Progress Energy

Crystal River Nuclear Plant
Docket No. 50-302
Operating License No. DPR-72

August 25, 2011
3F0811-03

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Crystal River Unit 3 – Response to Request for Additional Information to Support NRC Mechanical and Civil Branch Acceptance Review of the CR-3 Extended Power Uprate LAR (TAC No. ME6527)

References:
1. CR-3 to NRC letter dated June 15, 2011, "Crystal River Unit 3 – License Amendment Request #309, Revision 0, Extended Power Uprate" (Accession No. ML112070659)
2. Email from S. Lingam (NRC) to D. Westcott (CR-3) dated July 25, 2011, "Crystal River, unit 3 - EPU LAR"

Dear Sir:

By letter dated June 15, 2011, Florida Power Corporation (FPC), doing business as Progress Energy Florida, Inc., requested a license amendment to increase the rated thermal power level of Crystal River Unit 3 (CR-3) from 2609 megawatts (MWt) to 3014 MWt. The proposed license amendment is considered an Extended Power Uprate (EPU). On July 25, 2011, via electronic mail, the NRC provided a request for additional information (RAI) related to the piping and support design and analyses for scheduled EPU plant modifications and design information related to new valves to be added with the Low Pressure Injection System (LPI) cross-tie modification needed to support the Mechanical and Civil Branch acceptance review of the CR-3 EPU License Amendment Request (LAR).

Attachment A, "Response to Request for Additional Information to Support NRC Mechanical and Civil Branch Acceptance Review of the CR-3 EPU LAR," provides the CR-3 formal response to the RAI. Additionally, in support of the EPU acceptance review RAI response, Attachment B, "Supplemental EPU Modification Piping and Valve Design Information," provides a summary of the piping and support designs and analyses associated with safety-related plant modifications to systems, structures, and components explicitly assumed in the safety analyses for EPU operating conditions and additional valve design detail related to the LPI cross-tie modification.

This correspondence contains no new regulatory commitments.

If you have any questions regarding this submittal, please contact Mr. Dan Westcott, Superintendent, Licensing and Regulatory Programs at (352) 563-4796.

Sincerely,

Jeffrey Swartz
Director – Site Operations
Crystal River Nuclear Plant

JS/gwe

ADD1
NRR

Progress Energy Florida, Inc.
Crystal River Nuclear Plant
15760 W. Powerline Street
Crystal River, FL 34428

Attachments:

A. Response to Request for Additional Information to Support NRC Mechanical and Civil Branch Acceptance Review of the CR-3 EPU LAR

B. Supplemental EPU Modification Piping and Valve Design Information

xc: NRR Project Manager
Regional Administrator, Region II
Senior Resident Inspector
State Contact

STATE OF FLORIDA

COUNTY OF CITRUS

Jeffrey Swartz states that he is the Director-Site Operations, Crystal River Nuclear Plant for Florida Power Corporation, doing business as Progress Energy Florida, Inc.; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.

Jeffrey Swartz
Director – Site Operations
Crystal River Nuclear Plant

The foregoing document was acknowledged before me this 25th day of August, 2011, by Jeffrey Swartz.

Signature of Notary Public
State of Florida

SHARON I. LAYTON
Comm# DD0796549
Expires 6/13/2012
Florida Notary Assn., Inc

(Print, type, or stamp Commissioned
Name of Notary Public)

Personally Known _____ -OR- Produced Identification √

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302 /LICENSE NUMBER DPR-72

ATTACHMENT A

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT NRC MECHANICAL AND CIVIL BRANCH ACCEPTANCE REVIEW OF THE CR-3 EPU LAR

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT NRC MECAHNICAL AND CIVIL BRANCH ACCEPTANCE REVIEW OF THE CR-3 EPU LAR

By letter dated June 15, 2011, Florida Power Corporation (FPC), doing business as Progress Energy Florida, Inc., requested a license amendment to increase the rated thermal power level of Crystal River Unit 3 (CR-3) from 2609 megawatts (MWt) to 3014 MWt. The proposed license amendment is considered an Extended Power Uprate (EPU). On July 25, 2011, via electronic mail, the NRC provided a request for additional information (RAI) related to the piping and support design and analyses for scheduled EPU plant modifications and design information related to new valves to be added with the Low Pressure Injection (LPI) System cross-tie modification needed to support the Mechanical and Civil Branch acceptance review of the CR-3 EPU License Amendment Request (LAR).

NRC Request for Additional Information

The acceptance review of the EPU LAR submitted by Progress Energy (PE or the licensee) determined that, at minimum, the following have not been completed:

- Piping and support designs and analyses for scheduled EPU plant modifications scheduled for R17 have not been completed (See page 2.2.2.2-5 of Attachment 5 to the licensee's June 15, 2011 letter submitting LAR # 309, which indicates that these activities will be performed at a later date).
- Designs for two new safety-related motor operated valves to be added to the Boron Precipitation Line, and for two check valves to replace existing valves in the Decay Heat system have not been completed (See page 2.2.4-3 of the Attachment).

The staff requests that the licensee provide assurance that all structural modifications and/or additions have been identified and designed and that all structural evaluations and required design calculations to show that SSCs credited to and/or affected by the proposed EPU have been completed and that controlled documentation exists which finds the applicable SSCs structurally adequate to perform their intended design functions under EPU conditions.

CR-3 Response:

Provide assurance that all structural modifications and/or additions have been identified and designed and that all structural evaluations and required design calculations to show that SSCs credited to and/or affected by the proposed EPU have been completed and that controlled documentation exists which finds the applicable SSCs structurally adequate to perform their intended design functions under EPU conditions.

As described in Section 1.0 of Appendix E, "Major Plant Modifications," of the CR-3 EPU Technical Report (TR) (Reference 1, Attachment 7), the CR-3 EPU Project is being designed and implemented over several years. A number of plant modifications have already been installed in support of EPU plant operation (e.g., Condensate and Feedwater Systems heat exchanger upgrade, larger turbine bypass valves). Structural evaluations and design calculations for these installed structural modifications and additions have been completed, controlled documentation exists, and the applicable structures, systems and components (SSCs) are structurally adequate to perform their intended design functions under EPU conditions. Also, as stated in Section 2.2.2,

"Pressure-Retaining Components and Components Supports," of the CR-3 EPU TR (Reference 1, Attachment 7), CR-3 has reviewed the structural integrity of pressure retaining components (and their supports) and focused on the effects of the proposed EPU on the design input parameters and the design-basis loads and load combinations for normal operating, upset, emergency, and faulted conditions. CR-3 also performed a comparison of the resulting stresses and cumulative fatigue usage factors against the code allowable limits. These analyses evaluated the effects of the increased pressure, temperature and flow that will be exhibited when operating at EPU conditions. As stated in Section 2.2.2.2, "Balance of Plant Piping, Components, and Supports," of the CR-3 EPU TR (Reference 1, Attachment 7), piping systems not specifically listed in the stress summary table were evaluated but did not require detailed evaluation (i.e., no significant operating parameter increases due to EPU) to reconcile EPU conditions.

For structural modifications and additions credited in the EPU safety analyses that will be installed prior to EPU implementation, structural evaluations and design calculations are being prepared in accordance with the CR-3 engineering change (EC) process. CR-3 provides a commitment, as stated in the List of Regulatory Commitments of the CR-3 EPU LAR (Reference 1, Attachment 10), to implement EPU modifications prior to exceeding 2609 MWt. This includes installation of the modifications in Appendix E of the CR-3 EPU TR as well as finalization of structural evaluations and design calculations in accordance with the Progress Energy design control processes.

Refer to Attachment B, "Supplemental EPU Modification Piping and Valve Design Information," for additional detail and status of following items:

- Piping and support designs and analyses for scheduled EPU plant modifications; and
- Designs for two new safety-related motor operated valves to be added to the Boron Precipitation Line, and for two check valves to replace existing valves in the Decay Heat System.

To summarize, structural modifications and additions have been identified and designed to the extent practicable. Structural evaluations and design calculations for already installed EPU modifications and additions have been completed and controlled documentation exists. For remaining EPU modifications, structural evaluations associated with SSCs credited in the EPU safety analyses are being prepared in accordance with the CR-3 EC process and the final designs will ensure these SSCs are structurally adequate to perform their intended design functions under EPU conditions. Also, prior to operation at EPU conditions, CR-3 has committed to implement required modifications, which will include updating controlled documents and confirming the applicable SSCs are structurally adequate to perform their intended design functions under EPU conditions.

Reference

1. CR-3 to NRC letter dated June 15, 2011, "Crystal River Unit 3 – License Amendment Request #309, Revision 0, Extended Power Uprate." (Accession No. ML112070659)

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

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ATTACHMENT B

SUPPLEMENTAL EPU MODIFICATION PIPING AND VALVE DESIGN INFORMATION

SUPPLEMENTAL EPU MODIFICATION PIPING AND VALVE DESIGN INFORMATION

Introduction

This attachment provides a summary of the piping and support designs and analyses associated with safety-related plant modifications to systems, structures, and components (SSCs) which are explicitly assumed in the safety analyses for Extended Power Uprate (EPU) operating conditions. Also, this attachment includes additional design detail related to the new safety-related motor operated valves being added and the two replacement check valves associated with the Low Pressure Injection (LPI) System Cross-Tie and Hot Leg Injection (HLI) Modification.

Emergency Feedwater (EFW) System Upgrade

EFW System pump recirculation piping will be modified to supply sufficient EFW to the steam generators (SGs) prior to operation at EPU conditions. The EFW System will be modified by installing new safety-related motor operated valves (MOVs) in the currently continuously open EFW pump recirculation lines. The recirculation valves will close when flow to the SGs is sufficient to meet or exceed the pump manufacture's minimum recommended flow rates and reopen prior to EFW pump flow demand dropping below the minimum required pump flow rate. Additionally, the turbine driven EFW pump (EFP-2) recirculation line is currently undersized. As a result, the manufacturer's recommended minimum flow rate of 250 gpm for continuous operation cannot be achieved and the undersized line results in very high fluid velocity. The new modification will increase the size of this line from 1 inch to 2 inches while still maintaining adequate pump margins. The larger line will not only provide the 250 gpm minimum flow rate required for continuous pump operation, but also decrease the flow velocity to an acceptable rate. Figures 1.1-1 and 1.1-2 provide simplified drawings of the EFW System plant modification design.

Pipe stress analyses were performed for piping associated with the EFW System upgrade. Results of these stress analyses are summarized in Table 1.1-1. The scope of associated structural modifications and additions of pipe supports required for the EFW System upgrade are identified in Table 1.1-2. The EFW System modification design for pipe supports will be finalized as part of the Crystal River Unit 3 (CR-3) Engineering Change (EC) process. The related design documents will be processed and controlled in accordance with CR-3 design and configuration change control procedures. The scheduled finalization of the EFW System upgrade EC is spring of 2012.

Atmospheric Dump Valve (ADV) Replacement and Fast Cooldown System (FCS) Modification

As stated in Appendix E, "Major Plant Modifications," of the CR-3 EPU Technical Report (TR) (Reference 1, Attachment 7), the ADVs are to be replaced with larger safety-related valves. To accommodate the larger capacity ADVs, the existing 6-inch branch piping at the 24-inch main steam header to the ADVs is being replaced with 8-inch piping and components, including the existing 6-inch ADV block valves. The existing 10-inch exhaust piping from each ADV is being

replaced with a 12-inch exhaust pipe to accommodate the higher flow rates. Pipe stress analyses were performed for piping associated with the ADV and associated piping replacement. Results of these stress analyses are summarized in Table 1.2-1. The scope of associated structural modifications and additions of pipe supports required for the ADV and associated piping replacement are identified in Table 1.2-2. Description of the ADV replacement and FCS plant modification designs are provided in Appendix E, Enclosure 2, "ADV/Fast Cooldown System Modification," of the CR-3 EPU TR (Reference 1, Attachment 7). The ADV replacement and FCS modification designs for pipe supports will be finalized as part of the CR-3 EC process. The related design documents will be processed and controlled in accordance with CR-3 design and configuration change control procedures. The scheduled finalization of the ADV replacement and FCS modification EC is fall of 2011.

LPI System Cross-Tie and HLI Modification

As described in Appendix E, Enclosure 1, "LPI Cross-Tie Modification," of the CR-3 EPU TR (Reference 1, Attachment 7), the LPI System is being modified to support EPU. The following changes will be made to the piping: 1) a cross-tie in the discharge lines of the LPI trains will be installed to improve Emergency Core Cooling System (ECCS) performance while postulating a loss of one LPI pump (or train of cooling) during a postulated Core Flood Line Break; and 2) an associated active boron precipitation HLI line will be installed to enhance the ability of the ECCS to mitigate boron precipitation in the core region due to post accident coolant boil-off and ensure the core geometry remains amenable to cooling. Pipe stress analyses were performed for piping associated with the LPI System cross-tie and HLI line. Results of these stress analyses are summarized in Table 1.3-1. Simplified diagrams of these piping modifications are provided in Appendix E, Enclosure 1 (Reference 1, Attachment 7). The scope of associated structural modifications and additions of pipe supports associated with the new LPI cross-tie and HLI lines are identified in Table 1.3-2. The LPI cross-tie and HLI modification design for pipe supports will be finalized as part of the CR-3 EC process. The related design documents will be processed and controlled in accordance with CR-3 design and configuration change control procedures. The scheduled finalization of the LPI cross-tie and HLI modification EC is the end of 2011.

Feedwater (FW) System Isolation Valve Modification

As described in Section 2.5.5.4, "Condensate and Feedwater," of the CR-3 EPU TR (Reference 1, Attachment 7), the FW isolation valves will be replaced in order to achieve the closing time required by the Main Steam Line Break (MSLB) analysis for EPU operating conditions. A pipe stress evaluation was performed for piping associated with the replacement of the safety-related FW isolation valves. This evaluation determined that the increase in pipe stress was 161 psi, which is an increase of approximately 1%. This negligible increase is considered acceptable. No pipe support modifications are required for this change. The safety-related FW isolation valve modification design will be finalized as part of the CR-3 EC process. The related design documents will be processed and controlled in accordance with CR-3 design and configuration change control procedures. The scheduled finalization of the FW System modification EC is fall of 2011.

Main Steam (MS) System Pipe Support Modifications

Various MS System pipe supports are being modified to accommodate revised loading due to a more severe steam hammer event resulting from a turbine stop valve closure event with the increased steam flow rate at EPU operating conditions. Pipe stress analyses were performed for piping associated with the MS header (MS loops A-1, A-2, B-1, and B-2) and the EFW System steam lines to the steam driven EFW pump. Results of these stress analyses are summarized in Table 2.2.2.2-1, "Stress Summary at EPU Conditions," of the CR-3 EPU TR (Reference 1, Attachment 7). Additionally, the scope of associated structural modifications and additions of pipe supports are identified in Table 2.2.2.2-2, "Pipe Support Summary at EPU Conditions," of the CR-3 EPU TR. The modifications for MS piping snubbers (removals and replacements) rely on the pipe stress analyses which, as previously stated, have been prepared. The modification design for pipe supports will be finalized as part of the CR-3 EC process. The related design documents will be processed and controlled in accordance with CR-3 design and configuration change control procedures. The scheduled finalization of the MS pipe support modification EC, other than piping snubbers, is fall of 2011. The scheduled finalization of the MS piping snubbers modification ECs is 2012.

Piping and Pipe Support Final Designs and Controlled Documentation

EPU plant modification designs, scope, and associated structural analyses for the affected piping and pipe supports may be revised to accommodate field changes and re-analysis of the piping, as necessary, during finalization and implementation of the modifications. Pipe stress analyses, pipe support designs and structural analyses, and any revisions to the scope and final designs of the pipe supports or re-analysis of the piping is controlled in accordance with CR-3 design and configuration change control procedures. Any required re-analysis of piping and pipe supports will be performed in accordance with CR-3 licensing basis standards; specifically ANSI/USAS B 31.1.0 -1967 (Reference 2).

Summary of Structural Support of SSCs Credited in the EPU Safety Analyses

The pipe stress analyses, proposed final designs of piping and pipe supports, and associated structural analyses for the applicable pipe supports indicate that SSCs credited in or affected by the proposed EPU are structurally adequate to perform their intended design functions under EPU conditions.

HLI Safety-Related MOVs Additional Design Detail

As described in Appendix E of the CR-3 EPU TR (Reference 1, Attachment 7), two new safety-related MOVs (DHV-514 and DHV-614) will be added to the LPI System in the HLI line. The valves will be located in the CR-3 Reactor Building at an approximate plant elevation of 100 ft. for the center of flow.

The new valves are 6-inch NPS, American Society of Mechanical Engineers (ASME) Class 1500 (2500 psig @ 300°F design requirements) and are constructed to the 1998 Edition with 2000

Addendum of ASME III, Class 2 requirements. The valves are designed to conform to MPR-2524A, "Joint Owners' Group (JOG) Motor Operated Valve Periodic Verification Program Summary," (Reference 3). The valves are parallel-slide type and are designed to accommodate both pressure and thermal locking. The operator is designed to 130% of the required load to ensure margin exists.

The safety-related MOV valve modification design will be finalized as part of the CR-3 EC process. Post installation testing will be performed to ensure the new safety-related MOVs can perform their intended safety and design functions under EPU conditions. The related design documents will be processed and controlled in accordance with CR-3 design and configuration change control procedures. The scheduled finalization of the LPI cross-tie and HLI modification EC is the end of 2011.

New LPI System Discharge Stop-Check Valves Additional Design Detail

As described in Appendix E of the CR-3 EPU TR (Reference 1, Attachment 7), the current Decay Heat (DH) System discharge line throttle valves (DHV-210 and DHV-211) are to be replaced with two new stop-check valves (DHV-510 and DHV-610). The new valves will be located in the CR-3 Auxiliary Building in the same location as the existing throttle valves; downstream of the DH heat exchangers.

The new valves are 10-inch NPS, ASME Class 300 (520 psig at 300°F design requirements) and are constructed to the 1998 Edition with 2000 Addendum of ASME III, Class 2 requirements.

The stop-check valve modification design will be finalized as part of the CR-3 EC process. Post installation testing will be performed to ensure the new stop-check valves can perform their intended safety and design functions under EPU conditions. The related design documents will be processed and controlled in accordance with CR-3 design and configuration change control procedures. The scheduled finalization of the LPI cross-tie and HLI modification EC is the end of 2011.

References

1. CR-3 to NRC letter dated June 15, 2011, "Crystal River Unit 3 – License Amendment Request #309, Revision 0, Extended Power Uprate." (Accession No. ML112070659)

2. ANSI/USAS B 31.1.0, "Power Piping," 1967.

3. MPR-2524A, "Joint Owners' Group (JOG) Motor Operated Valve Periodic Verification Program Summary," Revision 1.

Table 1.1-1 EFW Recirculation Line Modification Stress Summary at EPU Conditions					
Piping Analysis Description	**Loading Condition**	**Existing Stress (psi)**	**EPU Stress (psi)**	**Allowable Stress (psi)**	**EPU Stress Ratio (Note 1)**
EFW Pump 2 Recirculation Line	Sustained (Normal)	4,907	6,817(*)	15,000	0.45
	Upset (OBE)	7,262(2)	8,608(*)	18,000	0.48
	Emergency (SSE)	7,262	10,400(*)	27,000	0.39
	Upset (Water Hammer)	7,279	7,356(*)	18,000	0.41
EFW Pump 3 Recirculation Line	Sustained (Normal)	4,292	5,418(*)	15,000	0.36
	Upset (OBE)	4,792	16,872(*)	18,000	0.94
	Emergency (SSE)	4,931	22,932(*)	27,000	0.85
	Upset (Water Hammer)	4,792(3)	4,792(3) (*)	18,000	0.27

Notes for Table 1.1-1:

(*) Reflects EPU conditions with support modifications as reported in Table 1.1-2

1. EPU Stress Ratio is based on the ratio of EPU stress divided by the allowable stress.
2. Operating Basis Earthquake (OBE) Stresses not calculated, only Safe Shutdown Earthquake (SSE).
3. EFP-3 water hammer stresses are conservative and unchanged by EPU. Combination of Water Hammer + Sustained Normal (4,292 + 500 = 4,792 psi).

Table 1.1-2 EFW Recirculation Line Modification Pipe Support Summary at EPU Conditions		
Piping Analysis Description	**Support Number (EFH-___)**	**Required Modification**
EFW Pump 2 Recirculation Line	611	Replace existing PH-28 with designed support.
	612	Increase U-bolt size from 1-inch to 2-inch
	653	New support; typical Type PH-28
	654	Replace existing Type 6 (loose U-bolt) with designed support.
	655	Increase U-bolt size from 1-inch to 2-inch
	657	Redesign to typical type PH-28
EFW Pump 3 Recirculation Line	656	New support design

Table 1.2-1 ADV Replacement Modification Stress Summary at EPU Conditions					
Piping Analysis Description	**Loading Condition**	**Existing Stress (psi) (Note 1A)**	**EPU Stress (psi) (Note 1B)**	**Allowable Stress (psi)**	**EPU Stress Ratio (Note 2)**
Atmospheric Dump Valve (ADV) Relief Vent MSV-25	Sustained (Normal)	1,601 (a)	5,794(*)	15,000	0.39
	Sustained (Normal)	1,533 (b)			
	Occasional (with OBE)	1,853 (a)	8,717(*)	18,000	0.48
	Occasional (with OBE)	1,797 (b)			
	Occasional (with OBE) [Main Steam - Penetration 106 to Isolation Valve MSV-412]	9,506 (c)			
	Occasional (with SSE) [Main Steam - Penetration 106 to Isolation Valve MSV-412]	15,027 (c)	22,278(*)	27,000	0.83
Atmospheric Dump Valve (ADV) Relief Vent MSV-26	Sustained (Normal)	1,601 (a)	5,777(*)	15,000	0.39
	Sustained (Normal)	1,533 (b)			
	Occasional (with OBE)	1,853 (a)	14,000(*)	18,000	0.78
	Occasional (with OBE)	1,797 (b)			
	Occasional (with OBE) [Main Steam - Penetration 107 to Isolation Valve MSV-414]	9,102 (d)			

Table 1.2-1 ADV Replacement Modification Stress Summary at EPU Conditions					
Piping Analysis Description	**Loading Condition**	**Existing Stress (psi) (Note 1A)**	**EPU Stress (psi) (Note 1B)**	**Allowable Stress (psi)**	**EPU Stress Ratio (Note 2)**
	Occasional (with SSE) [Main Steam - Penetration 107 to Isolation Valve MSV-414]	14,241(d)	23,659(*)	27,000	0.88

Notes for Table 1.2-1:

(*) Reflects EPU conditions with support modifications as reported in Table 1.2-2

1. A) Except as noted below, the existing stress enveloped both ADVs MSV-25 and MSV-26 and were as follows:
   (a) From existing piping analysis for piping below the Intermediate Building, Floor Elevation 149'-0". This enveloped stress does not include steam hammer effect from Main Steam Outside Containment Loop A-1 (MSV-25), Loop B-2 (MSV-26) and existing ADV thrust loads (i.e., the ADV was not included in the analysis boundary). Occasional (with SSE) stress was not tabulated.
   (b) From existing piping analysis for piping above the Intermediate Building's roof, Elevation 149'-0". This enveloped stress does not include wind and tornado wind loads. Occasional (with SSE) stress was not tabulated.
   (c) The existing stress obtained from Main Steam Outside Containment Loop A-1 reported in Table 2.2.2.2-1.
   (d) The existing stress obtained from Main Steam Outside Containment Loop B-2 reported in Table 2.2.2.2-1.

   B) The EPU Stress includes steam hammer effect from Main Steam Outside Containment Loop A-1 (MSV-25), Loop B-2 (MSV-26), new ADV thrust loads (with SSE), wind loads (bounds OBE) and tornado wind loads (bounds SSE). The entire piping model from Main Steam Header (Loop A-1 (MSV-25); Loop B-2 (MSV-26)) to end of relief vent pipe was included in one single model.

2. EPU Stress Ratio is based on the ratio of EPU stress divided by the allowable stress.

Table 1.2-2 ADV Replacement Modification Pipe Support Summary at EPU Conditions		
Piping Analysis Description	**Support Number (RVH-___)**	**Required Modification**
Atmospheric Dump Valve (ADV) Relief Vent MSV-25	38A (Note 1)	New Support
	59	New Support
Atmospheric Dump Valve (ADV) Relief Vent MSV-26	29A (Note 2)	New Support
	60	New Support

Notes for Table 1.2-2:

1. New ADV pipe will be routed to different location; thus existing support RVH-38A will be removed, but support tag number will be reused for new support.
2. New ADV pipe will be routed to different location; thus existing support RVH-29A will be removed, but support tag number will be reused for new support.

Table 1.3-1 LPI System Cross-Tie and HLI Modification Stress Summary at EPU Conditions					
Piping Analysis Description	**Loading Condition**	**Existing Stress (psi)**	**EPU Stress (psi)**	**Allowable Stress (psi)**	**EPU Stress Ratio (Note 1)**
Stress Analysis from DHHE-1A to Reactor Building Penetration 343	Sustained Loads	7,122	6,815(*)	15,550	0.44
	Thermal Expansion	21,119	26,718(*)	27,325	0.98
	Upset Condition	12,442	10,262(*)	18,660	0.55
	Faulted Condition SSE	17,763	18,232(*)	27,990	0.65
Stress Analysis from DHHE-1B to Reactor Building Penetration 342	Normal	8,648	8,583(*)	15,550	0.552
	Upset Condition	17,198	14,485(*)	18,660	0.776
	Emergency	25,747	22,468(*)	27,990	0.803
	Thermal	27,046	26,151(*)	27,325	0.960
Stress Analysis from Anchor DHH-663 to Auxiliary Building Penetration DHSL-745	Normal	4,239	4,357(*)	15,330	0.28
	Upset Condition	5,930	6,258(*)	18,396	0.34

Table 1.3-1 LPI System Cross-Tie and HLI Modification Stress Summary at EPU Conditions					
Piping Analysis Description	**Loading Condition**	**Existing Stress (psi)**	**EPU Stress (psi)**	**Allowable Stress (psi)**	**EPU Stress Ratio (Note 1)**
	Emergency	7,622	8,198(*)	27,594	0.30
	Thermal	11,731	15,620(*)	27,270	0.57
Stress Analysis for LPI Cross-Tie piping inside the Reactor Building	Normal Condition	6,677	11,002(*)	15,000	0.733
	Occasional Condition with OBE	11,210	18,737(*)	20,460	0.916
	Occasional Condition with SSE	22,693	25,286(*)	30,690	0.824
	Secondary Load	8,974	22,440(*)	27,188	0.825

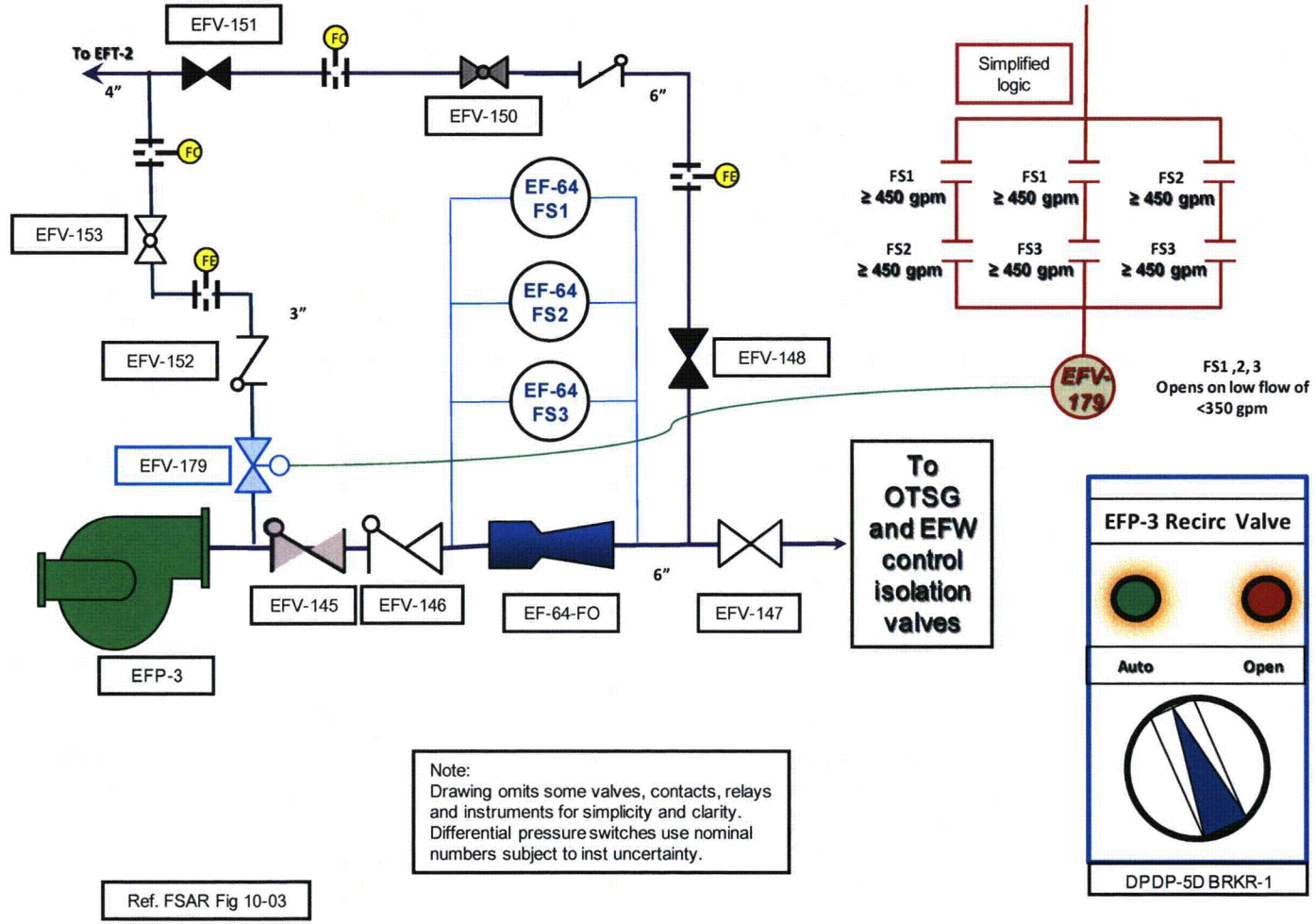
Notes for Table 1.3-1:

(*) Reflects EPU conditions with support modifications as reported in Table 1.3-2

1. EPU Stress Ratio is based on the ratio of EPU stress divided by the allowable stress,

Table 1.3-2 LPI System Cross-Tie and HLI Modification Pipe Support Summary at EPU Conditions		
Piping Analysis Description	**Support Number**	**Required Modification**
Qualification of New Supports for Cross-Tie Piping Inside the Reactor Building	DHH-683	New Rigid Strut Support
	DHH-684	New Rigid Support
	DHH-685	New Rigid Strut Support
	DHH-686	New Variable Spring Hanger
	DHH-687	New Variable Spring Hanger
	DHH-688	New Rigid Strut Support
Evaluation of Existing LPI Cross-Tie Pipe Supports Inside the Reactor Building	DHH-3	Replace the existing variable spring hanger with a higher rated variable spring, new cold load setting is 3153 lbs.
	DHH-14	Change the variable spring cold load setting from 1778 lbs to 2934 lbs.
	DHH-23	Replace snubber and associated components with higher rated components. Use additional weld on end bracket to support steel weld.
Evaluation of Existing LPI Cross-Tie Pipe Supports Outside the Reactor Building	DHR-45	Revise anchorage to eliminate anchor bolt closest to load path.
	DHR-53	Replace existing anchor bolts with higher capacity anchor bolts.
	DHR-54	Increase pin to pin length and modify rear bracket.
	DHR-55	Replace existing anchor bolts with higher capacity anchor bolts.
	DHH-663	Replace existing anchorage configuration with higher capacity bolts and additional bolts.

Figure 1.1-1
Simplified Diagram of EFP-3 Recirculation Valve



Note:
Drawing omits some valves, contacts, relays and instruments for simplicity and clarity. Differential pressure switches use nominal numbers subject to inst uncertainty.

Ref. FSAR Fig 10-03

Figure 1.1-2
Simplified Diagram of EFP-2 Recirculation Valve