supplement 11 as modified by the PDI Program. FPL stated that the weld overlay will be examined in accordance with the PDI qualified procedure from both sides to the fullest extent practicable, however, no credit for examination coverage can be given in any portion of the examination volume where the UT beam passes through the cast SS material. Section 3(c)(4) allows flaws in SWOLs exceeding the acceptance criteria of ASME Code, Section XI, Table IWB-3514-2 to be evaluated by analytical procedures and accepted for continued service by IWB-3640. Section 3(c)(4) also states if flaw growth in the weld overlay occurs and inservice inspection acceptance standards of Table IWB-3514-2 of ASME Code, Section XI cannot be met, a determination will be made as to whether the flaw is PWSCC and that if the cause is determined to be PWSCC or PWSCC cannot be excluded as the cause of the flaw, IWB-3600 shall not be used to accept these types of flaws and the flaws shall be repaired. The staff agrees with the acceptance criteria of IWB-3600 for flaws in the weld overlay if the flaw growth is caused by fatigue, which could be insignificant; however, flaw growth caused by PWSCC could be significant and the staff finds such a growth mechanism in the SWOLs as unacceptable. Therefore, the NRC staff accepts Section 3(c), with FPL's affirmation not to use ASME Code, Section XI, IWB-3600 to accept suspected PWSCC flaws in the weld overlays.

4.3.4 Examination Coverage of Cast Stainless Steel Components

FPL stated that UT examination of the SWOLs will be performed in accordance with ASME Code, Section XI, Appendix VIII, Supplement 11 using qualified procedures and personnel as modified by PDI with limitations due to the underlying cast SS base material. FPL states that the safe end cast SS base material identified in Section 3.3 above is not currently within the scope of PDI qualified UT examination procedures. FPL states qualified representative mockups are not currently available and examination procedures and personnel have not been demonstrated for the cast SS material. In these cases, FPL will perform UT examination in accordance with ASME Code, Section XI, Appendix III, using the existing PDI qualified personnel and procedures as shown in Attachment 1 of RR-2, Rev. 1.

FPL, as previously stated, will assume a postulated 100 percent through-wall flaw for SWOL length and thickness sizing. In addition, FPL will assume a postulated 100 percent through-wall flaw for welds on all nozzle locations where the SWOLs will be applied because the post SWOL UT examination is not qualified for flaw detection and sizing in cast SS base material.

FPL provided, in response to the NRC staff's RAI as stated in Section 1.0, weld overlay thickness and reduction in UT testing volume coverage information for weld overlaid locations of the cast SS components at SL-1:

WELD LOCATION	MINIMUM ANALYZED THICKNESS	REDUCTION IN UT EXAMINATION COVERAGE DUE TO CAST SAFE END/PIPING
Hot Leg Surge Line	0.78 inch	<10 percent
Shutdown Cooling to A RCS	0.73 inch	
Shutdown Cooling to B RCS	0.73 inch	

Based on the information provided, the staff understands the following: (1) FPL will perform preservice and inservice UT examinations, to the extent practicable, of the 25 percent underlying cast SS utilizing PDI qualified procedures and personnel qualified to wrought SS, (2) FPL will assume initial 100 percent axial and circumferential through-wall flaws for both SWOL design and flaw growth analysis for all cast SS material, (3) FPL states, in the table above, that the cast SS amounts to less than 10 percent of the total volume required to be UT inspected, (4) FPL states that the barrier layer thickness, will not be used in the structural or crack growth analysis of the SWOLs, (5) the staff notes that although the barrier layer is not considered in the analysis of the SWOLs, the barrier layer will contribute compressive forces to the cast SS safe ends and add to the overall structural integrity of the SWOLs, (6) the staff notes the SWOLs will control growth in PWSCC flaws and maintain weld integrity by producing compressive stress on the DMW and adjacent components, (7) the staff notes the full SWOLs will be sized to meet all structural requirements independent of the existing DMW, (8) the staff notes that industry operational experience has shown PWSCC in Alloy 82/182 will blunt at the interface with SS base metal, and (9) the staff notes Cast SS has not shown a susceptibility to PWSCC.

The staff accepts FPL's method to UT inspect, to the extent practicable, the underlying cast SS safe end material by utilizing PDI qualified procedures and personnel based on the preceding understandings. FPL's design and flaw growth analysis, based on the most conservative initially postulated (100 percent) axial and circumferential through-wall flaws in addition to the use of a barrier layer, would provide reasonable assurance of structural integrity and an acceptable level of quality and safety.

4.4 Mandatory Appendix I-Ambient Temperature Temper-Bead Welding

ASME Code Case N-638-1 provides requirements for ambient temperature temper bead welding. Mandatory Appendix I, Attachment 2 of RR-2, Rev. 1, is based on ASME Code Case N-638-2. The major differences between the two documents are discussed below.

Section I-1(b) of Mandatory Appendix I in Attachment 2 of RR-2, Rev. 1, states that the maximum area of the weld overlay based on the finished surface over the ferritic base material shall be 300-square inches. Code Case N-638-1 allows only 100-square inches over the ferritic base material. FPL stated that the SWOLs will require welding on more than 100-square inches, but less than 300-square inches, of surface on the hot leg surge nozzle and shutdown cooling CS nozzles. FPL continued that the SWOLs will extend toward the hot leg onto the ferritic steel nozzle base material for a sufficient length so that qualified ultrasonic examination of the required volume can be performed following SWOL application. FPL notes in Section 5.2 of RR-2, Rev. 1, the ASME committee has indicated ID compressive stress levels remain essentially the same between 100-square inches and 500-square inches in relation to SWOL applications. The presentation slides entitled, "Bases for 500 Square Inch Weld Overlay Over Ferritic Material," was provided to the NRC staff in a public meeting held on January 10, 2007, (ADAMS Accession No. ML070470565). Additional justification is provided in EPRI Report 1014351, "Repair and Replacement Applications Center: Topical Report Supporting Expedited NRC Review of Code Cases for Dissimilar Metal Weld Overlay Repairs, December 2006." The staff notes the industry provided results of finite element analysis demonstrating that the stresses of a nozzle with the 500 square inch weld area will not adversely affect the integrity of the nozzle. Therefore, the staff accepts the proposed Section I-1(b) maximum area of 300-square inches of the weld overlay over the ferritic base material based on a review of the preceding information.

Section I-1(d) of Mandatory Appendix I states that if a defect penetrates into the ferritic base material, repair of the base material, using a nonferritic weld filler material, may be performed provided the depth of repair in the base material does not exceed 3/8 inch. FPL stated that the thickness of the weld overlays may exceed 1/2 the CS nozzle base metal thickness limit as specified in ASME Code Case N-638-1. FPL states that the ASME Code Case N-638-1 requirement applies to excavated cavities in the ferritic steel base material that are subsequently welded flush and this requirement is not applicable to weld overlays since they are applied to the nozzle surface and limited to 3/8 inch depth into the ferritic steel. FPL noted that additional justification is provided in Appendix F of EPRI Report 1014351. The staff believes depth of preparation is not applicable to the SWOL design because the overlay requires no preparation other than surface cleanup prior to application. The staff also believes that the one half thickness limit was included in the code case as a conservative measure to assure sufficient material existed to support weld shrinkage stresses generated by the constraint of a deep cavity in a component. ASME Code Case N-638-1 was not written for overlay design applications and is not specific enough to be used without modification for this type of application. Therefore, the staff concludes that the depth of preparation is not applicable to this SWOL repair based on the preceding discussion.

Section I-2.1(c) of Mandatory Appendix I states that the maximum interpass temperature for the first three layers of the test assembly shall be 150 °F. Section I-3(d) of Mandatory Appendix I requires the maximum interpass temperature for field applications to be 350 °F regardless of the

interpass temperature during qualification. However, ASME Code, Section IX, QW-256 specifies maximum interpass temperature as a supplementary essential variable that must be held within 100 °F above that used during procedure qualification. FPL stated that the maximum interpass temperature during welding on the ferritic steel nozzle material will be limited to 350 °F maximum, although the maximum interpass temperature is limited to 150 °F maximum for the first three layers in the Procedure Qualification Record (PQR) test assembly. In addition, FPL noted this is greater than the maximum 100 °F interpass temperature increase permitted by ASME Code, Section IX, QW-406.3. FPL states that the limitation on the PQR maximum interpass temperature is to ensure the cooling rates achieved during procedure qualification are more severe than those encountered during field welding (are not slower than those achievable during field welding) and that the higher interpass temperature is permitted during field welding because it would only result in slower cooling rates, which could be helpful in producing more ductile transformation products in the ferritic steel HAZ. Therefore, the staff agrees the 350 °F maximum interpass temperature may prove beneficial for favorable metallurgical transformation during field applications by producing slower cooling rates.

The NRC staff finds that the requirements of Enclosure 1 together with Mandatory Appendix I of the proposed alternative are consistent with the intent of provisions approved in ASME Code Cases N-504-3 and N-638-1 including Section XI, Nonmandatory Appendix Q, of the ASME Code. Therefore, the proposed alternative is acceptable.

4.5 Modifications to Appendix VIII, Supplement 11

The U.S. nuclear utilities created the PDI Program to implement performance demonstration requirements contained in Section XI, Appendix VIII, of the ASME Code. Moreover, the PDI Program is designed for qualifying equipment, procedures and personnel to examine weld overlays in accordance with the UT criteria of Appendix VIII, Supplement 11. Preceding the Supplement 11 program, EPRI maintained a performance demonstration program for weld overlay qualification under the Tri-party Agreement (Reference 1). In lieu of having two programs with similar objectives, the NRC staff recognized the PDI Program (Reference 2) for weld overlay qualifications as an acceptable alternative to the Tri-party Agreement.

The PDI program is routinely assessed by the staff for consistency with the current ASME Code and proposed modifications. The PDI Program does not fully comport with the existing requirements of Supplement 11. PDI presented alternatives/modifications at public meetings in which the NRC participated (References 3 and 4). The modifications involve flaw location within test specimens and fabricated flaw tolerances. The modifications in flaw location permitted the use of test specimens from the Tri-party Agreement. The PDI Program is presented in Attachment 1 "PDI Program Modifications to Appendix VIII, Supplement 11" of RR-2, Rev. 1. The NRC staff evaluated the modifications identified in the PDI Program in comparison with Supplement 11 in the RR-2, Rev.1 submittal. The NRC staff concludes that the PDI program provides an acceptable level of quality and safety.

5.0 FPL COMMITMENTS

As stated in RR-2, Rev. 1, dated September 25, 2008, FPL committed to the following:

1. FPL will provide a report of the SWOL UT examinations within 60 days from the end of the SL1-22 refueling outage.

2. FPL will submit a summary report for the required evaluations of fatigue, residual stresses and flaw growth of the repaired weldments within 60 days from the end of the SL1-22 refueling outage.

6.0 CONCLUSION

The NRC staff has reviewed FPL's submittal and has determined that RR-2, Rev. 1, will provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the NRC staff authorizes the use of the RR-2, Rev. 1, for the application of full SWOLs of DMWs on the subject hot leg piping at SL-1 during the upcoming SL-1-22 Refueling Outage. The staff finds that the ISI requirements identified in RR-2, Rev. 1, are acceptable as they are based on current industry mandatory ISI guidance and Code Case N-504-3 and Appendix Q. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the staff authorizes the use of the licensee's proposed alternative for the remainder of the fourth ISI interval at SL-1, which is scheduled to end on February 10, 2018.

All other ASME Code, Section XI requirements for which relief was not specifically requested and approved in this relief request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

7.0 REFERENCES

1. The Tri-party Agreement is between NRC, EPRI, and the Boiling Water Reactor Owners Group (BWROG), "Coordination Plan for NRC/EPRI/BWROG Training and Qualification Activities of NDE (Nondestructive Examination) Personnel," July 3, 1984.

2. NRC Letter from William H. Bateman to Michael Bratton, "Weld Overlay Performance Demonstration Administered by PDI as an Alternative for Generic Letter 88-01 Recommendations," January 15, 2002 (ML020160532).

3. NRC Memorandum from Donald G. Naujock to Terence Chan, "Summary of Public Meeting Held June 12 through June 14, 2001, with PDI Representatives," November 29, 2001 (ML013330156).

4. NRC Memorandum from Donald G. Naujock to Terence Chan, "Summary of Public Meeting Held January 31 through February 2, 2002, with PDI Representatives," March 22, 2002 (ML010940402).

Principal Contributor: K. Hoffman

Date: November 3, 2008

Mr. J. A. Stall
Senior Vice President, Nuclear and
Chief Nuclear Officer
Florida Power and Light Company
P.O. Box 14000
Juno Beach, Florida 33408-0420

November 3, 2008

SUBJECT: ST. LUCIE, UNIT 1 - SAFETY EVALUATION OF RELIEF REQUEST TO USE STRUCTURAL WELD OVERLAY AND ALTERNATIVE EXAMINATION TECHNIQUES ON SAFE END DISSIMILAR METAL WELDS (TAC NO. MD9256)

Dear Mr. Stall:

By letter dated April 29, 2008, Florida Power & Light Company (FPL) submitted Relief Request Number 2 (RR-2) as an alternative to the repair requirements of American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, for St. Lucie, Unit 1. In response to the U.S. Nuclear Regulatory Commission's (NRC) request for additional information dated September 18, 2008, FPL revised RR-2 as Revision 1 (RR-2, Rev. 1) in a letter dated September 25, 2008. FPL proposed the use of a full structural weld overlay with temper bead welding for repair and the Performance Demonstration Initiative program for inspection as alternatives to the requirements of ASME Code, Section XI.

The NRC staff has evaluated the information provided by FPL and concludes that the proposed alternatives provide an acceptable level of quality and safety. Therefore, pursuant to Title 10 of the *Code of Federal Regulations* Section 50.55a(a)(3)(i), the proposed alternatives in RR-2, Rev. 1, are authorized for the repair and examination of the subject welds for the fourth 10-year Inservice Inspection interval at SL-1, which ends on February 10, 2018.

Further details on the bases for the NRC staff's conclusions are contained in the enclosed safety evaluation. If you have any questions regarding this issue, please feel free to contact the St. Lucie Project Manager, Brenda Mozafari, at (301) 415-2020.

Sincerely,
/RA/

Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No.: 50-335

Enclosure: Safety Evaluation

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