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A Duke Energy Company

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November 7, 2007

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

ATTENTION: Document Control Desk

Subject: Duke Power Company LLC d/b/a
Duke Energy Carolinas, LLC (Duke)
McGuire Nuclear Station, Unit 2
Docket No. 50-370

License Amendment Request for Temporary Change to Technical Specification 3.7.5, Auxiliary Feedwater System.

Pursuant to 10 CFR 50.90, Duke is requesting an amendment to the McGuire Nuclear Station (McGuire) Facility Operating License and Technical Specifications (TS) for a one time limited duration extension of the Required Action Completion Time to TS 3.7.5, Auxiliary Feedwater System (AFW).

The proposed TS change will allow the Unit 2 AFW "A" train to be declared inoperable for an additional 72 hours beyond the allowed 72 hours for piping modifications and testing of the Nuclear Service Water System (NSW). The evolution is scheduled to be performed within the allowed time (72 hours) for one train of AFW to be inoperable. However, implementation and schedule uncertainty could lead to exceeding the allowed 72 hours for the AFW Technical Specification. Therefore, in an effort to avoid an unnecessary Unit 2 shutdown or submittal of a request for Enforcement Discretion, McGuire is requesting a one time limited duration TS change.

The modifications include re-routing the piping for the "A" train of assured water to the "A" motor driven AFW pump and turbine driven AFW pump. The piping modifications will resolve an Operable But Degraded Non-conforming (OBDN) condition on the AFW system at McGuire Unit 2. The OBDN condition relates to the potential for air entrainment of the "A" motor driven and turbine driven AFW pumps. This OBDN condition requires the level of Lake Norman to be maintained above the minimum UFSAR level of 745 feet.

A001

NRR

The modifications were scheduled to be performed during the Spring 2008 Unit 2 refueling outage. However, due to the severity of the Southeastern U.S. drought conditions and the impact on the local drinking water supplies, Duke has re-evaluated the decision to perform the modifications during the upcoming refueling outage and determined that it is in the best interest of the public (i.e., availability of drinking water with no impact on electricity production) to pursue the modifications at the next available on line opportunity (December 2007). The ongoing Southeastern U.S. drought is very serious and near the all time worst condition on record. Duke has publicly stated that if the current lack of rainfall condition continues, both McGuire Units would be forced to shutdown by March 2008 unless these modifications are installed.

These piping modifications are extensive and require significant engineering and craft resources to implement. The Unit 2 design is complete and fabrication and installation are currently in progress with final NSW system tie-ins scheduled for December 2007. The revised implementation schedule is necessary so that resources may be shifted to the Unit 1 modifications such that they can be completed by March 2008. Unit 1 on-line installation is currently being reviewed; however, piping ties were not added during the last Unit 1 refueling outage as they were during the Fall 2006 Unit 2 refueling outage.

Duke has used Probabilistic Risk Analysis (PRA) to determine the risk associated with operating Unit 2 with one train of the AFW system inoperable for an extended period of time. The core damage frequency contribution from the proposed TS allowed outage time extensions was judged to be acceptable for this temporary, one time evolution based on the acceptance criteria contained in Regulatory Guides 1.174 and 1.177. These piping modifications resolve a degraded condition and improve overall AFW and NSW system reliability.

The contents of this proposed amendment are as follows:

Attachment 1 provides a marked copy of the affected Technical Specification showing the proposed change. Since this is a one time temporary change, the corresponding TS Bases will not require revision. The reprinted TS page will be provided prior to issuance of the approved amendment.

Attachment 2 provides Duke's evaluation of the proposed amendment which contains a description of the proposed TS change, the technical analysis, the determination that this proposed amendment contains No Significant Hazards Considerations, and the basis for the categorical exclusion from performing an Environmental Assessment/Impact Statement. In addition, this proposed amendment is modeled after similar amendments submitted by Catawba Nuclear Station and South Texas Project.

Attachment 3 provides a compilation of the regulatory commitments made by McGuire within this proposed amendment.

Implementation of this proposed amendment to the McGuire Technical Specifications will not impact the McGuire Updated Final Safety Analysis Report (UFSAR).

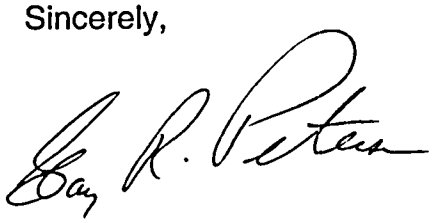
In accordance with Duke administrative procedures and the Quality Assurance Program Topical Report, this proposed amendment has been reviewed and approved by the McGuire Plant Operations Review Committee and the Duke Corporate Nuclear Safety Review Board.

Pursuant to 10 CFR 50.91, a copy of this proposed amendment is being forwarded to the appropriate State of North Carolina official.

Duke is requesting NRC review and approval of this proposed amendment by December 10, 2007 or as soon as practical to support Duke's expedited NSW piping modifications schedule.

Inquiries on this matter should be directed to Lee A. Hentz at 704-875-4187.

Sincerely,



Gary R. Peterson

Attachments

cc: w/attachments

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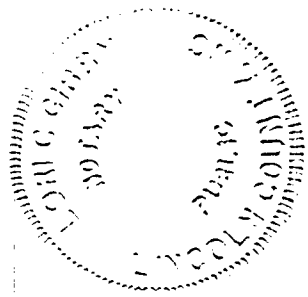
OATH AND AFFIRMATION

Gary R. Peterson affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

Gary R. Peterson, Site Vice President

Subscribed and sworn to me: November 7, 2007

Date



Lori C. Gibby / Lori C. Gibby

Notary Public

My commission expires: July 1, 2012

Date

bxc: w/attachments

K. L. Ashe (MG01RC)
R. D. Hart (CN01RC)
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ELL (EC050)
McGuire Master File # 1.3.2.9
NSRB Support Staff (EC05N)

ATTACHMENT 1

MARKED PAGE OF AFFECTED TECHNICAL SPECIFICATION

3.7 PLANT SYSTEMS

3.7.5 Auxiliary Feedwater (AFW) System

LCO 3.7.5 Three AFW trains shall be OPERABLE.

---NOTE---
Only one AFW train, which includes a motor driven pump, is required to be OPERABLE in MODE 4.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

ACTIONS

---NOTE---
LCO 3.0.4.b is not applicable when entering MODE 1.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One steam supply to turbine driven AFW pump inoperable.	A.1 Restore steam supply to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the LCO
B. One AFW train inoperable in MODE 1, 2 or 3 for reasons other than Condition A.	B.1 Restore AFW train to OPERABLE status.	72 hours * AND 10 days from discovery of failure to meet the LCO

(continued)

* For Unit 2, the Completion Time that the "A" train of AFW can be inoperable due to isolation of the assured water source as specified by Required Action B.1 may be extended 72 hours beyond the allowed 72 hours for a total of 144 hours as part of the Unit 2 NSW system modifications (MD 200464). Upon completion of the Unit 2 NSW system modifications and system restorations, this footnote is no longer applicable or if not used, will expire at midnight on March 1, 2008.

ATTACHMENT 2

EVALUATION OF PROPOSED AMENDMENT

1.0 DESCRIPTION

Pursuant to 10 CFR 50.90 Duke is requesting an amendment to the McGuire Nuclear Station (McGuire) Facility Operating License and Technical Specifications (TS) for a one time limited duration extension of the Required Action Completion Time to TS 3.7.5, Auxiliary Feedwater System (AFW).

The proposed TS change will allow the Unit 2 AFW "A" train to be declared inoperable for an additional 72 hours beyond the allowed 72 hours for piping modifications and testing of the Nuclear Service Water System (NSW). The evolution is scheduled to be performed within the allowed time (72 hours) for one train of AFW to be inoperable. However, implementation and schedule uncertainty could lead to exceeding the allowed 72 hours for the AFW Technical Specification. Therefore, in an effort to avoid an unnecessary Unit 2 shutdown or submittal of a request for Enforcement Discretion, McGuire is requesting a one time limited duration TS change.

The modifications include re-routing the piping for the "A" train of assured water to the "A" motor driven AFW pump and turbine driven AFW pump. The piping modifications will resolve an Operable But Degraded Non-conforming (OBDN) condition on the AFW system at McGuire Unit 2. The OBDN condition relates to the potential for air entrainment of the "A" motor driven and turbine driven AFW pumps. This OBDN condition requires the level of Lake Norman to be maintained above the minimum UFSAR level of 745 feet.

The modifications were scheduled to be performed during the Spring 2008 Unit 2 refueling outage. However, due to the severity of the Southeastern U.S. drought conditions and the impact on the local drinking water supplies, Duke has re-evaluated the decision to perform the modifications during the upcoming refueling outage and determined that it is in the best interest of the public (i.e., availability of drinking water with no impact on electricity production) to pursue the modifications at the next available on line opportunity (December 2007). The ongoing Southeastern U.S. drought is very serious and near the all time worst condition on record. Duke has publicly stated that if the current lack of rainfall condition continues, both McGuire Units would be forced to shutdown by March 2008 unless these modifications are installed.

These piping modifications are extensive and require significant engineering and craft resources to implement. The Unit 2 design is complete and fabrication and installation are currently in progress with final NSW system tie-ins scheduled for December 2007. The revised implementation schedule is necessary so that resources may be shifted to the Unit 1 modifications such that they can be completed by March 2008. Unit 1 on-line installation is currently being reviewed; however, piping ties were not added during the last Unit 1 refueling outage as they were during the Fall 2006 Unit 2 refueling outage.

PRECEDENT LICENSING ACTIONS

This proposed license amendment was modeled after a similar amendment submitted by Catawba Nuclear Station (Catawba) and approved by the NRC on November 17, 2005. The Catawba amendment temporarily modified their Technical Specifications to allow the NSW headers for each Unit to be taken out of service for up to 14 days each for system upgrades.

This proposed license amendment was also modeled after a similar amendment submitted by South Texas Project (STP) Unit 1 where extensive, unplanned repairs were necessary for the B train Essential Cooling Water pump. The STP amendment was submitted on January 6, 2005 and approved by the NRC on January 10, 2005.

2.0 BACKGROUND

The McGuire NSW system provides normal and assured cooling water for various Auxiliary Building and Reactor Building heat exchangers during all phases of station operation. Each Unit has two redundant "essential headers" serving two trains of equipment necessary for safe shutdown, and a "non-essential header" serving equipment not required for safe shutdown.

In addition, each train of the NSW system provides assured water to the AFW system. Each motor driven AFW pump motor is cooled and supplied with suction from its corresponding train of the NSW system. The turbine driven AFW pump is supplied from whichever train of the NSW System is in operation. Nuclear Service Water is used as the assured source of feedwater when the normal condensate supplies for the AFW System are unavailable.

It was previously discovered that air in the high points of the "A" train NSW essential discharge headers for both Units could potentially be entrained into the suction of the AFW pumps and possibly damage or limit flows from the pumps. To prevent this, the "A" NSW train headers were continuously vented. This air entrainment concern is not present on the "B" NSW trains due to a different piping configuration.

When the "A" NSW trains are aligned to the Standby Nuclear Service Water Pond (SNSWP), the continuous vents will not function properly. This results from a section of the 36 inch discharge piping on each header (centerline elevation 744 feet 6 inches) being above the maximum SNSWP elevation of 740 feet. Steps must be taken when aligning "A" NSW trains to the SNSWP to preclude air entrainment to the AFW pumps.

In July of 2004, McGuire determined that the operator manual alignments put in place to prevent air entrainment represented an Operable But Degraded, Nonconforming condition that needed to be corrected. Based on the currently documented Operability Evaluation of the NSW/AFW system air entrainment issue, the turbine driven AFW and "A" motor driven AFW pumps are currently considered Operable But Degraded, Nonconforming (OBDN).

The current maximum drawdown for Lake Norman, as described in the UFSAR, is elevation 745 feet. However, a more restrictive level is necessary to preclude potential air entrainment from NSW to the turbine driven and "A" motor driven AFW pumps following a loss of Lake Norman and resulting swap over to the SNSWP.

In order to effectively manage lake levels on the entire Catawba River Basin (including Lake Norman) during this severe drought condition, and operate the McGuire Units, the restriction on Lake Norman drawdown level imposed by the OBDN condition must be removed before March 2008. The NSW piping modifications eliminate the air entrainment issue such that the lake levels can be effectively managed.

OBDN CONDITION RESOLUTION PLAN

Piping modifications have been developed to eliminate the potential for air entrainment in the NSW/AFW assured supplies. The primary objectives of these modifications are to eliminate the potential for entrained air in the NSW assured makeup supply from reaching the AFW pumps, and remove the drawdown level restriction for Lake Norman.

The AFW "A" train assured supply from the NSW system is being re-located from the NSW discharge header to the supply header. The new location will provide cooler water to the AFW pumps, increase the suction pressure, and eliminate the air entrainment concern. The Unit 2 modifications will entail system realignments and draining, piping routing, welding, NDE, and flow balance testing of the NSW system.

3.0 PROPOSED CHANGES

The McGuire AFW System automatically supplies feedwater to the steam generators to remove decay heat from the Reactor Coolant System upon the loss of normal feedwater supply. The AFW pumps take suction from the non-safety related AFW Storage Tank (Water Tower). The assured source of water to the AFW System is the Nuclear Service Water System.

The AFW System consists of two motor driven AFW pumps and one steam turbine driven pump configured into three trains. Each of the motor driven pumps

supply 100% of the flow requirements to two steam generators, although each pump has the capability to be realigned to feed other steam generators. The turbine driven pump provides 200% of the flow requirements and supplies water to all four steam generators.

Per TS 3.7.5 Condition B, with one of the required AFW trains (pump or flow path) inoperable in MODE 1, 2, or 3 for reasons other than Condition A (one steam supply to turbine driven AFW pump inoperable), action must be taken to restore OPERABLE status within 72 hours. The 72 hour Completion Time is reasonable, based on redundant capabilities afforded by the AFW System, time needed for repairs, and the low probability of a DBA occurring during this time period.

During the Unit 2 NSW system piping modifications, the assured source of water to the "A" train of AFW will be isolated which makes the 2A motor driven AFW pump inoperable and requires entry into TS 3.7.5 Condition B. The normal supply of water from the AFW Storage Tank will still be available for all three AFW trains and the assured source of water from the "B" train of NSW will remain operable. The evolution is scheduled to be performed within 72 hours, however, due to implementation and schedule uncertainty, the evolution could exceed the allowed 72 hours for AFW. Therefore, in an effort to avoid an unnecessary Unit 2 shutdown or submittal of a request for Enforcement Discretion, McGuire is requesting a one time limited duration TS change.

The evolution schedule uncertainty is driven by NSW system isolations and draining to facilitate piping additions, piping and hanger installation, fit-up and welding, NDE inspections, and flow balance tests.

To address this uncertainty, it is proposed that the following footnote be added to TS 3.7.5 to temporarily allow one train of assured AFW water source to be inoperable for an additional 72 hours:

> *For Unit 2, the Completion Time that the "A" train of AFW can be inoperable due to isolation of the assured water source as specified by Required Action B.1 may be extended 72 hours beyond the allowed 72 hours for a total of 144 hours as part of the Unit 2 NSW system modifications (MD 200464). Upon completion of the Unit 2 NSW system modifications and system restorations, this footnote is no longer applicable or if not used, will expire at midnight on March 1, 2008.

4.0 TECHNICAL ANALYSIS

4.1 Probabilistic Risk Analysis

Duke Energy has used a risk-informed approach to determine the risk significance of extending the current AFW System TS 3.7.5 Condition B Completion Time of 72 hours by 3 days, for a total time of 6 days.

The current PRA model (Revision 3a) was used to perform the risk evaluation. The McGuire PRA is full scope PRA including both internal and external events. The base case non-seismic core damage frequency (CDF) and large early release frequency (LERF) are 2.7E-05/yr and 2.2E-6/yr, respectively. The seismic results typically are not sensitive to unavailabilities of individual components as demonstrated in previous analyses. For example, Reference [1] estimated the seismic contribution to core damage in the E-9/yr range in comparison to an internal events contribution in the E-6/yr range. Additionally, since the ability to power the hydrogen igniters is not affected by the proposed license amendment nor is containment bypass affected, the impact on LERF is much smaller than the CDF impact. Thus the overall seismic impact is judged to be insignificant relative to the non-seismic impacts.

The results indicate that the incremental conditional core damage probability (ICCDP) is the most limiting risk metric with respect to the Regulatory Guide acceptance criteria. The results are dominated by a Loss of Offsite Power initiating event, failure to recover offsite power, failure of on-site emergency power to train "B" equipment, failure to cross-connect offsite power between units, failure to establish Feed and Bleed cooling, unavailability of NSW "A" train supply to AFW, and failure of the condenser circulating water system piping supply (SSF source) to the AFW pumps.

With a one-time 6 day outage on one train of AFW, the non-seismic delta CDF and delta LERF are 2.0E-07/yr and 3.6E-10/yr, respectively and the ICCDP and incremental conditional large early release probability (ICLERP) are 1.8E-09 and 3.2E-12, respectively.

For *permanent* changes, Regulatory Guide (RG) 1.174 characterizes a delta CDF and delta LERF below 1E-6/yr and 1E-7/yr, respectively, as very small changes. RG 1.177 outlines acceptance guidance criteria of 5.0E-07 for ICCDP and 5.0E-08 for ICLERP, respectively. From the above results, the delta CDF, delta LERF, ICCDP and ICLERP impacts are all very small in comparison to the Regulatory Guide criteria. Thus the proposed one-time extension is concluded to have a very small impact on plant risk.

PRA Quality

Duke periodically evaluates changes to the plant with respect to the assumptions and modeling in the McGuire PRA. The original McGuire PRA was initiated in March 1982 by Duke Power Company staff with Technology for Energy Corporation as a contractor. Law Engineering Testing Company and Structural Mechanics Associates provided specific input to the seismic analysis. It was a full scope Level 3 PRA with internal and external events. A peer review of the draft PRA was conducted by Electric Power Research Institute's Nuclear Safety Analysis Center (NSAC) in May 1983 [2]. The final study, which incorporated the comments of the peer review, was completed in July 1984 and resulted in an internal Duke report [3] as Revision 0 to the PRA. In January 1988, Duke Power Company initiated a complete review and update of the original study.

On November 23, 1988, the NRC issued Generic Letter 88-20 [4], which requested that licensees conduct an Individual Plant Examination (IPE) in order to identify potential severe accident vulnerabilities at their plants. The McGuire response to GL 88-20 was provided by letter dated November 4, 1991 [5]. McGuire's response included an updated McGuire PRA (Revision 1) study which was the culmination of the review and update which began in January 1988.

The McGuire PRA Revision 1 study and the IPE process resulted in a comprehensive, systematic examination of McGuire with regard to potential severe accidents. The McGuire study was again a full-scope, Level 3 PRA with analysis of both the internal and external events. This examination identified the most likely severe accident sequences, both internally and externally induced, with quantitative perspectives on likelihood and fission product release potential. The results of the study prompted changes in equipment, plant configuration and enhancements in plant procedures to reduce vulnerability of the plant to some accident sequences of concern.

As part of the Generic Letter 88-20 IPE process, the NRC conducted an audit of the human reliability analysis of the McGuire IPE during the period July 28 – 30, 1993. By letter dated June 30, 1994 [6], the NRC provided a Staff Evaluation of the internal events portion of the above McGuire IPE submittal which included the results of the human reliability analysis audit. The conclusion of the NRC letter [page 15] states:

> "The staff finds the licensee's IPE submittal for internal events including internal flooding essentially complete, with the level of detail consistent with the information requested in NUREG-1335. Based on the review of the submittal, and audit of "tier 2" supporting information, the staff finds reasonable the licensee's IPE conclusion that no severe accident vulnerabilities exist at McGuire."

In response to Generic Letter 88-20, Supplement 4, Duke completed an Individual Plant Examination of External Events (IPEEE) for severe accidents. This IPEEE was submitted to the NRC by letter dated June 1, 1994 [7]. The report contained a summary of the methods, results and conclusions of the McGuire IPEEE program. The IPEEE process and supporting McGuire PRA included a comprehensive, systematic examination of severe accident potential resulting from external initiating events. By letter dated February 16, 1999 [8], the NRC provided an evaluation of the IPEEE submittal. The conclusion of the NRC letter [page 6] states:

> "On the basis of the overall review findings, the staff concludes that: (1) the licensee's IPEEE is complete with regard to the information requested by Supplement 4 to GL 88-20 (and associated guidance in NUREG-1407), and (2) the IPEEE results are reasonable given the MNS design, operation, and history. Therefore, the staff concludes that the licensee's IPEEE process is capable of identifying the most likely severe accidents and severe accident vulnerabilities, and therefore, that the MNS IPEEE has met the intent of Supplement 4 to GL 88-20 and the resolution of specific generic safety issues discussed in the SER."

In 1997, McGuire initiated Revision 2 of the 1991 IPE and provided the results to the NRC in 1998 [9]. Revision 3 of the McGuire PRA was completed in July 2002 and Revision 3a was completed in February 2005. Revision 3 was a comprehensive revision to the PRA models and associated documentation. The objectives of this update were as follows:

- To ensure the models comprising the PRA accurately reflect the current plant, including its physical configurations, operating procedures, maintenance practices, etc.

- To review recent operating experience with respect to updating the frequency of plant transients, failure rates, and maintenance unavailability data.

- To correct items identified as errors and implement PRA enhancements as needed.

- To address areas for improvement identified in the McGuire PRA Peer Review.

- To utilize updated Common Cause Analysis data and Human Reliability Analysis data.

Revision 3a was a minor change to merge the Containment Air Return and Hydrogen Mitigation fault trees into the simplified LERF fault tree.

PRA maintenance encompasses the identification and evaluation of new information into the PRA and typically involves minor modifications to the plant model. PRA maintenance and updates as well as guidance for developing PRA data and evaluation of plant modifications, are governed by Workplace Procedures.

Approved workplace procedures address the quality assurance of the PRA. One way the quality assurance of the PRA is ensured is by maintaining a set of system notebooks on each of the PRA systems. Each system PRA analyst is responsible for updating a specific system model. This update consists of a comprehensive review of the system including drawings and plant modifications made since the last update as well as implementation of any PRA change notices that may exist on the system. The analyst's primary focal point is with the system engineer at the site. The system engineer provides information for the update as needed. The analyst will review the PRA model with the system engineer and as necessary, conduct a system walkdown with the system engineer.

The system notebooks contain, but are not limited to, documentation on system design, testing and maintenance practices, success criteria, assumptions, descriptions of the reliability data, as well as the results of the quantification. The system notebooks are reviewed and signed off by a second independent person and are approved by the manager of the group.

When any change to the PRA is identified, the same three-signature process of identification, review, and approval is utilized to ensure that the change is valid and that it receives the proper priority.

In January 2001, an enhanced manual configuration control process was implemented to more effectively track, evaluate, and implement PRA changes to better ensure the PRA reflects the as-built, as-operated plant. This process was further enhanced in July 2002 with the implementation of an electronic PRA change tracking tool.

Peer Review Process

Between October 23-27, 2000, McGuire participated in the Westinghouse Owners Group (WOG) PRA Certification Program. This review followed a process that was originally developed and used by the Boiling Water Reactor Owners Group (BWROG) and subsequently broadened to be an industry-applicable process through the Nuclear Energy Institute (NEI) Risk Applications Task Force. The resulting industry document, NEI-00-02 [10], describes the overall PRA peer review process. The Certification/Peer Review process is also linked to the ASME PRA Standard [11].

The objective of the PRA Peer Review process is to provide a method for establishing the technical quality and adequacy of a PRA for a range of potential risk-informed plant applications for which the PRA may be used. The PRA Peer Review process employs a team of PRA and system analysts, who possess significant expertise in PRA development and PRA applications. The team uses checklists to evaluate the scope, comprehensiveness, completeness, and fidelity of the PRA being reviewed. One of the key parts of the review is an assessment of the maintenance and update process to ensure the PRA reflects the as-built plant.

The review team for the McGuire PRA Peer Review consisted of six members. Three of the members were PRA personnel from other utilities. The remaining three were industry consultants. Reviewer independence was maintained by assuring that none of the six individuals had any involvement in the development of the McGuire PRA or IPE.

A summary of some of the McGuire PRA strengths and recommended areas for improvement from the peer review are as follows:

Strengths

- Good Summary Report write-up with insights
- Good system notebooks
- Rigorous Level 2 & 3 PRA Model
- Integrated internal and external events model
- Up-to-date plant database using Maintenance Rule
- Ongoing PRA staff interaction with plant staff, plant staff reviews
- PRA personnel knowledge of plant good

Recommended Areas for Improvement

- Better integration of sequences and recoveries within quantification process needed
- Need to review treatment of events requiring time-phasing in the modeling
- Better approach to closing the loop on PRA update items (tracking of errors/mods) needed
- More thorough, systematic approach to HRA screening values and common cause modeling needed
- Need an approach for reconciling realistic LERF model with NRC expectations from simplistic LERF modeling
- Need to update the PRA model to be more in line with current practices and expectations for state-of-the-art PRA

The significance levels of the WOG Peer Review Certification process have the following definitions:

A. Extremely important and necessary to address to ensure the technical adequacy of the PRA, the quality of the PRA, or the quality of the PRA update process.

B. Important and necessary to address but may be deferred until the next PRA update.

Based on the PRA peer review report, the McGuire PRA received six Fact and Observations (F&O) with the significance level of "A" and 31 F&O with the significance level of "B." All six of the "A" F&O have been resolved and changes have been incorporated into McGuire PRA Revision 3a, the current PRA model. The "B" F&O have been reviewed and prioritized for incorporation into the PRA. Twelve of the "B" F&O have already been incorporated into Revision 3a of the PRA.

It is expected that the remaining F&O will be resolved and incorporated into Revision 4 of the PRA. The 19 remaining "B" F&O were reviewed with respect to the impact on the PRA and were determined to be insignificant with respect to this technical specification change.

PRA Model

The McGuire PRA is a full scope PRA including both internal and external events. The model includes the necessary initiating events (e.g., LOCAs, transients) to evaluate the frequency of accidents. The previous reviews of the McGuire PRA, NRC and peer reviews have not identified deficiencies related to the scope of initiating events considered.

The McGuire PRA includes models for those systems needed to estimate core damage frequency. These include all of the major support systems (e.g., ac power, service water, component cooling, and instrument air) as well as the mitigating systems (e.g., emergency core cooling). These systems are modeled down to the component level, pumps, valves, and heat exchangers. This level of detail is sufficient for this application.

Truncation Limit

Truncation issues are not a concern with this risk calculation. The model was re-solved for the configuration of interest using the base case truncation limits (1E-9 for CDF and 1E-10 for LERF). To ensure adequate representation of the configuration of interest in the resulting cut sets, the truncation limits were then lowered to zero. The issue identified in RG 1.177 (most of the failures appearing near the truncation cutoff) does not exist in this analysis.

Uncertainty and Sensitivity

We agree with the RG 1.177 statement that risk analyses of AOT extensions are relatively insensitive to uncertainties. We did not credit for equipment repair so there are no uncertainties to be evaluated for that issue. We required important

systems to remain in service during the AOT so no issues with mean downtimes should exist. Thus uncertainty and sensitivity are not expected to alter the conclusions of the evaluation.

Results of Reviews with Respect to this LAR

A review of the analyses (cut sets and pertinent accident sequences) was made for accuracy and completeness. Specifically, cut sets generated for the solutions were screened and invalid cut sets were removed and appropriate recovery events applied. This process was documented in a Duke calculation. The review verified that the calculation adequately modeled the effects of the extended AFW Completion Time. Consistent with the work place procedures governing PRA analysis, this calculation has undergone independent checking by a qualified reviewer.

Tier 2 Assessment: Avoidance of Risk-significant Plant Equipment Outage Configurations

Tier 2 provides reasonable assurance that risk-significant plant equipment outage configurations will not occur when specific plant equipment is out of service consistent with the proposed TS change. Specific components and trains have been identified that are not to be taken out of service on the affected unit. These are: the remaining AFW pump trains, NSW train B, and the B emergency diesel generator.

Duke has several Work Process Manual procedures and Nuclear System Directives that are in place at McGuire Nuclear Station to ensure that risk-significant plant configurations are avoided. The key documents are as follows:

- Nuclear System Directive 415, "Operational Risk Management (Modes 1-3) per 10 CFR 50.65 (a.4)"
- Nuclear System Directive 403, "Shutdown Risk Management (Modes 4, 5, 6, and No-Mode) per 10 CFR 50.65 (a.4)"
- Work Process Manual, WPM-609, "Innage Risk Assessment Utilizing ORAM-SENTINEL"
- Work Process Manual, WPM-608, "Outage Risk Assessment Utilizing ORAM-SENTINEL"

The program uses a blended approach of quantitative and qualitative evaluation of each configuration assessed. The McGuire on-line computerized risk tool, ORAM-Sentinel, considers both internal and external initiating events with the exception of seismic events. Thus, the overall change in plant risk during

maintenance activities is expected to be addressed adequately in accordance with RG 1.177 considering the proposed Technical Specifications.

Tier 3 Assessment: Maintenance Rule Configuration Control

10 CFR 50.65(a)(4), RG 1.182, and NUMARC 93-01 require that prior to performing maintenance activities, risk assessments shall be performed to assess and manage the increase in risk that may result from proposed maintenance activities. These requirements are applicable for all plant modes. NUMARC 91-06 requires utilities to assess and manage the risks that occur during the performance of outages.

As stated above, Duke has approved procedures and directives in place at McGuire to ensure the requirements of the Maintenance Rule are implemented. These documents are used to address the Maintenance Rule requirements, including the on-line (and off-line) Maintenance Policy requirement to control the safety impact of combinations of equipment removed from service.

More specifically, Nuclear System Directive 310, "Requirements for the Maintenance Rule," addresses the process, defines the program, and states individual group responsibilities to ensure compliance with the Maintenance Rule. The Work Process Manuals WPM-608 and WPM-609 provide a consistent process for utilizing the computerized software assessment tool, ORAM-SENTINEL, which manages the risk associated with equipment inoperability.

ORAM-SENTINEL is a Windows-based computer program designed by the Electric Power Research Institute as a tool for plant personnel to use to analyze and manage the risk associated with all risk significant work activities including assessment of combinations of equipment removed from service. It is independent of the requirements of Technical Specifications and Selected Licensee Commitments.

The ORAM-SENTINEL models for McGuire are based on a "blended" approach of probabilistic and traditional deterministic approaches. The results of the risk assessment include a prioritized listing of equipment to return to service, a prioritized listing of equipment to remain in service, and potential contingency considerations.

Additionally, prior to the release of work for execution, Operations personnel must consider the effects of severe weather and grid instabilities on plant operations. This qualitative evaluation is inherent of the duties of the Work Control Center Senior Reactor Operator (SRO). Responses to actual plant risk due to severe weather or grid instabilities are programmatically incorporated into applicable plant emergency or response procedures.

Impact of PRA Analysis on Fire and Flooding Events

The dominant sequences involved in the PRA evaluation of the extended completion time involve the Loss of Offsite Power initiator. There were no flood initiated cut sets above the CDF and LERF truncation limits, and fire cut sets contributed negligibly to the CDF and LERF results.

References

1. Risk Evaluation of the MNS RN to CA Air Entrainment Issue, SAAG 873, September 2005.

2. Nuclear Safety Analysis Center, "McGuire Unit 1 PRA Peer Review," May 27, 1983.

3. "McGuire Nuclear Station Unit 1 Probabilistic Risk Assessment," Volumes 1-2, Duke Power Company, July 1984.

4. Generic Letter 88-20, Individual Plant Examination for Severe Accident Vulnerabilities, USNRC, November 1988.

5. Letter Duke Power Company to Document Control Desk (USNRC), McGuire Nuclear Station, "Generic Letter 88-20," November 4, 1991.

6. Letter USNRC to Duke Power Company, "Staff Evaluation of the McGuire Nuclear Station, Units 1 and 2 Individual Plant Examination – Internal Events Only," June 30, 1994.

7. Letter Duke Power Company to Document Control Desk (USNRC), McGuire Nuclear Station, Units 1 and 2, "Individual Plant Examination of External Events (IPEEE) Submittal," June 1, 1994.

8. Letter USNRC to Duke Power Company, "REVIEW OF MCGUIRE NUCLEAR STATION, UNITS 1 AND 2 - INDIVIDUAL PLANT EXAMINATION OF EXTERNAL EVENTS SUBMITTAL," February 16, 1999.

9. Letter Duke Energy Corporation to Document Control Desk (USNRC), McGuire Nuclear Station, "1997 Update of Probabilistic Risk Assessment," March 19, 1998.

10. NEI-00-02, "Probabilistic Risk Assessment (PRA) Peer Review Process Guideline," Nuclear Energy Institute, January 2000.

11. "Standard For Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME RA-S-2002, January 31, 2002 and ASME RA-Sa-2003 Addenda, December 2003.

4.2 Contingency Measures

The following list describes the contingency measures that will be put in place for McGuire Unit 2 during the piping modifications and 72 hour extension period:

1. During the NSW piping modifications and 72 hour extension when operating with one of the three AFW trains on Unit 2 inoperable, the operable AFW trains will be considered protected and no major maintenance or testing will be planned on the operable AFW trains. To the maximum extent practicable, routine tests (e.g., quarterly pump tests) and preventive maintenance work (e.g., motor checks) will be scheduled prior to or following the modification period. Certain tests may have to be performed during the modification period.

2. During the NSW piping modifications and 72 hour extension, the Unit 2 "A" train of AFW will remain available with its non-safety condensate water source and no major maintenance or testing will be planned.

3. During the NSW piping modifications and 72 hour extension, the Unit 2 NSW system "B" train will be considered a protected train.

4. During the NSW piping modifications and 72 hour extension, the Unit 2 "B" Emergency Diesel Generator (EDG) will be considered the protected EDG.

5. During the NSW piping modifications and 72 hour extension, the McGuire Switchyard and the Unit 2 Transformer yard will be considered protected.

6. During the NSW piping modifications and 72 hour extension, no major maintenance or testing will be planned on the SSF. To the maximum extent practicable, routine tests and preventive maintenance work for the SSF will be scheduled prior to or following the modification period.

7. Appropriate training will be provided to Operations personnel on this TS change and NSW piping modification evolution.

8. Prior to starting the NSW piping modifications, McGuire will confirm that the Transmission Control Center (TCC) will notify the McGuire Control Room in the event of severe weather, system degradation, or perturbations.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration Determination

As required by 10 CFR 50.91(a)(1), this analysis is provided to demonstrate that this McGuire License Amendment Request (LAR) does not involve a significant hazards consideration.

The proposed TS change will allow the Unit 2 AFW "A" train to be declared inoperable for an additional 72 hours beyond the allowed 72 hours for piping modifications and testing of the Nuclear Service Water System (NSW). The evolution is scheduled to be performed within the allowed time (72 hours) for one train of AFW to be inoperable. However, implementation and schedule uncertainty could lead to exceeding the allowed 72 hours for the AFW Technical Specification. Therefore, in an effort to avoid an unnecessary Unit 2 shutdown or submittal of a request for Enforcement Discretion, McGuire is requesting a one time limited duration TS change.

The modifications include re-routing the piping for the "A" train of assured water to the "A" motor driven AFW pump and turbine driven AFW pump. The piping modifications will resolve an Operable But Degraded Non-conforming (OBDN) condition on the AFW system at McGuire Unit 2. The OBDN condition relates to the potential for air entrainment of the "A" motor driven and turbine driven AFW pumps.

Conformance of this LAR to the standards for a determination of no significant hazards, as defined in 10 CFR 50.92(c), is shown in the following:

1. Does this LAR involve a significant increase in the probability or consequences of an accident previously evaluated?

No. The NSW piping modifications and proposed temporary TS change have been evaluated to assess their impact and ensure the design basis safety functions of the affected AFW system are preserved. During the NSW modifications, the non-affected, redundant AFW trains will be fully operable and no major maintenance or testing will be performed on the operable trains. The operable trains will also be protected to ensure their availability if called upon. Since only one train is affected by these modifications and single failure is not considered while a plant is in a limiting condition for operation Required Action, the remaining operable AFW trains are adequate to maintain the design basis. Thus, this condition will not alter assumptions relative to the mitigation of an accident or transient event.

The increase in unavailability of the Unit 2 AFW "A" train assured water source as a result of the NSW modifications does involve a small, one time increase in

the probability or consequences of an accident previously evaluated. The probabilistic risk analysis conducted for this LAR demonstrated that the core damage probability associated with the TS Completion Time extension was judged to be acceptable for a one time, temporary evolution.

The proposed temporary TS change does not alter or prevent the ability of structures, systems, and components from performing their intended function to mitigate the consequences of an accident. Therefore, the proposed LAR will not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does this LAR create the possibility of a new or different kind of accident from any accident previously evaluated?

No. The NSW piping modifications and proposed temporary TS change will not create the possibility of a new or different kind of accident from any accident previously evaluated. This LAR will not degrade the basic operation of the AFW system. The only change is to increase the TS Required Action Completion Time to restore an inoperable train. The non-affected AFW trains will be fully operable and capable of performing their safety and design function. Only the redundancy of the AFW system is affected.

No changes are being made to the plant which would introduce new accident causal mechanisms. The NSW modifications are designed to eliminate the potential for air entrainment of the assured water sources to the AFW system.

3. Does this LAR involve a significant reduction in a margin of safety?

No. Margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following accident conditions. These barriers include the fuel cladding, the reactor coolant system, and the containment system. During the NSW piping modifications, the non-affected AFW trains will still be capable of performing their design functions such that margin of safety is not significantly affected.

The probabilistic risk analysis conducted for this LAR demonstrated that the core damage probability associated with the TS Completion Time extension was judged to be acceptable for a one time, temporary evolution. Therefore, the proposed LAR will not involve a significant reduction in a margin of safety.

CONCLUSION

Based on the preceding analysis, it can be concluded that this LAR does not involve a significant hazards consideration as defined in 10 CFR 50.92.

5.2 Applicable Regulatory Requirements/Criteria

During the applicable period of this proposed license amendment, McGuire will maintain the ability to meet the applicable General Design Criteria (GDC) as outlined in 10 CFR 50, Appendix A. The applicable GDCs are:

1. GDC-34, Residual Heat Removal
2. GDC-44, Cooling Water

There will be no changes to the design of the NSW or AFW systems such that compliance with any of applicable design criteria would come into question. The evaluations provided within this proposed amendment confirm that the plant will continue to comply with the applicable design criteria.

The requested, one time extension period of 72 hours to complete the Required Actions of the affected Technical Specification is reasonable considering the redundant capabilities of the above systems, the additional plant systems that provide redundancy, and the risk considerations discussed within this proposed amendment. In addition, McGuire will remain within the scope of the TS Limiting Conditions for Operation and is still subject to the requirements of the Required Actions.

Since the mid-1980s, the NRC has been reviewing and granting improvements to Technical Specifications that are based, at least in part, on PRA insights. In its final policy statement on TS improvements of July 22, 1993, the NRC stated that it expects that licensees, in preparing their TS related submittals, will utilize any plant-specific PSA (probabilistic safety assessment) or risk survey and any available literature on risk insights and PSAs. Similarly, the NRC staff will also employ risk insights and PSAs in evaluating TS related submittals. Further, as a part of the Commission's ongoing program of improving Technical Specifications, it will continue to consider methods to make better use of risk and reliability information for defining future generic TS requirements. The NRC reiterated this point when it issued the revision to 10 CFR 50.36, in July 1995.

In August 1995, the NRC adopted a final policy statement on the use of PRA methods in nuclear regulatory activities that improve safety decision making and regulatory efficiency. The PRA policy statement included the following points:

1. The use of PRA technology should be increased in all regulatory matters to the extent supported by state-of-the-art in PRA methods and data and in a manner that compliments the NRC's deterministic approach and supports the NRC's traditional defense-in-depth philosophy.

2. PRA and associated analyses (e.g., sensitivity studies, uncertainty analyses, and importance measures) should be used in regulatory matters, where practical within the bounds of the state-of-the-art, to reduce unnecessary conservatism associated with current regulatory requirements.

3. PRA evaluations in support of regulatory decisions should be as realistic as practicable and appropriate supporting data should be publicly available for review.

In conclusion, based on the deterministic and PRA considerations provided within this proposed amendment, (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) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.3 Environmental Assessment / Impact Statement

This McGuire License Amendment Request (LAR) has been reviewed against the criteria of 10 CFR 51.22 for environmental considerations. This LAR does not involve a significant hazards consideration, increase the types and amounts of effluents that may be released offsite, or result in a significant increase of individual or cumulative occupational radiation exposures. Therefore, this McGuire License Amendment Request meets the criteria provided by 10 CFR 51.22(c)(9) for categorical exclusion from the requirement for an Environmental Impact Statement.

ATTACHMENT 3

LIST OF REGULATORY COMMITMENTS

The following list identifies the regulatory commitments made by McGuire within this proposed license amendment. Any other statements in this proposed amendment are provided for information purposes and are not considered to be regulatory commitments.

1. During the NSW piping modifications and 72 hour extension when operating with one of the three AFW trains on Unit 2 inoperable, the operable AFW trains will be considered protected and no major maintenance or testing will be planned on the operable AFW trains. To the maximum extent practicable, routine tests (e.g., quarterly pump tests) and preventive maintenance work (e.g., motor checks) will be scheduled prior to or following the modification period. Certain tests may have to be performed during the modification period.

2. During the NSW piping modifications and 72 hour extension, the Unit 2 "A" train of AFW will remain available with its non-safety condensate water source and no major maintenance or testing will be planned.

3. During the NSW piping modifications and 72 hour extension, the Unit 2 NSW system "B" train will be considered a protected train.

4. During the NSW piping modifications and 72 hour extension, the Unit 2 "B" Emergency Diesel Generator (EDG) will be considered the protected EDG.

5. During the NSW piping modifications and 72 hour extension, the McGuire Switchyard and the Unit 2 Transformer yard will be considered protected.

6. During the NSW piping modifications and 72 hour extension, no major maintenance or testing will be planned on the SSF. To the maximum extent practicable, routine tests and preventive maintenance work for the SSF will be scheduled prior to or following the modification period.

7. Appropriate training will be provided to Operations personnel on this TS change and NSW piping modification evolution.

8. Prior to starting the NSW piping modifications, McGuire will confirm that the Transmission Control Center (TCC) will notify the McGuire Control Room in the event of severe weather, system degradation, or perturbations.