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U. S. Nuclear Regulatory Commission
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Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

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

Subject: Request for License Amendment to Revise Turbine Condenser Vacuum - Low Scram Instrumentation Function

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) requests an amendment to Appendix A, Technical Specifications (TS) of Renewed Facility Operating License Nos. DPR-19, DPR-25, DPR-29, and DPR-30 for Dresden Nuclear Power Station (DNPS) Units 2 and 3, and Quad Cities Nuclear Power Station (QCNPS) Units 1 and 2, respectively.

The proposed amendment would revise the TS Allowable Value (AV) for the Reactor Protection System (RPS) Instrumentation Function 10, "Turbine Condenser Vacuum - Low," specified in TS Table 3.3.1.1-1, "Reactor Protection System Instrumentation." The proposed amendment also revises the Channel Functional Test (CFT) and Channel Calibration (CC) Surveillance Test Interval (STI) for DNPS TS Table 3.3.1.1-1, Function 10. As part of the DNPS STI revision, SR 3.3.1.10, "Channel Calibration," which is specific to the Turbine Condenser Vacuum - Low instrument function, is deleted since it is no longer applicable.

The purpose of the proposed AV change is to increase margin and operating flexibility during restoration of condenser heat transfer capabilities (i.e., during routine periodic cleaning of the condenser by flow reversal). The implementation of these evolutions has historically resulted in a decrease in condenser vacuum levels when performed during periods of high ambient temperature. Reducing the RPS Turbine Condenser Vacuum-Low AV will provide additional margin and operating flexibility during these flow reversal operations, thus minimizing the potential for inadvertent automatic scrams due to low condenser vacuum.

The purpose of the proposed DNPS CFT STI change is to implement recommendations from a generic evaluation (i.e., an Allowed Outage Time (AOT)/STI licensing topical report) that was developed by General Electric (GE) and the Boiling Water Reactor Owners' Group (BWROG) and subsequently approved by the NRC.

The purpose of the proposed DNPS CC STI change is to implement the results of a revised setpoint error analysis for the Turbine Condenser Vacuum - Low scram instrumentation, which establishes an increased design margin between the trip setpoint and the AV for the instrument. This increased design margin, combined with historical CC data, provides adequate assurance that the component will remain operable during an extended CC STI.

This request is subdivided as follows:

Attachment 1 provides a description of the proposed changes, including a technical and regulatory analysis.

Attachments 2A and 2B provide the marked-up TS and Bases pages, with the proposed changes indicated, for DNPS and QCNPS, respectively.

The marked-up DNPS and QCNPS Bases pages in Attachments 2A and 2B are provided for information only.

The proposed changes have been reviewed by the Plant Operations Review Committees at each of the stations and approved by the respective Nuclear Safety Review Boards in accordance with the requirements of the EGC Quality Assurance Program.

There are no regulatory commitments contained within this letter.

EGC requests approval of the proposed amendments by August 1, 2008. Once approved, the amendments shall be implemented within 120 days.

In accordance with 10 CFR 50.91(b), EGC is notifying the State of Illinois of this application for changes to the TS by transmitting a copy of this letter and its attachments to the designated State Official.

If you have any questions concerning this letter, please contact Mr. John L. Schrage at (630) 657-2821.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 1st day of August 2007.

Respectfully,

Patrick R. Simpson

Patrick R. Simpson
Manager - Licensing

Attachments:

Attachment 1	Description of Proposed Changes, Technical Analysis, and Regulatory Analysis
Attachment 2A	Dresden Nuclear Power Station Marked-Up Technical Specification and Bases Pages
Attachment 2B	Quad Cities Nuclear Power Station Marked-Up Technical Specification and Bases Pages

ATTACHMENT 1
Description of Proposed Changes, Technical Analysis, and Regulatory Analysis

1.0 DESCRIPTION

In accordance with 10 CFR 50.90, "Application for amendment of license or construction permit," Exelon Generation Company, LLC (EGC) requests an amendment to Appendix A, Technical Specifications (TS) of Renewed Facility Operating License Nos. DPR-19, DPR-25, DPR-29, and DPR-30 for Dresden Nuclear Power Station (DNPS), Units 2 and 3, and Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2, respectively.

The proposed amendment revises the TS Allowable Value (AV) for the Reactor Protection System (RPS) Instrumentation Function 10, "Turbine Condenser Vacuum - Low," specified in TS Table 3.3.1.1-1, "Reactor Protection System Instrumentation," for both DNPS and QCNPS. The proposed amendment also revises the Channel Functional Test (CFT) and Channel Calibration (CC) Surveillance Test Interval (STI) for DNPS TS Table 3.3.1.1-1, Function 10. As part of the DNPS STI revision, SR 3.3.1.10, "Channel Calibration," which is specific to the Turbine Condenser Vacuum - Low instrument function, is deleted since it is no longer applicable.

The purpose of the proposed AV change is to increase margin and operating flexibility during restoration of condenser heat transfer capabilities (i.e., during routine periodic cleaning of the condenser by flow reversal). The implementation of these evolutions has historically resulted in a decrease in condenser vacuum levels when performed during periods of high ambient temperature. Reducing the RPS Turbine Condenser Vacuum-Low AV will provide additional margin and operating flexibility during these flow reversal operations, thus minimizing the potential for inadvertent automatic scrams due to low condenser vacuum.

The purpose of the proposed DNPS CFT STI change is to implement recommendations from a generic evaluation (i.e., an Allowed Outage Time (AOT)/STI licensing topical report) that was developed by General Electric (GE) and the Boiling Water Reactor Owners' Group (BWROG) in Reference 7, and subsequently approved by the NRC in Reference 8. This licensing topical report (LTR) assessed the reliability of TS actuation instrumentation and concluded that extending AOTs and CFT STIs for test and repair activities would enhance operational safety by reducing (1) potential unnecessary plant scrams, (2) excessive equipment test cycles, and (3) the diversion of personnel and resources for unnecessary testing.

The purpose of the proposed DNPS CC STI change is to implement the results of a revised setpoint error analysis for the Turbine Condenser Vacuum - Low scram instrumentation, which establishes an increased design margin between the trip setpoint and the AV for the instrument. This increased design margin, combined with historical CC data, provides adequate assurance that the component will remain operable during an extended CC STI.

2.0 PROPOSED CHANGES

2.1 DNPS

2.1.1. DNPS TS Table 3.3.1.1-1, "Reactor Protection System Instrumentation," Function 10, "Turbine Condenser Vacuum-Low," specifies an AV of "≥ 21.4 inches Hg vacuum." This AV is being revised to "≥ 20.5 inches Hg vacuum."

2.1.2. DNPS TS Table 3.3.1.1-1, "Reactor Protection System Instrumentation," Function 10, "Turbine Condenser Vacuum-Low," specifies SR 3.3.1.1.8 for Channel Functional Test and SR 3.3.1.1.10 for Channel Calibration. These two SRs are being changed to SR 3.3.1.1.11 for Channel Functional Test and SR 3.3.1.1.13 for Channel Calibration.

2.1.3. DNPS SR 3.3.1.10, "Channel Calibration," is deleted.

2.2 QCNPS

QCNPS TS Table 3.3.1.1-1, "Reactor Protection System Instrumentation," Function 10, "Turbine Condenser Vacuum-Low," specifies an AV of "≥ 21.6 inches Hg vacuum." This AV is being revised to "≥ 20.6 inches Hg vacuum."

3.0 BACKGROUND

3.1 Description and Basis for the Current Requirement

3.1.1 Purpose of RPS Instrumentation

The RPS at DNPS and QCNPS initiates a reactor scram when one or more monitored parameters exceed their specified limits to preserve the integrity of the fuel cladding and the reactor coolant pressure boundary and minimize the energy that must be absorbed following a loss of coolant accident (LOCA).

The protection and monitoring functions of the RPS have been designed to ensure safe operation of the reactor. This is achieved by specifying, in the TS, limiting safety system settings (LSSS) and Limiting Conditions for Operation (LCOs) in terms of parameters that are directly monitored by the RPS.

The DNPS and QCNPS LSSSs establish operational settings for the RPS instrumentation that initiate automatic protective action at a level such that the Safety Limits will not be exceeded during Design Basis Accidents.

TS Section 3.3.1.1 for DNPS and QCNPS provides the requirements for RPS instrumentation. The various functions of RPS instrumentation for LSSSs and LCOs are specified in Table 3.3.1.1-1, along with the applicable operational modes, surveillance requirements (SRs), and AVs.

3.1.2 Function of Turbine Condenser Vacuum - Low Scram Instrumentation

DNPS TS Table 3.3.1.1-1, Function 10, "Turbine Condenser Vacuum - Low," is required to be operable in Mode 1 and Mode 2 (i.e., with reactor pressure $\geq$ 600 psig), with an AV of ≥ 21.4 inches Hg vacuum. QCNPS TS Table 3.3.1.1-1, Function 10, "Turbine Condenser Vacuum - Low," is required to be operable in Mode 1 with an AV of ≥ 21.6 inches Hg vacuum.

The Turbine Condenser Vacuum - Low function is provided to shut down the reactor and reduce the energy input to the main condenser to help prevent overpressurization of the condenser in the event of a loss of main condenser vacuum. For this event, the reactor scram reduces the amount of energy that is required to be absorbed by the main condenser. Loss of condenser vacuum results in the condenser no longer being capable of receiving heat input from the reactor. This condition initiates a closure of the turbine stop valves and turbine bypass valves, which eliminates reactor heat input to the condenser. Closure of the turbine stop and bypass valves causes a reactor pressure transient, neutron flux rise, and an increase in fuel surface heat flux. For this condition, the turbine stop valve closure scram function (i.e., TS Table 3.3.1-1, Function 8, "Turbine Stop Valve Closure") initiates a reactor scram to prevent the fuel cladding integrity Safety Limit from being exceeded. The turbine stop valve closure scram function alone is capable of preventing the fuel cladding integrity Safety Limit from being exceeded, in the event of the most limiting transient (i.e., a turbine trip without bypass). The condenser low vacuum scram is anticipatory to the stop valve closure scram.

As described in the DNPS and QCNPS Updated Final Safety Analysis Report (UFSAR), Section 15.2.5, "Loss of Condenser Vacuum," the loss of main condenser vacuum is classified as a moderate frequency event. The worst case for the loss of main condenser vacuum event would occur if the loss of vacuum were instantaneous. If instantaneous, the event would be identical to the turbine trip without bypass event, and the scram signal from condenser low vacuum would be simultaneous with the turbine stop valve closure scram signal. The majority of the stored heat would be removed by the relief valves, while the Isolation Condenser (IC) at DNPS and the Reactor Core Isolation Cooling (RCIC) system at QCNPS would handle the remaining decay heat.

3.1.3 Physical Configuration and Surveillance Requirements for Turbine Condenser Vacuum - Low Scram Instrumentation

Turbine condenser vacuum pressure signals are derived from four pressure switches that sense pressure in the condenser. The current AV was selected to reduce the severity of a loss of main condenser vacuum event by anticipating the occurrence and scramming the reactor at a higher vacuum than the turbine trip setpoints.

The SRs that are specified in DNPS Table 3.3.1.1-1 for Function 10 are provided to ensure that the quality of RPS Instrumentation and associated components is maintained, thus ensuring a high degree of safety system reliability. A CFT (i.e., SR 3.3.1.1.8) is performed on each required channel of Function 10 to ensure that the channel will perform the intended function. The current frequency of 31 days for SR 3.3.1.1.8 is based upon engineering judgement, operating experience, and the reliability of the instrumentation.

The CC (i.e., SR 3.3.1.1.10) is a complete check of the instrument loop and sensor. This test verifies that the channel responds to the measured parameter within the necessary range and accuracy. The CC SR leaves the channel adjusted to account for instrument drift between successive calibrations, consistent with the plant-specific setpoint methodology.

The current DNPS frequency for SR 3.3.1.1.10 is based upon the impact of a 31-day calibration interval in the determination of the magnitude of equipment drift in the current setpoint analysis. This TS STI was revised from quarterly (i.e., once every 92 days) to the current value as part of License Amendments 177 and 173 to Facility Operating Licenses DPR-19 and DPR-25, respectively (References 5 and 6) to reflect the administrative controls for the SR at that time. DNPS SR 3.3.1.1.10 is only applicable to the Turbine Condenser Vacuum - Low instrument function.

Although DNPS License Amendments 177 and 173 also implemented the recommendations of NRC-approved GE LTRs with respect to CFT STI extensions for other RPS functions, the DNPS CFT STI was maintained at the current value of monthly, rather than the extended STI of quarterly.

3.2 Circumstances that Establish the Need for the Proposed Change

3.2.1 Revision of Allowable Value

The main condensers at DNPS and QCNPS are a three-pressure design, with circulating water flowing through the tubes oriented axially, beneath the low-pressure turbines. This configuration results in a cold, warm, and hot condenser section, since circulating water is run through the three sections in series. Additionally, the flow of circulating water may be reversed in the condenser, turning the cold section into the hot section, and vice versa. The condensers are designed to operate at optimum conditions with flow from either direction.

Condenser performance at both DNPS and QCNPS has historically exhibited progressive, but reversible degradation throughout an operating cycle due to fouling caused by accumulation of both organic and inorganic debris. With low circulating water temperatures, the condenser is capable of accepting high fouling rates with little adverse indication. However, when circulating water inlet temperatures rise, the area available for heat transfer becomes more critical, and condenser performance (i.e., heat transfer) can quickly degrade. If this degradation is not halted and reversed, an operating unit will experience progressively larger production limitations (i.e., lost generation capability) in order to maintain the vacuum level in the condenser above protective setpoints.

In order to halt and reverse the impact of fouling on condenser heat transfer capability, both DNPS and QCNPS have implemented periodic on-line flow reversals through the condensers, thus increasing heat transfer capability.

A main condenser flow reversal is an operating evolution where the circulating water system, which flows into one end of the condenser, is changed by reconfiguration of the condenser valves and piping to flow into the opposite end. This operating evolution provides cleaning of accumulated fouling on the inlet tubesheet, and flushing of the debris to the discharge piping. Each flow reversal is a short duration evolution, lasting approximately five minutes. These operating evolutions are normally performed at DNPS and QCNPS with a frequency that ranges from daily to weekly, depending on condenser performance.

Performance of these flow reversal evolutions when circulating water temperatures are elevated (i.e., during periods in the summer with very high ambient temperatures) has historically resulted in a decrease in the condenser vacuum level, until completion of the flow reversal evolution. Although this condition is expected, the decrease in vacuum level can, and has approached the AV and the scram setpoint.

During flow reversals at DNPS and QCNPS, condenser vacuum levels have fallen to within approximately two inches of the AV, which is approximately one inch from the scram setpoint. In addition, both DNPS and QCNPS have historically implemented power reductions prior to, and during flow reversal evolutions in order to maintain vacuum level above the scram setpoint. Typical operating margin during non-summer periods (i.e., periods when circulating water temperatures are low) ranges from approximately four to seven inches Hg to the AV (i.e., three to six inches from the scram setpoint) at both DNPS and QCNPS.

Based on this historical data, the proposed change to the RPS Turbine Condenser Vacuum - Low AV will provide DNPS and QCNPS with additional margin and operating flexibility during flow reversal evolutions thus reducing the potential for inadvertent automatic reactor scrams during flow reversal evolutions.

In addition to the benefit of the proposed change during flow reversal evolutions, the proposed change to reduce the condenser low vacuum scram AV will provide additional time to the station operators to respond to operational transients that result in a declining condenser vacuum condition. This additional operator response time could reduce the need to manually scram the reactor due to a low condenser vacuum condition, as well as reduce the potential for an automatic reactor scram.

DNPS and QCNPS abnormal operating procedures provide a series of actions that station operators would implement to diagnose and arrest a declining condenser vacuum level. As stated in each procedure, the implementation of the various actions should be based upon the severity of the declining vacuum level. These actions include a rapid reactor power reduction. If the actions specified in the procedures do not arrest the declining trend, then the procedures instruct the operators to manually scram the reactor.

3.2.2 Relaxation of STIs (DNPS only)

In 1983, the BWROG formed a Technical Specifications Improvement Committee to identify improvements to AOTs and STIs in the BWR Standard TS. The primary objective of the BWROG AOT/STI effort was to minimize unnecessary testing that could potentially degrade overall plant safety and availability.

Consistent with this objective, the BWROG generated a series of generic LTRs justifying AOT and STI extensions in the TS for the RPS Instrumentation. With respect to an extension of the CFT STI for RPS Function 10, GE LTR NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection Systems," (Reference 7) provides the generic justification for TS improvements for RPS actuation functions. This use of this LTR to justify extension of the CFT STI for RPS instrumentation was reviewed and approved by the NRC (Reference 8).

The DNPS CC STI for the Turbine Condenser Vacuum - Low scram instrumentation was revised from quarterly (i.e., once every 92 days) to the current value as part of License Amendments 177 and 173 to Facility Operating Licenses DPR-19 and DPR-25, respectively (References 5 and 6) to reflect the administrative controls for the SR at that time.

Subsequent to the issuance of Amendments 177 and 173, EGC performed a revised setpoint error analysis that established a revised AV, trip setpoint, and Expanded Tolerance (ET) for the DNPS Turbine Condenser Vacuum - Low scram instrument, which resulted in additional design margin between the AV and the trip setpoint. This increased design margin, combined with historical CC data, provides adequate assurance that the component will remain operable during the previously approved CC quarterly STI.

The implementation of the extended CC STI consists of a revision to the applicable SR in DNPS TS Table 3.3.1-1 for the Turbine Condenser Vacuum - Low instrument function. Since the current applicable CC SR (i.e., SR 3.3.1.10) is only applicable to the Turbine Condenser Vacuum - Low instrument function, it is no longer required in the TS.

4.0 TECHNICAL ANALYSIS

4.1 Revision of Allowable Value

In order to increase margin and operating flexibility during restoration of condenser heat transfer capabilities (i.e., during routine periodic cleaning of the condenser by flow reversal), EGC proposes to lower the TS AV for the RPS Turbine Condenser Vacuum - Low function at DNPS and QCNPS.

As stated in section 3.1.3 above, the current DNPS and QCNPS Turbine Condenser Vacuum - Low AV was selected to reduce the severity of a loss of main condenser vacuum event by anticipating the occurrence and scramming the reactor at a higher vacuum than the turbine trip setpoints. EGC has performed setpoint calculations to derive new AVs, trip setpoints, and ETs for the Turbine Condenser Vacuum - Low scram function at DNPS Units 2 and 3 and QCNPS Units 1 and 2. In these calculations, the Turbine Condenser Vacuum - Low Scram AL was established equal to the nominal value for the turbine trip setpoint. These new AVs, trip setpoints, and ETs establish increased design margin between the AV and the trip setpoint.

The EGC setpoint methodology that was used for determining the revised AV is described in Reference 10. This setpoint methodology is consistent with ISA-RP67.04.02-2000, Method 3 (Reference 11). The NRC reviewed and approved the use of this setpoint methodology by EGC to determine AVs in Reference 12.

The standard operating setpoints, controls, and operating practices for the Turbine and Main Condenser will not be revised by this proposed change. The additional margin and operating flexibility resulting from the revised AVs, trip setpoints, and ETs will reduce the potential for inadvertent automatic reactor scrams during short duration (i.e., approximately 5 minute) condenser flow reversal evolutions, as well as in response to a declining condenser vacuum condition that may result from other operational transients.

EGC has reviewed the impact of the proposed change upon the turbine and condenser protection requirements. This review indicated that utilization of the added operating margin is acceptable.

The Turbine Condenser Vacuum - Low scram function is credited in the Loss of Main Condenser Vacuum anticipated operational occurrence (AOO). The loss of main condenser AOO event assumes that the main condenser is instantaneously lost while the unit is operating at full power. This is classified as a moderate frequency event and is described in the UFSAR as being bounded by the turbine trip with bypass failure event.

As vacuum decreases, the sequence of events is as follows:

- Condenser Low Vacuum alarm, which occurs at a vacuum level of 24" Hg.

- Condenser Vacuum Low alarm, which occurs at a vacuum level of 23.5" Hg.
- Condenser Low Vacuum RPS Scram, which occurs at a nominal trip setpoint of 22.2" Hg.
- Turbine Trip (including a corresponding scram signal), which occurs at a nominal trip setpoint of 20" Hg.
- Turbine bypass valve closure, which occurs at a vacuum level of 7" Hg.

The worst case for this AOO would occur if the loss of vacuum were instantaneous. In this case, the loss of main condenser event would be identical to the turbine trip with bypass failure event. During a turbine trip with bypass failure event, the primary system relief valves would remove the majority of the stored heat, while the IC at DNPS and RCIC at QCNPS would remove the remaining decay heat. Slower losses of condenser vacuum would produce less severe AOOs, since the turbine stop valves and bypass valves will still be available prior to vacuum level reaching the nominal trip setpoint for the turbine trip and turbine bypass valve closure scram.

In that the proposed reduction of the Turbine Condenser Vacuum – Low AV is based upon an AL that is equal to the nominal trip setpoint for the turbine trip, the resulting nominal trip setpoint for the Turbine Condenser Vacuum – Low scram will still be more conservative than the turbine trip setpoint. Therefore, the sequence of events for the loss of main condenser AOO will still result in a reactor scram prior to the turbine trip. Since the proposed change to the Turbine Condenser Vacuum - Low AV will not impact the limiting AOO analysis (i.e., the turbine trip with bypass failure event), the proposed change does not reduce any margin of safety.

The Turbine Condenser Vacuum - Low scram function will continue to serve as an anticipatory signal to the turbine stop valve closure scram function (i.e., a scram signal generated with a turbine trip - TS Table 3.3.1.1-1, Function 8). As such, the Turbine Condenser Vacuum-Low scram function does not protect a Safety Limit. This is consistent with the guidance in Regulatory Issue Summary (RIS) 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, 'Technical Specifications,' Regarding Limiting Safety System Settings During Periodic Testing and Calibration of Instrument Channels," and the definition of a Safety Limit - Limiting Safety System Setting (SL-LSSS), as described in draft Technical Specification Task Force Traveler (TSTF)-493, Revision 2, "Clarify Application of Setpoint Methodology for LSSS Functions."

4.2 Relaxation of STIs (DNPS only)

4.2.1 Turbine Condenser Vacuum - Low CFT STI

By letter and Safety Evaluation dated July 15, 1987 (Reference 8), the NRC indicated that GE LTR NEDC-30851P-A (Reference 7) provided an acceptable generic basis for supporting plant-specific TS changes related to extension of the CFT STI for RPS instrumentation, subject to three conditions. Specifically, the NRC indicated that each applicant for proposed extension of the CFT STI must satisfy the following conditions:

1. Confirm the applicability of the generic analysis to the specific plant.

2. Demonstrate by use of current drift information provided by the equipment vendor or plant specific data, that the drift characteristics for instrumentation used in the RPS channels in the plant are bounded by the assumptions used in the generic analyses when the functional test interval is extended from monthly to quarterly.

3. Confirm that the differences between the parts of the RPS that perform the trip functions in the plant and those of the generic analyses are included in the plant-specific analysis using the procedures of Appendix K of NEDC-30851 P-A.

EGC has reviewed the Reference 7 LTR and completed the necessary plant-specific evaluation to confirm that the generic results and conclusions apply to DNPS, Units 2 and 3 for RPS Instrumentation, Function 10. The following discussion provides a response to these three conditions.

<u>NRC CONDITION No.1</u>

Confirm the applicability of the generic analyses to the specific plant.

<u>RESPONSE TO NRC CONDITION NO. 1</u>

GE LTR NEDC-30851P-A provides the generic justification for TS improvements (i.e., AOT and CFT STI extensions) for RPS actuation functions. The NRC approved the generic justification in Reference 8.

The GE plant-specific evaluation for DNPS that is required by the NRC SE was submitted to the NRC in Reference 5. This evaluation confirmed the applicability of the Reference 7 generic analysis to DNPS, Units 2 and 3. Subsequent to the original submittal of the DNPS plant-specific evaluation, EGC has reconfirmed the applicability of the Reference 7 conclusions to the proposed Turbine Condenser Vacuum - Low CFT STI.

NRC CONDITION No. 2

Demonstrate by use of current drift information provided by the equipment vendor or plant specific data, that the drift characteristics for instrumentation used in the channels in the plant are bounded by the assumptions used in the generic analyses when the functional test interval is extended from monthly (or weekly) to quarterly.

RESPONSE TO NRC CONDITION NO. 2

The EGC setpoint error analysis methodology uses the instrument CC STI to account for expected instrument drift. Since the expected instrument drift in the setpoint error analysis does not impact the CFT STI, the proposed extension of the CFT STI remains within the existing allowance in the setpoint calculation. This is consistent with the guidance provided by the NRC in Reference 9:

> ...licensees need only confirm that the setpoint drift which could be expected under the extended STIs has been studied and either (1) has been shown to remain within the existing allowance in the RPS and ESFAS instrument setpoint calculation or (2) that the allowance and setpoint have been adjusted to account for the additional expected drift.

NRC CONDITION No. 3

Confirm that the differences between the parts of the RPS that perform the trip functions in the plant and those of the base case plant were included in the plant-specific analysis using the procedures of Appendix K of NEDC-30851P (This issue applies only to NEDC-30851P-A).

RESPONSE TO NRC CONDITION NO. 3

The GE plant-specific evaluation for DNPS that is required by the NRC SE was submitted to the NRC in Reference 5, and approved by the NRC in Reference 6. With respect to the Turbine Condenser Vacuum - Low scram function, the plant-specific analysis indicated that the function is not considered in the generic model. The addition of this scram signal does not significantly change the RPS failure frequency.

The responses to the three NRC Conditions described above confirm that the generic results of the Reference 7 LTR, as approved by the NRC in Reference 8 are applicable to DNPS, Units 2 and 3 for RPS Instrumentation, Function 10, Turbine Condenser Vacuum - Low. Therefore, the proposed extension of the DNPS CFT STI is consistent with the Reference 7 LTR and the associated NRC applicability requirements in Reference 8

4.2.2 Turbine Condenser Vacuum - Low CC STI

The proposed DNPS TS change to relax the CC STI for the Turbine Condenser Vacuum - Low scram function from the current monthly frequency to the previously approved quarterly frequency (i.e., prior to License Amendments 177 and 173 for DNPS Units 2 and 3) is based upon a revised setpoint error analysis. This revised setpoint error analysis establishes a new AV, trip setpoint, and ET for the instrument. The new AV, trip setpoint, and ET establish increased design margin between the nominal trip setpoint and the AV. This is consistent with the second NRC acceptance criterion specified in Reference 9. That is, adjustment of the allowance and setpoint to account for the additional expected drift associated with the extended STI.

The increased design margin, and the associated assumption for instrument drift between successive calibrations, combined with historical CC data, provides adequate assurance that the component will remain operable when necessary, throughout an extended CC STI, for the prevention or mitigation of accidents or transients.

The proposed deletion of SR 3.3.1.10 is an administrative change, since the SR will no longer be applicable to any instrument function in DNPS TS Table 3.3.1-1. Therefore, the proposed deletion of SR 3.3.1.10 will not impact the testing, calibration, and inspection of RPS instrumentation that is necessary to assure that the quality of the instrumentation is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

Exelon Generation Company, LLC, (EGC) is requesting an amendment to Appendix A, Technical Specifications (TS), of Renewed Facility Operating License Nos. DPR-19, DPR-25, DPR-29, and DPR-30 for Dresden Nuclear Power Station (DNPS), Units 2 and 3, and Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2, respectively.

The proposed amendment would revise the TS Allowable Value (AV) for the DNPS and QCNPS Reactor Protection System (RPS) Instrumentation Function 10, "Turbine Condenser Vacuum-Low," specified in TS Table 3.3.1.1-1, "Reactor Protection System Instrumentation." The proposed amendment also revises the Channel Functional Test (CFT) and Channel Calibration (CC) Surveillance Test Interval (STI) for DNPS TS Table 3.3.1.1-1, Function 10.

The purpose of the proposed AV change is to increase margin and operating flexibility during restoration of condenser heat transfer capabilities (i.e., during routine periodic cleaning of the condenser by flow reversal), thus minimizing the potential for inadvertent automatic reactor scrams.

The purpose of the proposed DNPS CFT STI change is to implement recommendations from a generic licensing topical report (LTR) that was developed by General Electric (GE) and the Boiling Water Reactor Owners' Group (BWROG), and subsequently approved by the NRC.

The purpose of the proposed DNPS CC STI change is to implement the results of a revised setpoint error analysis for the Turbine Condenser Vacuum - Low scram instrumentation, which establishes an increased design margin between the trip setpoint and the AV for the instrument. This increased design margin, combined with historical CC data, provides adequate assurance that the component will remain operable during an extended CC STI.

According to 10 CFR 50.92(c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated; or

2. Create the possibility of a new or different kind of accident from any accident previously evaluated; or

3. Involve a significant reduction in a margin of safety.

In support of this determination, an evaluation of each of the three criteria set forth in 10 CFR 50.92 is provided below regarding the proposed license amendment.

1. The proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

<u>Revision of Allowable Value</u>

The proposed license amendment implements a revised AV for the Turbine Condenser Vacuum - Low scram instrument function at DNPS Units 2 and 3 and QCNPS Units 1 and 2.

The proposed changes to the DNPS and QCNPS Turbine Condenser Vacuum - Low scram AV do not require modification any system interface or affect the probability of any event initiators at the facilities. Overall RPS performance will remain within the bounds of the previously performed accident analyses, since no hardware changes are proposed.

There will be no degradation in the performance of, or an increase in the number of challenges imposed on safety-related equipment that are assumed to function during an accident situation. The proposed changes will not alter any assumptions or change any mitigation actions in the radiological consequence evaluations in the Updated Final Safety Analysis Report. The proposed changes are consistent with safety analysis assumptions and resultant consequences.

For these reasons, the proposed DNPS and QCNPS AV changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

Relaxation of STIs (DNPS only)

The proposed license amendment implements a revised CFT and CC STI for the Turbine Condenser Vacuum - Low scram instrument function at DNPS Units 2 and 3. The proposed DNPS TS change to increase the CFT STI for the Turbine Condenser Vacuum - Low scram instrument function is based on an analytical method that has been reviewed and approved by the NRC.

The proposed change to relax the CFT STI implements recommendations from a generic evaluation that was developed by General Electric (GE) and the Boiling Water Reactor Owners' Group (BWROG), and subsequently approved by the NRC. This licensing topical report (LTR) assessed the reliability of TS actuation instrumentation and concluded that extending AOTs and CFT STIs for test and repair activities would enhance operational safety.

The proposed DNPS TS change to increase the CC STI for the Turbine Condenser Vacuum - Low scram instrument function is based upon a revised setpoint error analysis that provides revised AVs, trip setpoints, and Expanded Tolerances (ETs) for the instrument. These new AVs, trip setpoints, and ETs establish increased design margin between the nominal trip setpoint and the AV. This increased design margin, combined with historical CC data, provides adequate assurance that the component will remain operable when necessary for the prevention or mitigation of accidents or transients.

The TS requirements that govern operability or routine testing of plant instruments are not assumed to be initiators of any analyzed event because these instruments are intended to prevent, detect, or mitigate accidents. Therefore, these proposed STI changes will not involve an increase in the probability of occurrence of an accident previously evaluated. Additionally, these changes will not increase the consequences of an accident previously evaluated because the proposed changes do not involve any physical changes to plant systems, structures or components (SSCs), or the manner in which these SSCs are operated. These changes will not alter the operation of equipment assumed to be available for the mitigation of anticipated operational occurrences (AOOs) by the plant safety analysis or licensing basis.

The proposed deletion of SR 3.3.1.10 is an administrative change, since the SR will no longer be applicable to any instrument function in DNPS TS Table 3.3.1-1. Therefore, the proposed deletion of SR 3.3.1.10 will not impact the testing, calibration, and inspection of RPS instrumentation that is necessary to assure that the quality of the instrumentation is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

For these reasons, the proposed DNPS STI changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

In summary, the proposed license changes do not involve a significant increase in the probability or consequences of any accident previously evaluated.

2. The proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

The proposed changes to the DNPS and QCNPS Turbine Condenser Vacuum - Low scram AV and the DNPS CFT and CC STIs do not affect the design, functional performance, or operation of the facility. Similarly, the proposed changes do not affect the design or operation of any SSCs involved in the mitigation of any accidents, nor do they affect the design or operation of any component in the facilities such that new equipment failure modes are created.

No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures are introduced as a result of these changes. There will be no adverse effect or challenges imposed on any safety-related system as a result of these changes.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

3. The proposed changes do not involve a significant reduction in a margin of safety.

The proposed DNPS and QCNPS AV change does not affect the acceptance criteria for any analyzed event, nor is there a change to any Safety Analysis Limit. There will be no effect on the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined nor will there be any effect on those plant systems necessary to assure the accomplishment of protection functions. All required design functions are maintained, and the AVs, are consistent with NRC-approved methodology and guidance for establishment of TS AVs.

The proposed AV changes do not affect the accident analyses that assume operability of the instrument associated with the AV. The Turbine Condenser Vacuum - Low scram function is credited in the Loss of Main Condenser Vacuum

AOO. The loss of main condenser AOO event assumes that the main condenser is instantaneously lost while the unit is operating at full power. This is classified as a moderate frequency event and is described in the UFSAR as being bounded by the turbine trip with bypass failure event.

The worst case for this AOO would occur if the loss of vacuum were instantaneous. In this case, the loss of main condenser event would be identical to the turbine trip with bypass failure event. During a turbine trip with bypass failure event, the primary system relief valves would remove the majority of the stored heat, while the IC at DNPS and RCIC at QCNPS would remove the remaining decay heat. Slower losses of condenser vacuum would produce less severe AOOs, since the turbine stop valves and bypass valves will still be available prior to vacuum levels reaching the nominal trip setpoint for the turbine trip and turbine bypass valve closure scram.

In that the proposed reduction of the Turbine Condenser Vacuum – Low AV is based upon an AL that is equal to the nominal trip setpoint for the turbine trip, the resulting nominal trip setpoint for the Turbine Condenser Vacuum – Low scram will still be more conservative than the turbine trip setpoint. Therefore, the sequence of events for the loss of main condenser AOO will still result in a reactor scram prior to the turbine trip. Since the proposed change to the Turbine Condenser Vacuum - Low AV will not impact the limiting AOO analysis (i.e., the turbine trip with bypass failure event), the proposed change does not reduce any margin of safety.

Therefore, the proposed AV changes do not involve a significant reduction in the margin of safety.

The proposed DNPS CFT STI change is based on an NRC-approved generic analysis. This analysis concluded that the proposed CFT STI change does not significantly affect the probability of failure or availability of the affected instrumentation systems. Therefore, the proposed DNPS CFT STI change does not affect the accident analyses that assume operability of the instrument associated with the AV.

The proposed DNPS CC STI change is based on a revised setpoint error analysis for the Turbine Condenser Vacuum - Low scram instrument function that provides a revised AV, trip setpoint, and Expanded Tolerance (ET) for the instrument. The new AV, trip setpoint, and ET establish increased design margin between the nominal trip setpoint and the AV. This increased design margin, combined with historical CC data, provides adequate assurance that the component will remain operable when necessary for the prevention or mitigation of accidents or transients. Therefore, the proposed DNPS CFT STI change does not affect the accident analyses that assume operability of the instrument associated with the AV.

Therefore, the proposed changes to extend the DNPS CFT and CC STIs do not involve a significant reduction in the margin of safety.
In summary, the proposed DNPS and QCNPS AV changes and DNPS STI changes do not involve a significant reduction in the margin of safety.

Based on the above analysis, EGC has concluded that the proposed amendment involves no significant hazards consideration under the standards set forth in 10 CFR 50.92(c) and, accordingly, a finding of "no significant hazards consideration," is justified.

5.2 Applicable Regulatory Requirements/Criteria

EGC has evaluated the proposed changes to the DNPS and QCNPS Turbine Condenser Vacuum - Low scram AV and the DNPS Turbine Condenser Vacuum - Low CFT and CC STIs to determine whether applicable regulations and requirements have been met. EGC has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than a revision to the Technical Specifications. The regulatory bases and guidance documents associated with the systems discussed in this license amendment request are described below:

10 CFR 50.36(c)(1)(ii)(A) requires that the Technical Specifications include Limiting Safety System Settings (LSSSs) for variables that have significant safety functions. For variables on which a Safety Limit (SL) has been placed, the LSSS must be chosen to initiate automatic protective action to correct abnormal situations before the SL is exceeded. The regulation also requires appropriate action if it is determined that the automatic safety system does not function as required to protect an SL.

10 CFR 50.36(c)(3) requires that the Technical Specifications include surveillance requirements for testing, calibration, and inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

Upon implementation of the proposed AV change, the Turbine Condenser Vacuum - Low scram instrument function at DNPS Units 2 and 3 and QCNPS Units 1 and 2 will continue to serve as an anticipatory signal to the turbine stop valve closure scram function (i.e., a scram signal generated with a turbine trip - TS Table 3.3.1.1-1, Function 8).

Since the proposed change to the Turbine Condenser Vacuum - Low AV will not impact the limiting AOO analysis (i.e., the turbine trip with bypass failure event), the proposed AV change does not protect a Safety Limit. This is consistent with the guidance in Regulatory Issue Summary (RIS) 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, 'Technical Specifications,' Regarding Limiting Safety System Settings During Periodic Testing and Calibration of

Instrument Channels," and the definition of a Safety Limit - Limiting Safety System Setting (SL-LSSS), as described in draft Technical Specification Task Force Traveler (TSTF)-493, Revision 2, "Clarify Application of Setpoint Methodology for LSSS Functions." Therefore, the requirements of 10 CFR 50.36(c)(1)(ii)(A) will continue to be met with the proposed AV change.

The proposed DNPS CFT STI change is based on an NRC-approved generic analysis and the proposed DNPS CC STI is based upon a revised setpoint error analysis, combined with historical CC data. The requirements of 10 CFR 50.36(c)(3) to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met will continue to be met with the proposed STI changes.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

EGC has reviewed this proposed license amendment and has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criteria for categorical exclusion set forth in paragraph (c)(9) of 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review." Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

i. The amendment involves no significant hazards consideration.

   As demonstrated in Section 5.1 above, "No Significant Hazards Consideration," the proposed change does not involve any significant hazards consideration.

ii. There is no significant change in the types or significant increase in the amounts of any effluent that may be released offsite.

The proposed changes will revise an Allowable Value (AV) for a Reactor Protection System instrumentation function at Dresden Nuclear Power Station (DNPS) Units 2 and 3 and Quad Cities Nuclear Power Station (QCNPS) Units 1 and 2. The proposed changes will also extend the DNPS Channel Functional Test (CFT) and Channel Calibration (CC) Surveillance Test Intervals (STIs) for the same RPS instrumentation function. The proposed changes do not result in an increase in power level, and do not increase the production nor alter the flow path or method of disposal of radioactive waste or byproducts; thus, there will be no change in the amounts of radiological effluents released offsite.

Based on the above evaluation, the proposed change will not result in a significant change in the types or significant increase in the amounts of any effluent released offsite.

iii. There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed changes will not result in any changes to the configuration of the facility. The proposed changes will not cause a change in the level of controls or methodology used for the processing of radioactive effluents or handling of solid radioactive waste, nor will the proposed amendment result in any change in the normal radiation levels in the plant. Therefore, there will be no increase in individual or cumulative occupational radiation exposure resulting from this change.

7.0 PRECEDENT

A similar change to the Turbine Condenser Vacuum - Low Allowable Value was submitted by Oyster Creek Nuclear Generating Station in Reference 1 and approved by the NRC in Reference 2.

A similar CFT STI change for the Turbine Condenser Low Vacuum scram function, as well as other RPS actuation instrumentation functions was previously submitted by Commonwealth Edison Company (i.e., the predecessor to EGC) for QCNPS in Reference 3, and approved by the NRC in Reference 4. In addition, Commonwealth Edison submitted a similar CFT STI change for other RPS actuation instrumentation functions for DNPS in Reference 5, which was approved by the NRC in Reference 6.

8.0 REFERENCES

1. Letter from E. E. Fitzpatrick (GPU Nuclear Corporation) to USNRC, "Technical Specification Change Request No. 188," dated July 10, 1990

2. Letter from USNRC to J. J. Barton (GPU Nuclear Corporation), "Issuance of Amendment," dated March 4, 1991

3. Letter from R. M. Krich (Exelon Generation Company) to USNRC, "Proposed Technical Specifications Change, Surveillance Test Intervals and Allowable Outage Times for Protective Instrumentation," dated December 27,1999

4. Letter from USNRC to O. D. Kingsley (Exelon Generation Company), "Quad Cities Nuclear Power Station, Units 1 and 2 - Issuance of Amendments," dated March 28, 2001

5. Letter from J. M. Heffley (Exelon Generation Company) to USNRC, "Proposed Technical Specifications Change, Surveillance Test Intervals and Allowable Outage Times for Protective Instrumentation," dated January 11, 2000

6. Letter from USNRC to O. D. Kingsley, "Dresden - Issuance of Amendments Changing Allowable Out-of-Service Times and Surveillance Test Intervals," dated August 2, 2000

7. General Electric Licensing Topical Report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System"

8. Letter from USNRC to T. A. Pickens (BWROG), "General Electric Company (GE) Topical Reports NEDC-30844, 'BWR Owners Group Response to NRC Generic Letter 83-28,' and NEDC-30851P, 'Technical Specification Improvement Analysis for BWR RPS'," dated July 15, 1987

9. Letter from USNRC to R. Janacek (BWROG), "Staff Guidance for Licensee Determination that Drift Characteristics for Instrumentation Used in RPS Channels are Bounded by NEDC-30851P Assumptions when the Functional Test Interval is Extended from Monthly to Quarterly," dated April 17, 1988

10. NES-EIC-20.04, "Analysis of Instrument Channel Setpoint Error and Instrument Loop Accuracy"

11. ISA-RP67.04.02-2000, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation," approved January 1, 2000

12. Letter from USNRC to O. D. Kingsley, "Issuance of Amendments," dated March 30, 2001

ATTACHMENT 2A

Dresden Nuclear Power Station
Units 2 and 3

NRC Docket Nos. 50-237 and 50-249

Renewed Facility Operating License Nos. DPR-19 and DPR-25

Request for License Amendment to Revise Turbine Condenser Vacuum - Low Scram Instrumentation Function

Marked-Up Technical Specification and Bases Pages

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3.3.1.1-10

Bases Page

B 3.3.1.1-20
B 3.3.1.1-31
B 3.3.1.1-32

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.1.1.4	-------------------NOTE------------------- Not required to be performed when entering MODE 2 from MODE 1 until 24 hours after entering MODE 2. -- Perform CHANNEL FUNCTIONAL TEST.	7 days
SR 3.3.1.1.5	Perform a functional test of each RPS automatic scram contactor.	7 days
SR 3.3.1.1.6	Verify the source range monitor (SRM) and intermediate range monitor (IRM) channels overlap.	Prior to fully withdrawing SRMs
SR 3.3.1.1.7	-------------------NOTE------------------- Only required to be met during entry into MODE 2 from MODE 1. -- Verify the IRM and APRM channels overlap.	7 days
SR 3.3.1.1.8	Perform CHANNEL FUNCTIONAL TEST.	31 days
SR 3.3.1.1.9	Calibrate the local power range monitors.	2000 effective full power hours
SR 3.3.1.1.10	~~Perform CHANNEL CALIBRATION.~~	~~31 days~~

(continued)

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Table 3.3.1.1-1 (page 3 of 3)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
7. Scram Discharge Volume Water Level–High					
a. Thermal Switch (Unit 2) Level Indicating Switch (Unit 3)	1,2	2	G	SR 3.3.1.1.1[d] SR 3.3.1.1.5 SR 3.3.1.1.11 SR 3.3.1.1.12[d] SR 3.3.1.1.17 SR 3.3.1.1.18	≤ 37.9 gallons (Unit 2) ≤ 38.7 gallons (Unit 3)
	5[a]	2	H	SR 3.3.1.1.1[d] SR 3.3.1.1.5 SR 3.3.1.1.11 SR 3.3.1.1.12[d] SR 3.3.1.1.17 SR 3.3.1.1.18	≤ 37.9 gallons (Unit 2) ≤ 38.7 gallons (Unit 3)
b. Differential Pressure Switch	1,2	2	G	SR 3.3.1.1.5 SR 3.3.1.1.11 SR 3.3.1.1.12 SR 3.3.1.1.17 SR 3.3.1.1.18	≤ 37.9 gallons (Unit 2) ≤ 38.7 gallons (Unit 3)
	5[a]	2	H	SR 3.3.1.1.5 SR 3.3.1.1.11 SR 3.3.1.1.12 SR 3.3.1.1.17 SR 3.3.1.1.18	≤ 37.9 gallons (Unit 2) ≤ 38.7 gallons (Unit 3)
8. Turbine Stop Valve-Closure	≥ 38.5% RTP	4	E	SR 3.3.1.1.5 SR 3.3.1.1.11 SR 3.3.1.1.14 SR 3.3.1.1.17 SR 3.3.1.1.18 SR 3.3.1.1.19	≤ 9.5% closed
9. Turbine Control Valve Fast Closure, Trip Oil Pressure–Low	≥ 38.5% RTP	2	E	SR 3.3.1.1.5 SR 3.3.1.1.11 SR 3.3.1.1.14 SR 3.3.1.1.17 SR 3.3.1.1.18 SR 3.3.1.1.19	≥ 466 psig
10. Turbine Condenser Vacuum–Low	1, 2[c]	2	F	SR 3.3.1.1.5 SR 3.3.1.1.~~8~~ 11 SR 3.3.1.1.~~10~~ 13 SR 3.3.1.1.18 SR 3.3.1.1.19	≥ ~~21.4~~ 20.5 inches Hg vacuum
11. Reactor Mode Switch–Shutdown Position	1,2	1	G	SR 3.3.1.1.16 SR 3.3.1.1.18	NA
	5[a]	1	H	SR 3.3.1.1.16 SR 3.3.1.1.18	NA
12. Manual Scram	1,2	1	G	SR 3.3.1.1.8 SR 3.3.1.1.18	NA
	5[a]	1	H	SR 3.3.1.1.8 SR 3.3.1.1.18	NA

(a) With any control rod withdrawn from a core cell containing one or more fuel assemblies.
(c) With reactor pressure ≥ 600 psig.
(d) Specified SR performance only required for Unit 3.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY (continued)

10. Turbine Condenser Vacuum—Low

The Turbine Condenser Vacuum—Low Function is provided to shut down the reactor and reduce the energy input to the main condenser to help prevent overpressurization of the main condenser in the event of a loss of the main condenser vacuum. ~~The Turbine Condenser Vacuum—Low Function is the primary scram signal for the loss of condenser vacuum event analyzed in Reference 9. For this event, the reactor scram reduces the amount of energy required to be absorbed by the main condenser and helps to ensure the MCPR SL is not exceeded by reducing the core energy prior to the fast closure of the turbine stop valves. This Function helps maintain the main condenser as a heat sink during this event.~~

INSERT Bases 1

Turbine condenser vacuum pressure signals are derived from four pressure switches that sense the pressure in the condenser. ~~The Allowable Value was selected to reduce the severity of a loss of main condenser vacuum event by anticipating the transient and scramming the reactor at a higher vacuum than the setpoints that close the turbine stop valves and bypass valves.~~

INSERT Bases 2

Four channels of Turbine Condenser Vacuum—Low Function, with two channels in each trip system arranged in a one-out-of-two logic, are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. The Function is required in MODE 1 and MODE 2 when reactor pressure is ≥ 600 psig since, in these MODES, a significant amount of core energy can be rejected to the main condenser. During MODE 2 with reactor pressure < 600 psig, and MODES 3, 4, and 5, the core energy is significantly lower. This Function is automatically bypassed with the reactor mode switch in any position other than run and reactor pressure is < 600 psig.

11. Reactor Mode Switch—Shutdown Position

The Reactor Mode Switch—Shutdown Position Function provides signals, via the two manual scram logic channels (A3 and B3), which are redundant to the automatic protective instrumentation channels and provide manual reactor trip

(continued)

INSERT Bases 1

Loss of condenser vacuum occurs when the condenser can no longer handle the heat input (e.g., loss of heat transfer capability or excessive inleakage). This condition initiates a closure of the turbine stop valves and turbine bypass valves, which eliminates the reactor heat input to the condenser. Closure of the turbine stop and bypass valves causes a pressure transient, neutron flux rise and an increase in fuel surface heat flux. To prevent the fuel cladding integrity Safety Limit from being exceeded if this occurs, a reactor scram occurs on turbine stop valve closure. The turbine stop valve closure scram function alone is adequate to prevent the fuel cladding integrity Safety Limit from being exceeded, in the event of a turbine trip transient with bypass closure. The condenser low vacuum scram is anticipatory to the turbine stop valve closure scram.

INSERT Bases 2

The Allowable Value is consistent with the main turbine trip on low main condenser vacuum setpoint, and provides main condenser overpressure protection by shutting down the reactor; thereby, reducing energy into the main condenser.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.1.1.6 and SR 3.3.1.1.7 (continued)

As noted, SR 3.3.1.1.7 is only required to be met during entry into MODE 2 from MODE 1. That is, after the overlap requirement has been met and indication has transitioned to the IRMs, maintaining overlap is not required (APRMs may be reading downscale once in MODE 2).

If overlap for a group of channels is not demonstrated (e.g., IRM/APRM overlap), the reason for the failure of the Surveillance should be determined and the appropriate channel(s) declared inoperable. Only those appropriate channels that are required in the current MODE or condition should be declared inoperable.

A Frequency of 7 days is reasonable based on engineering judgment and the reliability of the IRMs and APRMs.

SR 3.3.1.1.9

LPRM gain settings are determined from the local flux profiles measured by the Traversing Incore Probe (TIP) System. This establishes the relative local flux profile for appropriate representative input to the APRM System. The 2000 effective full power hours (EFPH) Frequency is based on operating experience with LPRM sensitivity changes.

~~SR 3.3.1.1.10,~~ SR 3.3.1.1.13, SR 3.3.1.1.15, and SR 3.3.1.1.17

A CHANNEL CALIBRATION is a complete check of the instrument loop and the sensor. This test verifies that the channel responds to the measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drifts between successive calibrations consistent with the plant specific setpoint methodology.

Note 1 to SR 3.3.1.1.15 and SR 3.3.1.1.17 states that neutron detectors are excluded from CHANNEL CALIBRATION because they are passive devices, with minimal drift, and because of the difficulty of simulating a meaningful signal. For the APRMs, changes in neutron detector sensitivity are

(continued)

BASES

SURVEILLANCE REQUIREMENTS

~~SR 3.3.1.1.10,~~ SR 3.3.1.1.13, SR 3.3.1.1.15, and SR 3.3.1.1.17 (continued)

compensated for by performing the 7 day calorimetric calibration (SR 3.3.1.1.2) and the 2000 EFPH LPRM calibration against the TIPs (SR 3.3.1.1.9). A second Note is provided that requires the APRM and IRM SRs to be performed within 24 hours of entering MODE 2 from MODE 1. Testing of the MODE 2 APRM and IRM Functions cannot be performed in MODE 1 without utilizing jumpers, lifted leads, or movable links. This Note allows entry into MODE 2 from MODE 1 if the associated Frequency is not met per SR 3.0.2. Twenty four hours is based on operating experience and in consideration of providing a reasonable time in which to complete the SR. Note 3 to SR 3.3.1.1.15 states that for Function 2.b, this SR is not required for the flow portion of these channels. This allowance is consistent with the plant specific setpoint methodology. This portion of the Function 2.b channels must be calibrated in accordance with SR 3.3.1.1.17.

~~The Frequency of SR 3.3.1.1.10 is based upon the assumption of a 31 day calibration interval in determination of the magnitude of equipment drift in the setpoint analysis.~~ The Frequency of SR 3.3.1.1.13 is based upon the assumption of a 92 day calibration interval in determination of the magnitude of equipment drift in the setpoint analysis. The Frequency of SR 3.3.1.1.15 is based upon the assumption of a 184 day calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis. The Frequency of SR 3.3.1.1.17 is based upon the assumption of an 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

SR 3.3.1.1.11 and SR 3.3.1.1.16

A CHANNEL FUNCTIONAL TEST is performed on each required channel to ensure that the channel will perform the intended function. A successful test of the required contact(s) of a channel relay may be performed by the verification of the change of state of a single contact of the relay. This clarifies what is an acceptable CHANNEL FUNCTIONAL TEST of a relay. This is acceptable because all of the other required contacts of the relay are verified by other Technical

(continued)

ATTACHMENT 2B

Quad Cities Nuclear Power Station
Units 1 and 2

NRC Docket Nos. 50-254 and 50-265

Renewed Facility Operating License Nos. DPR-29 and DPR-30

Request for License Amendment to Revise Turbine Condenser Vacuum - Low Scram Instrumentation Function

Marked-Up Technical Specification and Bases Pages

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Table 3.3.1.1-1 (page 3 of 3)
Reactor Protection System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER TRIP SYSTEM	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE
7. Scram Discharge Volume Water Level–High					
a. Float Switch	1,2	2	G	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.16 SR 3.3.1.1.17	≤ 38.9 gallons
	5[a]	2	H	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.16 SR 3.3.1.1.17	≤ 38.9 gallons
b. Differential Pressure Switch	1,2	2	G	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.11 SR 3.3.1.1.16 SR 3.3.1.1.17	≤ 32.3 gallons
	5[a]	2	H	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.11 SR 3.3.1.1.16 SR 3.3.1.1.17	≤ 32.3 gallons
8. Turbine Stop Valve-Closure	≥ 38.5% RTP	4	E	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.13 SR 3.3.1.1.16 SR 3.3.1.1.17 SR 3.3.1.1.18	≤ 9.7% closed
9. Turbine Control Valve Fast Closure, Trip Oil Pressure–Low	≥ 38.5% RTP	2	E	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.13 SR 3.3.1.1.16 SR 3.3.1.1.17 SR 3.3.1.1.18	≥ 475 psig
10. Turbine Condenser Vacuum-Low	1	2	F	SR 3.3.1.1.5 SR 3.3.1.1.10 SR 3.3.1.1.12 SR 3.3.1.1.17 SR 3.3.1.1.18	≥ ~~21.6~~ 20.6 inches Hg vacuum
11. Reactor Mode Switch–Shutdown Position	1,2	1	G	SR 3.3.1.1.15 SR 3.3.1.1.17	NA
	5[a]	1	H	SR 3.3.1.1.15 SR 3.3.1.1.17	NA
12. Manual Scram	1,2	1	G	SR 3.3.1.1.8 SR 3.3.1.1.17	NA
	5[a]	1	H	SR 3.3.1.1.8 SR 3.3.1.1.17	NA

(a) With any control rod withdrawn from a core cell containing one or more fuel assemblies.

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

9. Turbine Control Valve Fast Closure, Trip Oil Pressure—Low (continued)

This is normally accomplished automatically by pressure switches sensing turbine first stage pressure; therefore, opening the turbine bypass valves may affect the OPERABILITY of this Function.

The Turbine Control Valve Fast Closure, Trip Oil Pressure-Low Allowable Value is selected high enough to detect imminent TCV fast closure. At lower reactor power levels (above bypass), the power/load unbalance device may not actuate in which case TCV fast closures do not occur. For this situation, the applicable analysis in Reference 15 accounting for how the plant actually behaves has been performed.

Four channels of Turbine Control Valve Fast Closure, Trip Oil Pressure—Low Function with two channels in each trip system arranged in a one-out-of-two logic are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. This Function is required, consistent with the analysis assumptions, whenever THERMAL POWER is ≥ 38.5% RTP. This Function is not required when THERMAL POWER is < 38.5% RTP, since the Reactor Vessel Steam Dome Pressure—High and the Average Power Range Monitor Fixed Neutron Flux—High Functions are adequate to maintain the necessary safety margins.

10. Turbine Condenser Vacuum—Low

The Turbine Condenser Vacuum—Low Function is provided to shut down the reactor and reduce the energy input to the main condenser to help prevent overpressurization of the main condenser in the event of a loss of the main condenser vacuum. ~~The Turbine Condenser Vacuum—Low Function is the primary scram signal for the loss of condenser vacuum event analyzed in Reference 9. For this event, the reactor scram reduces the amount of energy required to be absorbed by the main condenser and helps to ensure the MCPR SL is not exceeded by reducing the core energy prior to the fast closure of the turbine stop valves. This Function helps maintain the main condenser as a heat sink during this event.~~

INSERT Bases 1

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

INSERT Bases 2

10. Turbine Condenser Vacuum—Low (continued)

Turbine condenser vacuum pressure signals are derived from four pressure switches that sense the pressure in the condenser. ~~The Allowable Value was selected to reduce the severity of a loss of main condenser vacuum event by anticipating the transient and scramming the reactor at a higher vacuum than the setpoints that close the turbine stop valves and bypass valves.~~

Four channels of Turbine Condenser Vacuum—Low Function, with two channels in each trip system arranged in a one-out-of-two logic, are required to be OPERABLE to ensure that no single instrument failure will preclude a scram from this Function on a valid signal. The Function is required in MODE 1 since in this MODE there is a significant amount of core energy that can be rejected to the main condenser. During MODES 2, 3, 4, and 5, the core energy is significantly lower. This Function is automatically bypassed with the reactor mode switch in any position other than run.

11. Reactor Mode Switch—Shutdown Position

The Reactor Mode Switch—Shutdown Position Function provides signals, via the two manual scram logic channels (A3 and B3), which are redundant to the automatic protective instrumentation channels and provide manual reactor trip capability. This Function was not specifically credited in the accident analysis, but it is retained for the overall redundancy and diversity of the RPS as required by the NRC approved licensing basis.

The reactor mode switch is a single switch with two channels, each of which provides input into one of the two manual scram RPS logic channels.

There is no Allowable Value for this Function, since the channels are mechanically actuated based solely on reactor mode switch position.

Two channels of Reactor Mode Switch—Shutdown Position Function, with one channel in each manual trip system, are available and required to be OPERABLE. The Reactor Mode Switch—Shutdown Position Function is required to be

(continued)

INSERT Bases 1

Loss of condenser vacuum occurs when the condenser can no longer handle the heat input (e.g., loss of heat transfer capability or excessive inleakage). This condition initiates a closure of the turbine stop valves and turbine bypass valves, which eliminates the reactor heat input to the condenser. Closure of the turbine stop and bypass valves causes a pressure transient, neutron flux rise and an increase in fuel surface heat flux. To prevent the fuel cladding integrity Safety Limit from being exceeded if this occurs, a reactor scram occurs on turbine stop valve closure. The turbine stop valve closure scram function alone is adequate to prevent the fuel cladding integrity Safety Limit from being exceeded, in the event of a turbine trip transient with bypass closure. The condenser low vacuum scram is anticipatory to the turbine stop valve closure scram.

INSERT Bases 2

The Allowable Value is consistent with the main turbine trip on low main condenser vacuum setpoint, and provides main condenser overpressure protection by shutting down the reactor; thereby, reducing energy into the main condenser.