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Quad Cities Nuclear Power Station
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10 CFR 50.59
10 CFR 72.48

SVP-07-001

January 3, 2007

U. S. Nuclear Regulatory Commission
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Washington, D.C. 20555

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

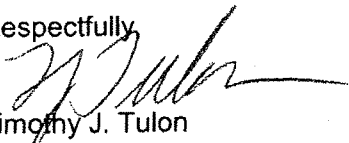
Reference: Letter from T. J. Tulon (Exelon Generation Company) to U. S. NRC,
"10 CFR 50.59 Summary Report," dated January 3, 2003

Subject: 10 CFR 50.59 / 10 CFR 72.48 Summary Report

In accordance with 10 CFR 50.59, subpart (d)(2), and 10 CFR 72.48 subpart (d)(2), "Changes, tests, and experiments," we are forwarding a summary of completed changes, tests, and experiments (Attachment). This submittal contains a summary of 10 CFR 50.59 evaluations completed between January 1, 2004 and December 31, 2006 (the Reference letter provides the previous summary report). No 10 CFR 72.48 evaluations were completed between January 1, 2004 and December 31, 2006.

Should you have any questions concerning this letter, please contact Mr. W. J. Beck at (309) 227-2800.

Respectfully,


Timothy J. Tulon
Site Vice President
Quad Cities Nuclear Power Station

Attachment: Summary Report of Changes, Tests, and Experiments Completed

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

ATTACHMENT
Summary Report of Completed Changes, Tests, and Experiments

1 Tracking Number: QC-E-2004-03

Unit: Unit 1

Activity Description

The activity involves a modification that replaces the existing analog Reactor Recirculation Control System (RRCS) with a digital microprocessor based system. This includes an upgrade to the Main Control Room (MCR) control stations and certain transmitters and sensors necessary to interface with the new equipment. Additionally, the activity will replace the present analog processing system for the jet pump flow instrumentation with a digital system with programming for compiling and transmitting the information to various system displays.

Impact of Activity

The RRCS controls the operation of the variable speed motor-generators and ultimately the recirculation pump speed. The performance of the existing RRCS will be modified to include specific design upgrade objectives and specific control system design requirements. The RRCS will consider both dual loop and single loop operation. The activity will replace the existing RRCS and jet pump instrumentation with a fault-tolerant, state-of-the-art digital control system to support power operation throughout the remainder of plant life.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The review determined that the change does not increase any transient, accident, or malfunction consequences. In addition, the change does not increase the probability or likelihood of an accident or malfunction. Based on the 50.59 evaluation, the activity may be implemented per plant procedures without obtaining prior NRC approval.

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Summary Report of Completed Changes, Tests, and Experiments

2 Tracking Number: QC-E-2004-04

Unit: Unit 1 and Unit 2

Activity Description

The activity involves a modification to remove the automatic main turbine trip on high bearing vibration. Included in this modification is a revision to the control room annunciator response procedures to require a manual turbine trip after verification of a valid high vibration condition. The UFSAR will also be revised to eliminate the automatic turbine trip on turbine bearing high vibration.

Impact of Activity

The effect of this activity is to remove the automatic turbine trip on high vibration. The operators must manually trip the main turbine after confirmation that a valid high vibration condition exists. Replacing the automatic action with a manual action may increase the vibration level and/or time required before the turbine is tripped; however, these parameters are not specified in the UFSAR and they do not affect accident or transient analysis. Only the main turbine overspeed trip feature is credited for protection against turbine missiles. The turbine vibration probes and associated trip instrumentation are not credited to mitigate accident or transient conditions. The UFSAR will be revised to eliminate the main turbine high vibration trip. Industry experience indicates there have been spurious turbine trips caused by wiring, connector or vibration probe failures. Removing the automatic turbine trip on high turbine vibration eliminates the potential for spurious trips which could unnecessarily challenge plant equipment and operators, and will improve plant reliability.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The turbine vibration probes and associated trip instrumentation are non-safety-related, are not credited with preventing turbine missiles, and are not relied upon to mitigate accidents or transients. Removing the high turbine vibration trip will not prevent safety-related components from fulfilling their design function. Removing the high vibration trip will beneficially decrease the frequency of spurious turbine trips. Based on the 10 CFR 50.59 evaluation, the activity may be implemented without obtaining prior NRC approval.

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Summary Report of Completed Changes, Tests, and Experiments

3 Tracking Number: QC-E-2004-06

Unit: Unit 2

Activity Description

The activity involves a modification to the plant involving the removal, and subsequent replacement, of a section of the Unit 2 Reactor Building (RB) siding in order to provide an opening to facilitate the movement of the new steam dryers into secondary containment. The modification is being implemented as part of the Steam Dryer Replacement Project. This activity will consist of the cutting and removal of both layers of the RB siding, subgirts and insulation, and removal of the support girts as necessary. Temporary flashing will be attached to both the inner and outer layers of the remaining siding to reinforce the remaining sections of siding along the perimeter of the cut and to prevent the area between the remaining siding layers from being exposed to the elements. This activity will also update (on an interim basis) procedure QCTS-0410-02, "Secondary Containment Capability Test," that will be used to test the operability of the alternate secondary containment boundary established at this location. In addition, the design includes repair details to provide a contingent method to immediately restore the secondary containment, if required, during cutting activities. Finally, this EC will provide for the installation of replacement siding at this location, following movement of the steam dryers into the RB. Once installed, the replaced siding will be tested to ensure it is as leak tight as the existing siding.

Impact of Activity

The effect of the proposed modification is to provide an alternate access to secondary containment to allow passage of the new steam dryers. Testing will be performed to confirm that the door and enclosure are functioning properly and that secondary containment can be maintained. These local tests will be performed prior to making any cuts in the RB siding in order to provide the required level of assurance that the secondary containment can be maintained. To ensure the design basis of secondary containment is not impacted, the RB siding configurations have been evaluated against the design criteria set forth in Calculation QDC-0020-S-0176, "Quad Cities Units 1 and 2 Design Basis Siding Qualification." All configurations have been evaluated and found to be within the design criteria. Calculation QDC-0000-S-1399, "Design of Temporary Enclosure on Refueling Floor for the Steam Dryer Replacement Project," provides the evaluation of the structural adequacy of these sheet metal panels for all of the applicable loads including wind and seismic loads.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The configurations have been evaluated to meet the design criteria of secondary containment; therefore, the activity has no adverse effects on any UFSAR described functions. There is no increase in the frequency of any accidents or transients as previously evaluated in the UFSAR. During cutting activities, contingent methods will be in place to immediately restore secondary containment within the required time period, if required. There is no increase in radiological consequences, as an alternate secondary containment boundary will be in place and operable while the RB siding is removed. Therefore, a secondary containment boundary will always exist at this location. The activity does not exceed or alter the design basis pressure limit as described in the UFSAR, and there is no change to any evaluation methodology as described in the UFSAR. There are no

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Summary Report of Completed Changes, Tests, and Experiments

changes required to the Technical Specifications to support this change. Therefore, the proposed activity may be implemented without prior NRC approval.

4 Tracking Number: QC-E-2005-01

Unit: Unit 1 and Unit 2

Activity Description

The activity involves a modification to the plant. The change implements the following enhancements to the Electro-Hydraulic Control (EHC) system:

- Install a Thrust Bearing Wear Detector (TBWD) bypass switch in support of TBWD testing with indication of bypass switch position (if other than normal) via a control room alarm.
- Install a push-to-test indicating light to eliminate a single point vulnerability potential.
- Remove the high exhaust hood turbine temperature trip function while maintaining the associated alarm.
- Disable the "NO EHC DC Power" trip function while maintaining an alarm of the condition (this trip has been jumpered since original construction).

These changes represent turbine reliability enhancements designed to eliminate sources of spurious turbine trips. The TBWD changes are a direct response to the turbine trip and reactor scram that occurred during turbine testing in March 2004. The high exhaust hood and EHC DC power trip eliminations were both identified as reliability improvement opportunities during turbine single point vulnerability reviews.

Impact of Activity

The changes to the turbine trip logic will not impact the plant design basis, or supporting safety analyses as described in the UFSAR. The TBWD trip function will remain functional during normal operations. This function is not discussed in the UFSAR. Following the implementation of the proposed change to the turbine trip on high exhaust hood temperature, operators will manually trip the main turbine after confirmation of a valid high exhaust hood temperature condition, based on control room indications. This may increase the temperature and/or time required before the turbine is tripped since the turbine will be tripped manually instead of automatically. However, these parameters are not specified in the UFSAR and they do not affect accident or transient analysis. Only the turbine overspeed trip feature is credited with preventing a postulated turbine missile, which is not modified by this change.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The turbine control circuitry affected by the modification is non-safety-related, not credited with preventing a postulated turbine missile, and not relied upon to mitigate postulated accidents or transients. Also, the changes will not prevent any safety-related component/system from fulfilling its design function. These changes will beneficially decrease the frequency of turbine trips from spurious actuations. For these reasons, the proposed activity may be implemented without prior NRC approval.

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Summary Report of Completed Changes, Tests, and Experiments

5 Tracking Number: QC-E-2005-02

Unit: Unit 1

Activity Description

The activity involves a change to the facility. During a forced outage (Q1F51), damage was identified on a portion of the Unit 1 main steam dryer. The missing part of the steam dryer outer bank hood is a triangular ½ inch thick 304 stainless steel plate measuring approximately 6.5 inches by 9.0 inches. Extensive searches during subsequent outages (Q1F51 and Q1R18) were unsuccessful in locating the missing dryer material. The change evaluates this material as a permanent lost part in Unit 1. A lost parts evaluation was documented in report GE-NE-0000-0023-5200-R0, "Lost Parts Analysis for Quad Cities Generating Station Unit 1, Steam Dryer Outer Hood." The evaluation reviewed possible lost part migration paths and concluded that operating Unit 1 with the missing dryer material does not compromise reactor safety.

Impact of Activity

General Electric (GE) evaluated the impact of the lost material on structures, systems and components. GE concluded that safe reactor operation will not be compromised. There is no safety concern for flow blockage to the fuel bundles, interference with the control rod scram function, fretting, corrosion, adverse chemical reaction, or interference with reactor instrumentation. Although the lost material poses certain operational concerns related to partial bottom head drain plugging and recirculation system performance, these issues can be detected and mitigated through existing procedures. The lost parts evaluation documented in GE-NE-0000-0023-5200-R0 concludes that operating Unit 1 with the missing dryer material does not compromise reactor safety.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The proposed activity does not result in operation of equipment outside design as described in the UFSAR or outside any limits or controls established by the Technical Specifications or Operating License. Since no described design functions are more than minimally affected, and no change to Technical Specifications or the Operating License is required, the change can be implemented and does not require prior NRC approval.

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Summary Report of Completed Changes, Tests, and Experiments

6 Tracking Number: QC-E-2005-03

Unit: Unit 1

Activity Description

The activity is a change to the facility. The change evaluated is the accumulated foreign material (FM) that either currently resides in the Unit 1 reactor pressure vessel, or may migrate from connected systems. The evaluation is being performed to review the potential cumulative effects of the FM prior to startup from the current refueling outage (Q1R18). Exelon procedures require that a best effort be made to retrieve FM and to actively preclude FM from entering sensitive areas in the plant. Despite best efforts to preclude FM, some items have been lost and are unaccounted for. The evaluation considers all of the material that has been identified as potentially being in the reactor vessel at this time, including the most recent items identified during Q1R18 (reflects items that were recovered in Q1R18).

Impact of Activity

The results of industry studies conclude that while FM can lead to operational concerns, FM does not compromise safe operation. Exelon procedures provide guidance for mitigating FM. When loose parts are lost in the reactor or connected systems, there are a number of important considerations which are included in the lost parts evaluation. In addition, the review must determine if there are cumulative impacts that could result from the synergistic effects that accumulate over time. The Unit 1 lost parts evaluation concludes there is no significant impact on plant safety.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The review concludes there is not a significant impact on plant safety. Potential cumulative effects from FM were reviewed in detail. In addition, the evaluation considered the effects that can accumulate over time, such as fretting wear and the potential to plug screens and strainers. The cumulative effects were not detrimental to any structure, system or component. Therefore, Unit 1 operation with the existing FM does not require prior NRC approval.

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Summary Report of Completed Changes, Tests, and Experiments

7 Tracking Number: QC-E-2005-04

Unit: Unit 1 and Unit 2

Activity Description

The proposed activity is a plant modification that replaces the existing reactor pressure vessel (RPV) steam dryer assembly with a new assembly having a modified and more structurally robust design. The existing RPV steam dryer assembly has experienced structural damage during operation at extended power uprate (EPU) conditions. The replacement RPV steam dryer assembly supports continued operation at EPU power levels. The new Unit 2 steam dryer assembly includes instrumentation that will be used to measure pressure oscillations, confirm structural integrity and validate the design analyses during plant operation. The post modification test program provides requirements for monitoring steam dryer performance during power ascension following dryer installation.

Impact of Activity

The replacement dryer has been designed to ensure key plant operating parameters are not adversely impacted (e.g., thermal power, steam flow, steam pressure or steam temperature). While the new dryer assembly is heavier (and uses longer dryer vanes, increasing the height of the assembly), there is no significant change to handling operations.

The new steam dryer assembly is qualified to rigorous design codes (ASME Sec. III). No design code was applied during the original dryer design. The new design is qualified to updated design loading combinations including differential pressure loads, seismic loads, thermal loads, flow induced vibrations, and transient loads. The Unit 2 steam dryer assembly includes instrument sensors (accelerometers, pressure transducers and strain gages) that are structurally attached to the dryer and are qualified for the loads to which they are exposed. The instrumentation allows for data gathering and does not perform any reactor control function. The new dryer design was fully evaluated to ensure acceptable performance during postulated accidents and anticipated operational occurrences.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The proposed activity will not affect the performance or design function of the RPV steam dryer, RPV internals, or other systems and structures described in the UFSAR. There are no changes to any UFSAR described evaluation methodology or the use of an alternative methodology in establishing the design basis or safety analyses. The proposed activity does not involve a test or experiment that would operate any SSC outside of its UFSAR described design function and no change to the Technical Specifications or Operating License is required. RPV stress levels will remain within ASME code limits. The proposed modification does not result in operation of equipment outside the design as described in the UFSAR. The design does not adversely impact any ECCS system or barrier credited in mitigating the consequences of an accident. For these reasons, the proposed activity can be implemented without prior NRC review and approval.

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Summary Report of Completed Changes, Tests, and Experiments

8 Tracking Number: QC-E-2005-05

Unit: Unit 1 and Unit 2

Activity Description

The activity is a change to the facility. The 10 CFR 50.59 involves an aggregate review of the accumulated foreign material (FM) that either may reside in the reactor pressure vessel currently or may migrate to or from connecting systems. Over the course of the plant history, some FM has been lost and not recovered. Technical Evaluations for those lost parts were reviewed and supplemented with additional engineering evaluations to determine the current scope of FM in the Unit 1 and Unit 2. The systems, structures, and components (SSCs) evaluated include fission product barriers, the fuel cladding and the reactor pressure vessel boundary. The reactor internals are also considered to verify that there is no adverse impact on design function.

In addition, systems connected to the reactor are considered for the potential impact on the ability to isolate these systems and/or the potential for FM to enter these systems from the reactor and adversely affect functions important to safety.

This evaluation reviews the FM that has been identified as potentially being in the reactor vessel, up to and including the most recent outages on each Unit (i.e., Q2P03 and Q1R18) and reflects items that have been recovered. The review considers the cumulative effects of all the material that is thought to remain in the vessel and connected systems.

Impact of Activity

The results of industry studies conclude that while FM can lead to operational concerns, FM does not compromise safe operation. Industry groups have developed documents that form the bases for utilities to develop FM procedures and practices necessary to minimize the potential for FM. General Electric has reviewed the consequences of the FM for Unit 1 and Unit 2; the result this review conclude the FM does not compromise safe operation of the reactor.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The 50.59 review concludes there is not a significant impact on plant safety. Potential cumulative effects from FM were reviewed in detail. In addition, the evaluation looked at effects that can accumulate over time such as fretting wear and the potential to plug screens and strainers. The cumulative effects are not detrimental to any SSC. Therefore, operation with the existing FM does not require prior NRC approval.

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9 Tracking Number: QC-E-2005-07

Unit: Unit 1

Activity Description

The activity is a temporary change to the facility. The Temporary Configuration Change Package (TCCP) will bypass a single main steam line tunnel high temperature switch (TS 1-0261-17B) by installing a jumper across the switch contact. The switch contact is normally closed and opens on high temperature. The switch has been identified as faulty by troubleshooting efforts and has caused a half primary containment isolation system (PCIS) group I isolation and a full PCIS group III isolation. The design function of the temperature switch is to detect a leak in the reactor coolant pressure boundary (in the main steam tunnel) and initiate an isolation signal. Only eight of sixteen channels (2 of 4 in each trip string) are required operable by the Technical Specifications. The installation of the jumper will remove the PCIS isolation signals and reduce the chances of an unnecessary plant transient.

Impact of Activity

The TCCP will render TS 1-0261-17B inoperable; however, redundant channels will remain operable. Technical Specification 3.3.6.1 requires only 2 of 4 temperature switches per string to be operable for the main steam line tunnel high Temperature trip function. The three remaining operable switches satisfy the Technical Specification minimum requirement. No other systems, structures, or components are affected by this temporary change. Therefore, this change has no impact on equipment reliability or on existing design evaluations, analysis, or methodology. No new failure modes are introduced; the change is being implemented as an approved TCCP Package per approved procedures.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. The main steam line tunnel high temperature portion of the PCIS system logic has 2 trip channels. Each trip channel has 2 trip strings. Each trip string has 4 main steam line tunnel high temperature switches. Even with TS 1-0261-17B bypassed, 3 of 4 switches are operable in the applicable trip string. Therefore, implementation of this TCCP is within the bounds of the Technical Specifications. The TCCP permits the removal of the half PCIS group I isolation and full PCIS group III isolation signals. This change does not increase the frequency of occurrence or consequences of an accident evaluated in the UFSAR. It does not increase the likelihood of occurrence or consequences of a malfunction of an SSC important to safety. It does not create the possibility of an accident of a different type of malfunction of an SSC important to safety from those previously evaluated in the UFSAR. The change does not result in a design basis limit for fission product barrier being exceeded or altered, and does not depart from existing design evaluations, analyses, or methods. Therefore, this change may be implemented without prior NRC approval.

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10 Tracking Number: QC-E-2005-09

Unit: Unit 1 and Unit 2

Activity Description

The proposed activity is a plant modification. The change is the replacement of the Unit 2 safety related 250 VDC Battery under a procedurally controlled Temporary Configuration Change (TCC). The 250 VDC battery supplies power to the Unit 2 HPCI system and other non-safety related Unit 2 loads as well as the Unit 1 RCIC system. For ease of installation, the battery will be replaced in three sections. As each section is disconnected, a portion of the Unit 2 125 VDC Alternate Battery will be connected into the 250 VDC Battery string to form a complete 250 VDC operable battery. The cells which were disconnected will then be replaced, tested, and then re-connected to the 250 VDC Battery. This process will be repeated for the remaining two sections of the battery. The reason for the change is that the Unit 2 safety related 250 VDC Battery is nearing its 20 year design life and must be replaced.

Impact of Activity

The alternate battery is normally disconnected from the plant's 125 VDC system and is in a standby configuration. It is not required to be operable and may be connected into the 250 VDC battery under the TCC. Both batteries are safety related, seismically mounted, and are composed of the same type of cells. The 125 VDC alternate battery will be tested to ensure that the 250 VDC battery will remain fully operable during the replacement activities. The jumper cables will be safety related and routed such that they will not be damaged by sharp corners or possible falling objects. The cables will be routed in low traffic areas and will be protected (i.e., conduit, and diamond plate) in areas where they may come into contact with personnel.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10 CFR 50.59. Both the 125 VDC alternate and 250 VDC batteries are safety related, seismically mounted, and are composed of the same type of cells. The use of the Unit 2 125 VDC alternate battery to facilitate replacement of the Unit 2 safety related 250 VDC battery is acceptable. The worst case scenario associated with the use of this TCC would be a loss of the Unit 2 250 VDC battery. The loss of this battery, however, has been previously analyzed in the UFSAR and was found to be acceptable. For these reasons, prior NRC approval is not required to implement this change.

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Summary Report of Completed Changes, Tests, and Experiments

11 Tracking Number: QC-E-2006-02

Unit: Unit 1 and Unit 2

Activity Description

The proposed activity involves a plant design change. The change modifies the inlet configuration of the eight Main Steam Safety Valves (MSSVs) and the four Electromatic Relief Valves (ERVs). The modification adds an Acoustic Side Branch (ASB) to the inlet configuration. The ASB is a 24 inch length pipe (on MSSV standpipes, 30 inch length on ERV standpipes) filled with metal screen material. The ASB functions to eliminate the 140 and 150 - 160 Hz resonance at Extended Power Update (EPU) power levels which has contributed to increased loads on main steam components, including the steam dryer. The modification does not change the inlet configuration of the Target Rock safety relief valve.

Impact of Activity

The modification of the main steam piping configuration to install the ASBs does not impact the function or have adverse impact on the performance requirements of main steam components including the ERVs and MSSVs. The modified piping system meets all required UFSAR stress acceptance criteria. The modified inlet does not impact the setpoint of those valves credited to meet the overpressure protection requirements of the Reactor Pressure Vessel (RPV). The ASB installation results in an increase in the pressure drop between the RPV and the ERVs/ MSSVs with an associated impact on valve flow rate but no change on ASME certified valve capacity. All potentially impacted accident and transient analyses associated with these valves were evaluated, and it was determined that appropriate acceptance criteria continue to be met.

The ASBs will reduce the main steam vibration levels and will be implemented along with upgraded ERV actuators. Vibration monitoring during start-up and periodically during operation will ensure the operating environment of the piping and associated components remains acceptable. The ASB has been designed with a foreign material barrier. Analysis and testing have been done on the ASB design to ensure foreign materials from the ASB will not enter a main steam line.

Bases for Not Requiring NRC Prior Approval

This activity has been evaluated under the criteria of 10CFR50.59. The activity installs an ASB between the main steam lines and the MSSVs and ERVs in order to reduce the amplitude of the acoustic resonance frequency caused by increased flow through the main steam lines. Main steam vibration loads have increased at EPU power levels. The modification is fully qualified in accordance with the UFSAR pipe stress requirements. The modified branch pipe has no impact on the function or performance requirements of the main steam lines as described in the UFSAR. The modified inlet pipe does not impact the function of the ERVs or MSSVs. The associated increased pressure drop has the effect of reducing the flow through the ERVs and MSSVs during postulated operational occurrences. This increased pressure drop was included in an evaluation of all accident and transient analyses that credit ERV, SRV or MSSV actuation. The results of the evaluation (performed in accordance with the current licensed methodology) concluded that appropriate acceptance criteria continue to be met. The modified configuration will reduce operating loads on the main steam dryer and main steam line components. There are no

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Summary Report of Completed Changes, Tests, and Experiments

changes required to any Technical Specifications. System operations are not impacted by this change. For these reasons, it was determined that the activities could proceed in accordance with the implementing procedure without prior NRC approval.
