Progress Energy

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

January 19, 2012
3F0112-07

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 Component Performance and Testing Branch Technical 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 November 3, 2011, "Crystal River, Unit 3 EPU LAR - RAIs from Component Performance & Testing Branch (CPTB) (TAC No. ME6527)"
3. NRC to CR-3 letter dated December 7, 2011, "Crystal River Unit 3 Nuclear Generating Plant - Request for Additional Information for Extended Power Uprate License Amendment Request (TAC No. ME6527)" (Accession No. ML11326A231)

Dear Sir:

By letter dated June 15, 2011, Florida Power Corporation, 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. On November 3, 2011, via electronic mail, the NRC provided a draft request for additional information (RAI) needed to support the Component Performance and Testing Branch (EPTB) technical review of the CR-3 Extended Power Uprate (EPU) License Amendment Request (LAR). By teleconference on November 29, 2011, CR-3 discussed the draft RAI with the NRC to confirm an understanding of the information being requested. On December 7, 2011, the NRC provided a formal RAI required to complete its evaluation of the CR-3 EPU LAR, which included the EPTB RAI.

The attachment, "Response to Request for Additional Information to Support NRC Component Performance and Testing Branch Technical Review of the CR-3 EPU LAR," provides the CR-3 formal response to the RAI needed to support the EPTB technical review of the CR-3 EPU LAR.

In support of the EPU technical review RAI responses, an enclosure is provided. The enclosure, "Evaluation of EPU Impact on CR-3 Safety-Related Pumps and Valves," provides a summary of the EPU evaluations performed for the Inservice Testing Program pumps and valves for each safety-related system.

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

A001
NRR

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,

Jon A. Franke
Vice President
Crystal River Nuclear Plant

JAF/gwe

Attachment: Response to Request for Additional Information to Support NRC Component Performance and Testing Branch Technical Review of the CR-3 EPU LAR

Enclosure: Evaluation of EPU Impact on CR-3 Safety-Related Pumps and Valves

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

STATE OF FLORIDA

COUNTY OF CITRUS

Jon A. Franke states that he is the Vice President, 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.

Jon A. Franke
Vice President
Crystal River Nuclear Plant

The foregoing document was acknowledged before me this 19 day of January, 2012, by Jon A. Franke.

Signature of Notary Public
State of Florida

CAROLYN E. PORTMANN
Commission # DD 937553
Expires March 1, 2014
Bonded Thru Troy Fain Insurance 800-385-7019

(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

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT NRC COMPONENT PERFORMANCE AND TESTING BRANCH TECHNICAL REVIEW OF THE CR-3 EPU LAR

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION TO SUPPORT NRC COMPONENT PERFORMANCE AND TESTING BRANCH TECHNICAL 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. On November 3, 2011, via electronic mail, the NRC provided a draft request for additional information (RAI) needed to support the Component Performance and Testing Branch (EPTB) technical review of the CR-3 Extended Power Uprate (EPU) License Amendment Request (LAR). By teleconference on November 29, 2011, CR-3 discussed the draft RAI with the NRC to confirm an understanding of the information being requested. On December 7, 2011, the NRC provided a formal RAI required to complete its evaluation of the CR-3 EPU LAR, which included the EPTB RAI. The following provides the CR-3 formal response to the RAI needed to support the EPTB technical review of the CR-3 EPU LAR. For tracking purposes, each item related to this RAI is uniquely identified as EPTB X-Y, with X indicating the RAI set and Y indicating the sequential item number

Component Performance and Testing Branch (EPTB)

19. (EPTB 1-1)

On page 2.2.4-2, it is stated:

"If not discussed below, no adverse impact was found to the pumps or valves."

This statement is very vague and does not describe the adequacy of the evaluation for EPU conditions for pumps and valves. Please list and describe each plant system and component that did not experience adverse impacts to safety-related pumps and valves when reviewed for EPU conditions.

Response:

As noted in Section 2.2.4, "Safety-Related Valves and Pumps," of the CR-3 EPU Technical Report (TR), (Reference 1, Attachments 5 and 7), CR-3 implementation of valve programs incorporating the guidance of Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance," and GL 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves," were evaluated and accepted by the NRC. Additionally, CR-3 participation in the Joint Owners Group (JOG) program, thereby implementing the guidance of GL 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Power-Operated Valves, was evaluated and accepted by the NRC. Each of these valve programs is linked to the CR-3 design control process to assure that changes to system conditions or safety-related component additions are addressed within the associated program.

The EPU review of CR-3 safety-related motor-operated valves (MOVs) considered changes in differential pressure, required stroke time, mechanical weak-link, and the potential for pressure-locking/thermal-binding. Additionally, each air operated valve (AOV), solenoid operated valve (SOV), check valve, and pressure relief valve listed in the station In-service Testing (IST) database were reviewed for impact as a result of EPU conditions. As indicated in Section 2.2.4 of the CR-3 EPU Technical Report (TR), (Reference 1, Attachments 5 and 7), modifications to

the Decay Heat (DH), Emergency Feedwater (EFW), Main Steam, and Main Feedwater (MFW) systems involve the addition or modification of safety-related valves. Section 2.2.4 provides a brief discussion of the impact these modifications have on the IST Program.

An enclosure, "Evaluation of EPU Impact on CR-3 Safety-Related Pumps and Valves," provides a summary of the results of the EPU review of station safety-related and IST Program pumps and valves organized by plant system.

20. (EPTB 1-2)

Please identify any modifications to your Appendix J program as a result of the EPU.

Response:

The acceptance criteria associated with the CR-3 Containment Leakage Rate Testing Program, which implements the requirements of 10 CFR 50, Appendix J, are not altered as a result of EPU. As indicated in Section 2.6.1, "Primary Containment Functional Design," of the CR-3 EPU Technical Report (TR), (Reference 1, Attachments 5 and 7), the initial containment pressure is assumed at a lower value (1.5 psig) resulting in a peak containment internal pressure which is conservative with respect to the peak calculated containment internal pressure (P_a) of 54.2 psig specified in CR-3 Improved Technical Specification (ITS) 5.6.2.20, "Containment Leakage Rate Testing Program." As a result, the overall Type A, B, and C testing acceptance criteria, based on allowable leakage (L_a), will not change.

The following are changes related to EPU that impact the scope of the CR-3 Containment Leakage Rate Testing Program:

1. Two containment electrical penetration will be added as a result of the new low pressure injection (LPI) hot leg injection (HLI) line and are currently identified to be included in the Type B testing population;

2. Two check valves will be added in the new LPI HLI line and located inside containment. One of these two series check valves is considered a containment isolation valve. These valves are not subject to local leak rate testing (LLRT) consistent with the existing exception associated with LPI discharge line penetrations as allowed by Section 3.1.1 of American Nuclear Standard ANSI/ANS 56.8-1994, "Containment System Leakage Testing Requirements," (Reference 2). These penetrations are required to be in service post-accident and the containment isolation valves in these penetrations are required to be open to perform the system safety function post-accident and are not required to perform an automatic containment isolation function; and

3. The atmospheric dump valves (ADVs) will be replaced with larger ADVs. While these valves are within the penetration boundary for the main steam lines, they are not subject to Type C LLRT consistent with the existing exception as allowed by Section 3.3.1 of ANSI/ANS 56.8-1994 (Reference 2). The main steam lines do not communicate with the Reactor Coolant System (RCS) pressure boundary or the containment atmosphere and the lines are not postulated to rupture during a loss of coolant accident and thus, containment leakage into the ADV line is not credible.

The current calculated combined Type B and C containment leakage is 0.085 L_a. Anticipated increase in containment leakage, as a result of the additional containment penetration flowpaths, will have minimal impact on the margin to the ITS 5.6.2.20 limit of 0.6 L_a containment leakage for Type B and C leakage.

21. (EPTB 1-3)

Please describe your air-operated valve (AOV) program and any modifications as a result of the EPU.

Response:

The CR-3 AOV Program is implemented by the Progress Energy Air Operated Valve Reliability Program. The AOVs are classified based on safety significance, mode of operation, and affect on plant reliability. Category 1 AOVs are defined as those valves that perform an active 10 CFR 50.65 maintenance rule function and have high safety significance. Category 2 AOVs are defined as those valves that are safety-related, perform an active safety function, and have low safety significance. Category 3 AOVs are defined as those valves that are classified as Generation Significant and not Category 1 or 2. The AOV Program includes the basis for classification and design basis documentation, testing, and maintenance requirements of those valves determined to be within the scope of the program. The AOV Program also includes the following elements: Setpoint Control, Design Basis Reviews, Baseline Testing, Periodic Testing, Post Maintenance Testing, Preventative Maintenance, Documentation/Data Management, AOV Parameter Trending, and AOV Failure Tracking and Trending. These program requirements are in conformance with the JOG AOV Program for Category 1 and Category 2 valves.

The EPU does not alter the CR-3 AOV Program requirements. Additionally, the CR-3 engineering change (EC) process ensures changes that impact the plant AOVs are processed through the AOV Program, as applicable. Specifically, evaluations of the EPU impact to the CR-3 safety-related AOVs conclude that six AOVs associated with the Main Steam System are affected by an increase in differential pressure; four main steam isolation valves (MSIVs) and two ADVs.

The ADVs are being replaced with larger valves due to increased decay heat as a result of the EPU. The EPU design evaluation addresses the full capability of the ADVs to function at the elevated differential pressure. The ADVs are assumed in the safety analyses to accomplish RCS fast cooldown function and are therefore, safety-related. As a result, these valves are currently identified to be added to the station AOV Program as Category 1 valves and maintained in accordance with the AOV Program requirements.

The MSIVs were assessed and confirm that the MSIVs are fully functional at the elevated differential pressure and can continue to perform their associated safety functions at EPU conditions.

The CR-3 AOV Program continues to address plant changes as a result of the EPU. Implementation of the EPU does not alter the AOV Program requirements associated with setpoint control, testing, valve performance evaluations and monitoring, maintenance, data management, or tracking and trending.

22. (EPTB 1-4)

On page 2.2.4-4, it is stated:

"Calculations reviewing the stroke times for MOVs [motor operated valves] predict that the stroke times will increase minimally, therefore the impact to stroke time is negligible"

This statement is unclear. Please better define "minimally" and "negligible" in this statement.

Response:

The referenced statement on page 2.2.4-4 of the CR-3 EPU TR (Reference 1, Attachments 5 and 7) related to minimal increase and negligible impact on MOV stroke time was specifically referring to the MOVs associated with FWV-33 and FWV-36 since these were the MOVs that indicated an increase in stroke time as a result of fluid system changes at EPU conditions. The MOV assessment performed for EPU concluded that the stroke times associated with the other safety-related MOVs were not impacted as a result of fluid system changes at EPU conditions. The stroke times for MOVs FWV-33 and FWV-36 indicated an increase of 0.03 seconds; 30.54 seconds to 30.57 seconds for FWV-33 and 30.65 seconds to 30.68 seconds for FWV-36. This minimal increase in stroke time is considered a negligible impact on MOVs FWV-33 and FWV-36.

23. (EPTB 1-5)

Please describe the lessons learned programs for MOVs and AOVs.

Response:

The lessons learned programs for the MOV and AOV programs consist of maintaining and updating the respective programs based on internal Progress Energy fleet operating experience (OE); industry information, regulatory information, and vendor information received; and other utility experience. FPC relies on industry feedback and OE to monitor the health of MOV and AOV performance and reliability and to enhance these programs. Selected personnel responsible for MOV and AOV Program implementation participate with industry groups dedicated to valve performance, including the Air-Operated Valve User Group, American Society of Mechanical Engineers (ASME) committees, JOG, and the Electric Power Research Institute. The Institute of Nuclear Power Operations (INPO) OE forum is monitored to enable early detection of industry experiences. Applicable INPO event reports are screened and reviewed to determine the impact to the MOV and AOV programs and recommendations incorporated, as appropriate.

24. (EPTB 1-6)

Throughout section 2.2.4, often it is stated at the end of the section that "Changes are reflected in the Inservice Testing Program." This statement is very vague. For each instance of a change to the Inservice Testing (IST) Program in this section, please provide a more detailed description of the change that will be instituted and how it impacts the IST program.

Response:

The statement is consistent with current CR-3 Improved Technical Specification content that defers periodic testing requirement descriptions to the required programs. The plant design control processes assure that new pumps and valves are added to the same programs and that system condition changes are reflected in program acceptance criteria. The intent of the statement(s) was to confirm that remains true for EPU related changes.

Emergency Feedwater System

Two SOVs will be added in emergency feedwater pump (EFP-2 and EFP-3) recirculation lines and are currently identified to be included in the CR-3 IST Program.

Decay Heat System

Two check valves will be added in the new LPI hot leg injection line and are currently identified to be included in the CR-3 IST Program. One of these series check valves is considered a containment isolation valve and both valves perform the RCS pressure isolation function.

Two MOVs will be added in the new LPI hot leg injection line and are currently identified to be included in the CR-3 IST Program. These valves will be tested in accordance with ASME Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Certain Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants, OM Code-1995, Subsection ISTC."

Two DH heat exchanger outlet MOV isolation valves are being replaced with manual stop check valves and therefore, will be removed from the CR-3 IST Program. The two stop check valves are currently identified to be included in the IST Program.

The two DH pumps are currently identified to be re-baselined following the EPU modifications. The reference flow rate for these pumps is expected to increase approximately 200 gpm.

Main Steam System

The ADVs are being replaced with larger ADVs to support the EPU. The ADVs are currently in the IST Program and the testing scope is not anticipated to be altered by this modification. However, valve stroke times will change as a result of the larger size and therefore, the new valves will be re-baselined following the EPU modification.

The new ADVs include a new safety-related Backup Air System. Passive and active valves associated with the new ADV Backup Air System will be added to the CR-3 IST Program. Six instrument air check valves, in line between the backup air bottles and the ADV actuators, are currently identified in the design as active components to be included in the IST Program. The CR-3 EC process ensures the applicable IST testing requirements are identified for the active valves of the ADV Backup Air System required to support the ADV safety function.

Main Feedwater System

The MFW pump suction MOVs are being replaced to support the EPU. The MFW pump suction MOVs are currently in the IST Program and tested in accordance with ASME Code Case OMN-1 and the MOV JOG Program. EPU analyses require the design limiting stroke time for the new MFW pump suction MOVs to decrease; 34 seconds to 20 seconds. The MFW pump suction MOVs will continue to be tested per the IST Program on a Cold Shutdown frequency.

25. (EPTB 1-7)

The weak link component capability and maximum actuator capacities of the MOVs, post-EPU, are provided on Table 2.2.4-2 on page 2.2.4-6. For valves FWV-33 and FWV-36, please identify if analysis was performed to determine their susceptibility to a "hot short" since the weak link component capabilities are less than the maximum actuator capabilities.

Response:

The evaluations performed for MOVs at EPU conditions included mechanical weak link evaluations. Evaluations of weak link impacts due to hot shorts were not specifically performed for the EPU LAR. However, these evaluations have been performed as a part of a plant compliance review associated with NRC Information Notice 92-18, "Potential for Loss of Remote Shutdown Capability During a Control Room Fire" (Reference 3). The current evaluation concluded that weak link impacts due to hot shorts associated with feedwater valves FWV-33 and FWV-36 is not a concern based on an operator action to manually actuate the Emergency Feedwater Initiation and Control System MFW isolation, which trips the MFW pumps and closes the MFW isolation valves. This existing operator action is not altered by EPU conditions and therefore, continues to provide an alternative that addresses the susceptibility of FWV-33 and FWV-36 to hot short conditions.

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. American Nuclear Standard ANSI/ANS 56.8, "Containment System Leakage Testing Requirements," American Nuclear Standards Institute, American Nuclear Society, August 4, 1994.

3. NRC Information Notice 92-18, "Potential for Loss of Remote Shutdown Capability During a Control Room Fire," dated February 28, 1992.

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302 /LICENSE NUMBER DPR-72

ENCLOSURE

EVALUATION OF EPU IMPACT ON CR-3 SAFETY-RELATED PUMPS AND VALVES

EVALUATION OF EPU IMPACT ON CR-3 SAFETY-RELATED PUMPS AND VALVES

Abstract

This enclosure is provided to summarize the results of the evaluation performed to determine the impacts of the Crystal River Unit 3 (CR-3) Extended Power Uprate (EPU) on station safety-related and Inservice Testing (IST) Program pumps and valves in support of the CR-3 EPU license amendment request. The scope of this evaluation was determined by using the current station IST database which identifies all of the safety-related pumps and valves in the plant. Over 750 valves were reviewed as part of this evaluation and include motor operated valves (MOVs), air operated valves (AOVs), solenoid operated valves (SOVs), check valves, and pressure relief valves. Manual valves were not included in the scope of this review. While over 100 valves were determined to be impacted in some way by EPU, only 18 were modified, replaced, or newly installed. Additionally, over 70 safety-related pumps were reviewed as part of this evaluation. Of these, only two were noted to be impacted by EPU and none to the point where modifications to the IST Program were necessary. The following are the results of these evaluations organized by plant system.

Air Handling (AH)

No EPU modifications were performed or are planned for the AH System that would impact the Safety-Related/IST program valves within the system. EPU is not changing the inputs, outputs or requirements of the Containment Isolation/Engineering Safeguards systems that would impact the AH System valves. There are no IST Program pumps in the AH System.

Valves Reviewed = 4
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Auxiliary Steam (AS)

A non-EPU related plant modification was implemented to allow for pressurization of the Main Steam (MS) System from Units 1 & 2 through the CR-3 AS System. This modification presented no abnormal pressures to the AS or MS systems. No EPU modifications were performed or are planned for the AS System that would directly impact the Safety-Related/IST program valves within the system. Valves which interface directly with the MS System will be subjected to elevated pressure (+30 psig) due to increase in Main Steam Header Pressure as a result of EPU, but this is bounded by the valve design. There are no IST Program pumps in the AS System.

Valves Reviewed = 5
Valves Impacted by EPU = 3
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Reactor Building Spray (BS)
No EPU modifications were performed or are planned for the BS System that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 52
Valves Impacted by EPU = 0
Pumps reviewed = 2
Pumps Impacted by EPU = 0

Chemical Addition, Liquid Sampling, and Post Accident Sampling (CA)
Due to increase in Reactor Coolant (RC) System temperature and changes in the MS System operating temperature and pressure, the CA System Containment Isolation Valves will be subjected to correspondingly higher pressures and temperatures. A review of the valve design pressures and temperatures indicate that no design limitations will be exceeded by the EPU induced changes. Relief valve set points within the system are not challenged or changed by EPU. Evaluations for MOV maximum d/p capabilities will be performed to confirm acceptable margins are maintained. The two pumps in the CA System serve no safety or IST function and are not impacted by EPU implementation.

Valves Reviewed = 23
Valves Impacted by EPU = 12
Pumps reviewed = 2
Pumps Impacted by EPU = 0

Condensate (CD)
The one valve included in the review of the CD System is normally isolated during power operation. There is no EPU impact associated with this valve. The CD Pumps will be replaced as part of EPU, but these are not within the scope of this review. These pumps are non-safety, non-IST.

Valves Reviewed = 1
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Core Flood (CF)
There are currently no EPU changes installed or planned for the CF System that would impact any Safety-Related/IST Valves within the system. The CF Injection Check Valves will be subject to higher temperatures, pressures, and flows due to increasing RC System temperatures and Decay Heat System changes. This impact has been determined to be within the design of the valves and no additional actions are required as a result of EPU implementation. There are no IST Program pumps in the CF System.

Valves Reviewed = 23
Valves Impacted by EPU = 2
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Chilled Water (CH)
There are no EPU adverse effects or EPU changes required to the CH System or any interfacing system that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 29
Valves Impacted by EPU = 0
Pumps reviewed = 3
Pumps Impacted by EPU = 0

Industrial Cooling Water (CI)
There are no EPU adverse effects or EPU changes required to the CI System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the CI System.

Valves Reviewed = 6
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Diesel Air for EFP-3 (DA)
There are no EPU adverse effects or EPU changes required to the DA System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the DA System.

Valves Reviewed = 11
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Decay Heat Closed Cycle Cooling (DC)
There are no EPU adverse effects or EPU changes required to the DC System or any interfacing system that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 30
Valves Impacted by EPU = 0
Pumps reviewed = 2
Pumps Impacted by EPU = 0

Diesel Fuel Oil Transfer (DF)
There are no EPU adverse effects or EPU changes required to the DF System or any interfacing system that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 19
Valves Impacted by EPU = 0
Pumps reviewed = 10
Pumps Impacted by EPU = 0

Decay Heat Removal (DH)

The Low Pressure Isolation Cross Tie Modification removes some existing valves and adds several new safety-related valves to the IST Program. The new valves will include: stop check valves; nozzle check valves for containment isolation; motor operated valves for the new boron precipitation line; and manual valves. These new valves have been evaluated and approved for implementation and use in accordance with the installation engineering change (EC) package. Other changes as a result of this modification (i.e., increased flows) and their effect on the Safety-Related/IST Program valves and pumps have also been evaluated by the installation EC package and found to be acceptable. No other specific EPU valve or pump issues within the scope of this review were identified within the DH System.

Valves Reviewed = 42
Valves Impacted by EPU = 13
Pumps reviewed = 2
Pumps Impacted by EPU = 2

Diesel Jacket Coolant / Air Cooler Coolant (DJ)

There are no EPU adverse effects or EPU changes required to the DJ System or any interfacing system that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 17
Valves Impacted by EPU = 0
Pumps reviewed = 8
Pumps Impacted by EPU = 0

Diesel Lube Oil (DL)

There are no EPU adverse effects or EPU changes required to the DL System or any interfacing system that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 23
Valves Impacted by EPU = 0
Pumps reviewed = 12
Pumps Impacted by EPU = 0

Domestic Water (DO)

There are no EPU adverse effects or EPU changes required to the DO System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the DO System.

Valves Reviewed = 11
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Condensate and Demineralized Water Supply (DW)
There are no EPU adverse effects or EPU changes required to the DW System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the DW System.

Valves Reviewed = 2
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Emergency Feedwater (EF)
Based on EPU analyses, the minimum required flow of EF to the Once Through Steam Generators (OTSGs) must be increased to supply sufficient flow for Design Basis Accidents. In order to meet the new flow requirements, the EF System will be modified by installing new safety-related SOVs in the recirculation lines, which will be normally open. The SOVs will close when flow to the OTSGs is sufficient to meet or exceed the pump manufacturer's minimum suggested flow rate and reopen when flow demand to the OTSGs drops below the minimum required pump flow rate. No other specific EPU valve issues within the scope of this review were identified within the EF System. EF Pump design flow rates will not change as a result of EPU implementation. No EPU impact on EF System pumps.

Valves Reviewed = 37
Valves Impacted by EPU = 31
Pumps reviewed = 3
Pumps Impacted by EPU = 0

Diesel Compressed Starting Air and Engine Exhaust (EG)
There are no EPU adverse effects or EPU changes required to the EG System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the EG System.

Valves Reviewed = 16
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Fire Service Water (FS)
There are no EPU adverse effects or EPU changes required to the FS System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the FS System.

Valves Reviewed = 1
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Main Feedwater (FW)
The FW Booster Pumps and the FW Pumps will be replaced at part of EPU scope. This will result in increased flow and pressures in the FW System. Pressure is expected to rise

approximately 20 psi and flow approximately 2000 gpm. These pumps are not Safety-Related nor are they in the IST Program. Therefore, they are outside the scope of this evaluation. Vendor hydraulic analysis and the EPU MOV Assessment evaluated the FW valves and confirmed acceptability at EPU conditions. The FW Pump suction valves will be replaced to address stroke time/isolation requirements during a loss of FW event. No other FW System valves within the scope of this review were determined to require additional action as a result of EPU implementation.

Valves Reviewed = 19
Valves Impacted by EPU = 17
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Instrument Air (IA)
New safety-related high pressure air storage bottles and associated piping/valves will be installed to supply air to the new safety-related atmospheric dump valves (ADVs). This will result in new safety-related valves within the IA System. These new valves have been evaluated and approved for use by the implementing EC package. There are no IST Program pumps in the IA System.

Valves Reviewed = 24
Valves Impacted by EPU = 17
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Reactor Building Leak Rate Testing and Post Accident Hydrogen Purge (LR)
There are no EPU adverse effects or EPU changes required to the LR System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the LR System.

Valves Reviewed = 4
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Main Steam (MS)
Due to changes in the operating pressure and flow rates throughout the system, the following valves required the following actions due to EPU:

The main turbine bypass control valves were replaced to address increased flow requirements. No additional actions are required for these valves to support EPU.

The ADVs are being replaced with larger valves. Analyses and evaluations have been completed and confirm adequate valve capacities and functions post EPU.

The main steam isolation valves were evaluated at EPU conditions and were found to be acceptable. No other specific EPU valve issues within the scope of this review were identified within the MS System. There are no IST Program pumps in the MS System.

Valves Reviewed = 36
Valves Impacted by EPU = 28
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Make-up and Purification (MU)
EPU changes result in a slight increase in RC System temperatures. However, this change does not adversely impact any MU System Safety-Related valves or pumps within the scope of this review.

Valves Reviewed = 122
Valves Impacted by EPU = 0
Pumps reviewed = 12
Pumps Impacted by EPU = 0

Nitrogen (NG)
There are no EPU adverse effects or EPU changes required to the NG System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the NG System.

Valves Reviewed = 1
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Reactor Coolant (RC)
EPU changes result in an increase in RC System average temperature. However, this change is within the design limitations of the system components and does not adversely impact any RC System Safety-Related valves or pumps within the scope of this review.

Valves Reviewed = 22
Valves Impacted by EPU = 0
Pumps reviewed = 4
Pumps Impacted by EPU = 0

Nuclear Services and Decay Heat Sea Water (RW)
There are no EPU adverse effects or EPU changes required to the RW System or any interfacing system that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 19
Valves Impacted by EPU = 0
Pumps reviewed = 4
Pumps Impacted by EPU = 0

Spent Fuel Cooling (SF)
There are no EPU adverse effects or EPU changes required to the SF System or any interfacing system that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 7
Valves Impacted by EPU = 0
Pumps reviewed = 2
Pumps Impacted by EPU = 0

Nuclear Services Closed Cycle Cooling (SW)
There are no EPU adverse effects or EPU changes required to the SW System or any interfacing system that would impact the Safety-Related/IST Program valves or pumps within the system.

Valves Reviewed = 106
Valves Impacted by EPU = 0
Pumps reviewed = 5
Pumps Impacted by EPU = 0

Liquid Waste Disposal, Gas Waste Disposal and Waste Gas Sampling (WD)
There are no EPU adverse effects or EPU changes required to the WD System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the WD System.

Valves Reviewed = 26
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0

Containment Monitoring (WS)
There are no EPU adverse effects or EPU changes required to the WS System or any interfacing system that would impact the Safety-Related/IST Program valves within the system. There are no IST Program pumps in the WS System.

Valves Reviewed = 20
Valves Impacted by EPU = 0
Pumps reviewed = 0
Pumps Impacted by EPU = 0