Steven D. Capps
Vice President
McGuire Nuclear Station

Duke Energy
MG01VP | 12700 Hagers Ferry Road
Huntersville, NC 28078
o: 980.875.4805
f: 704.875.4809
Steven.Capps@duke-energy.com

Serial No: MNS-15-069 10CFR 50.90

August 28, 2015

U.S. Nuclear Regulatory Commission
Washington, DC 20555-001

ATTENTION: Document Control Desk

Subject: Duke Energy Carolinas, LLC (Duke Energy)
McGuire Nuclear Station, Unit 1
Docket No. 50-369
Renewed License No. NPF-9

License Amendment Request for One-Time Change to Technical Specification 3.5.2, "Emergency Core Cooling Systems (ECCS) - Operating"

In accordance with the provisions of 10 CFR 50.90, Duke Energy proposes a license amendment request (LAR) for the Renewed Facility Operating License (FOL) and Technical Specifications (TS) for McGuire Nuclear Station, Unit 1.

Duke Energy is requesting a one-time change to TS 3.5.2, "Emergency Core Cooling Systems (ECCS) - Operating," to facilitate repairs to the 1A Residual Heat Removal pump motor air handling unit (AHU). TS 3.5.2, Required Action A.1 applies to one inoperable train of ECCS, and an adverse trend in AHU performance indicates the need for repairs that cannot be completed within the associated 72 hour Completion Time (CT). Therefore, this LAR is being submitted to request an extension of the CT by 168 hours for a total of 240 hours. As discussed in Enclosure 1, Duke Energy believes a one-time extension is in the best interest of nuclear and public safety and will result in no net increase in radiological risk.

This LAR would be applicable one-time for the 1A RHR system and would expire on March 31, 2016. The request is deterministic and involves the use of an alternate source of forced cooling to the 1A RHR pump room. This alternate source of cooling will ensure that the 1A RHR system remains available throughout the maintenance evolution.

Enclosure 1 provides a description of the proposed change, the technical justification, an evaluation of significant hazards consideration pursuant to 10 CFR 50.92(c), a statement of environmental consideration, and the following attachments:

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- Attachment 1 provides the existing TS pages marked to show the proposed changes for McGuire Nuclear Station.
- Attachment 2 provides existing TS Bases marked to show the proposed changes for McGuire Nuclear Station. These pages are provided for information only. The TS Bases change will be processed after LAR approval under the McGuire Bases Control Program (TS 5.5.14).
- Attachment 3 identifies Regulatory Commitments made in support of this LAR.

Although vibration trends are not currently critical, Duke Energy requests NRC review and approval of this LAR by December 15, 2015, in case repairs are required prior to the next Unit 1 outage. Duke Energy has determined that a 14 day implementation grace period will be sufficient to implement this LAR.

In accordance with Duke Energy internal procedures and the Quality Assurance Topical Report, the proposed amendment has been reviewed and approved by the McGuire Plant Operations Review Committee.

Pursuant to 10 CFR 50.91, a copy of this LAR has been forwarded to the appropriate North Carolina state officials.

Please direct any questions you may have in this matter to Brian Richards at (980) 875-5171.

I declare under penalty of perjury that the foregoing is true and correct. Executed on August 28, 2015.

Sincerely,

McGuire Plant Manager
for SDC Acting

Steven D. Capps

Enclosure

1. Evaluation of the Proposed Change

cc w/ Attachments:

V. M. McCree
Administrator, Region II
U.S. Nuclear Regulatory Commission
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

J. Zeiler
NRC Senior Resident Inspector
McGuire Nuclear Station

G. E. Miller, Project Manager
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop O-8 G9A
Rockville, MD 20852-2738

W. L. Cox, III, Section Chief
North Carolina Department of Environment and Natural Resources
Division of Environmental Health
Radiation Protection Section
1645 Mail Service Center
Raleigh, NC 27699-1645

Enclosure 1

Evaluation of the Proposed Change

Subject: License Amendment Request to Revise Technical Specification 3.5.2, "Emergency Core Cooling Systems (ECCS) - Operating"

1.0 SUMMARY DESCRIPTION

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1. McGuire Technical Specification Page Markups
2. McGuire Technical Specification Bases Page Markups (pages included for information only)
3. Regulatory Commitments

1.0 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, Duke Energy Carolinas, LLC (Duke Energy) proposes a license amendment request (LAR) for the Renewed Facility Operating License (FOL) and Technical Specifications (TS) for McGuire Nuclear Station, Unit 1.

The proposed LAR requests a one-time change to TS 3.5.2, "Emergency Core Cooling Systems (ECCS) - Operating," as it pertains to Required Action A.1. This Required Action applies with one ECCS train inoperable. The 1A Residual Heat Removal (RHR) pump motor Air Handling Unit (AHU) test results indicate an adverse trend over the last two quarterly tests. Repair of this condition and restoration to operable status cannot be completed within the 72 hour Completion Time (CT) mandated by TS 3.5.2, Required Action A.1. Therefore, this LAR is being submitted to request an extension of the CT by 168 hours for a total of 240 hours.

2.0 DETAILED DESCRIPTION

2.1 Summary of the Requested Technical Specification Change

The proposed LAR would revise the CT for Required Action A.1 of TS 3.5.2 from 72 hours to 240 hours (10 days) on a one-time basis. A footnote will be added to the TS page stating:

> *For Unit 1 only, the Completion Time that one train of ECCS can be inoperable as specified by Required Action A.1 may be extended beyond the "72 hours" for up to 10 days during the 1A RHR AHU repair evolution. This allowance may be used one-time for the 1A RHR AHU repair and is contingent on meeting the compensatory measures and commitments described in MNS LAR submittal correspondence letter MNS-15-069. Upon completion of the repair and restoration, this footnote is no longer applicable and will expire on March 31, 2016.*

The marked-up TS 3.5.2 page illustrating the proposed change is provided in Attachment 1 to this enclosure.

Attachment 2 provides a portion of the existing TS Bases pages marked-up to show the corresponding proposed Bases changes. These pages are provided for information only. The TS Bases change will be processed after LAR approval under the McGuire Bases Control Program (TS 5.5.14).

2.2 Discussion of Need to Repair 1A RHR AHU

1A RHR pump motor AHU vibration testing is performed each quarter, and testing since January 2015 has shown higher than normal vibration for the AHU. As noted during testing, vibration is higher when the AHU starts and then settles out as the fan continues to run.

Analysis of the vibration data indicates potential looseness in the rotating equipment bearing housing or between the bearings and the fan shaft. Internal inspections of the AHU (while running and while idle) were performed in May 2015, and no indications of structural looseness were observed. Because of the results of the internal inspection, it is currently believed that looseness associated with the bearing is causing the elevated vibration readings.

Although current vibration test results are bounded by a threshold value for acceptable performance established by engineering, additional performance degradation is possible. Should the vibration reach unacceptable levels, it will be necessary to remove the AHU from service to effect repairs and ensure that its function is maintained. Non-required maintenance and testing to the RHR pump and its associated AHU are being limited to prevent the AHU from being started unnecessarily, which could further degrade performance. This provides assurance that any valid ECCS actuations occurring before repairs can be effected do not push the vibration levels beyond the threshold values.

Due to the configuration of the AHU and the confined working conditions, the necessary repair work is expected to exceed the current 72 hour allowed outage time (AOT).

3.0 TECHNICAL EVALUATION

3.1 System Description

Although the RHR system is used to remove heat from the Reactor Coolant System (RCS) during unit cooldown, that function is not used during periods of power operation. However, the system also serves as part of the ECCS, and this function is affected by the proposed change.

The function of the ECCS is to provide core cooling and negative reactivity to ensure that the reactor core is protected after any of the following accidents:

a. Loss of coolant accident (LOCA), coolant leakage greater than the capability of the normal charging system
b. Rod ejection accident
c. Loss of secondary coolant accident, including uncontrolled steam or feedwater release
d. Steam generator tube rupture (SGTR).

The addition of negative reactivity is designed primarily for the loss of secondary coolant accident where primary cooldown could add enough positive reactivity to achieve criticality and return to significant power.

The RHR portion of the ECCS consists of two redundant, 100% capacity trains. The system is designed to perform its safety function assuming a single failure of safety-related equipment.

An AHU is interlocked with each RHR pump and will automatically start with the pump. Each AHU is located in the room with its respective RHR pump and is equipped with a service water cooling coil and a belt-driven centrifugal fan. The AHU is designed to maintain the RHR pump room at a maximum temperature of 145°F. Without sufficient cooling, as provided by the AHU, the associated RHR pump would not be assured of meeting its mission time during accident conditions.

3.2 1A RHR AHU Repair Discussion

The 1A RHR AHU will have to be completely disassembled in order to make the required repairs. Given the location of this AHU, access to the enclosure internals is limited. Removing the cooling coils is required to best facilitate this access. Once the cooling coils are removed, maintenance will validate that no structural looseness exists, and both fan bearings will be

replaced. Again, due to space requirements, replacement of the bearings will be done sequentially because there is insufficient room to do both replacements at one time.

Replacement parts necessary for any anticipated contingencies repairs are available on site, and around-the-clock coverage will be present until the work is complete.

ACTIVITY	TIME REQUIRED
Tagout and Prestaging • Tag out 1A RHR AHU • Remove insulation from pipe flanges to AHU cooling coil • Install gag on inlet valve to AHU cooling coil • Remove hanger and cable tray interferences • Remove AHU cooling coils	29 hours
Inspect/repair internal structural supports	24 hours
Replace AHU fan bearings	96 hours
Recovery and restoration • Replace AHU cooling coils • Restore hanger • Remove tag out • Maintenance functional testing	26 hours
Margin for unanticipated repairs (fan wheel crack, significant shaft damage, etc)	65 hours
Requested AOT	240 hours

The 1A RHR AHU repairs will be controlled in accordance with AD-WC-ALL-0410, "Work Activity Integrated Risk Management." The key components of risk plans include plans for accomplishing the activity, a designated activity manager, contingency plans if problems develop, clear criteria for terminating the activity, training needs evaluated, pre-job briefings, and plan review and approval by a management review team.

3.3 Alternate Forced Cooling Defense-in-Depth

As a defense-in-depth measure, alternate forced cooling equipment will be installed for the duration of the repairs to the 1A RHR AHU. This alternate cooling will be manually started if the 1A RHR train is required. Station engineering has determined that the 1A RHR pump may be run for up to an hour without the room temperatures becoming excessive. Procedures have been developed to start the alternate cooling when required, and personnel will be designated to ensure that the equipment is started before room temperatures exceed the limits. Because the alternate cooling is non-safety, the 1A RHR train would not be considered operable, but its design provides reasonable assurance that the 1A RHR system train would continue to be

capable of providing the ECCS safety function during the repair evolution.

The Engineering Change (EC) process was used to provide reasonable assurance that the defense-in-depth measure would support continued availability of the 1A RHR system train ECCS safety function and that the measure would not adversely impact the safety function (i.e., operability) of other Systems, Structures and Components (SSCs) that are not part of the 1A RHR system train.

A temporary chiller will route cooling water to an alternate AHU, which will be located within the 1A RHR pump room. Both the chiller and the AHU have been sized to provide sufficient cooling to the room, and pump motor heat will continue to be removed if the RHR pump is called upon to perform its ECCS safety function.

This chiller will be installed on Elevation 716' of the Auxiliary Building, between columns JJ-56 and HH-56, and will be powered from a welding receptacle in the vicinity. It will use Fire Protection (RF) system as the cooling water supply. Specifically, a drain valve (1RF-189) located on Elevation 695' will be connected to the chiller with two-inch rubber hose. During chiller operation, 1RF-189 will be throttled to provide the flow rate appropriate for chiller operation.

The alternate AHU will be installed in the 1A RHR pump room and will be located above the floor (using seismically qualified mounting). The fan will be powered from an electrical panelboard in the vicinity.

The chiller and AHU are commercial-grade components that are built to industry standards. The NQW10 Accuchiller water-cooled portable chiller was procured from Thermal Care, which is ISO:9001 2008-certified. The AHU (a USA Coil vertical belt drive unit, model BWVD-040-W2-40) is in compliance with UL/ANSI Standard 1995 (USA) CSA C22.2#236 (CA) and is certified as complying with the latest edition of AHRI Standard 430.

One and a half inch insulated hose will be used to provide chilled water to the alternate AHU, which will be installed in the 1A RHR pump room. This hose will be qualified to withstand 75 psi from the chiller's pump. The water will discharge via two inch hose to the C Sump in the Groundwater Drainage (WZ) system. There are two WZ C sump pumps that provide assurance that water does not overflow and flood equipment in the area. However, the capacity of one pump is sufficient to remove the additional discharge flow from the chiller.

RF is an inherently reliable water supply because there are two jockey pumps that are normally controlled in automatic mode. When the pressurizer tank level is low, the first jockey pump will start. The second pump will start on low-low tank level. If both jockey pumps cannot maintain system pressure, the three main motor-driven fire pumps are started sequentially. All pumps are tested periodically to ensure that they function as designed. Although the RF pumps are not supplied with safety-related power, they are supplied from diverse power sources; two of the motor-driven fire pumps are connected to the McGuire switchgear, and the third has a separate electrical supply line from Riverbend Steam Station. Therefore, there is assurance that the water supply to the chiller will be available if needed. Furthermore, the total capacity of all fire pumps is sufficient to support flow to the chiller as well as its normal fire suppression functions.

The potential break in the two inch cooling water supply hose could cause RF to start flooding on elevations 716' or 695' of the Auxiliary Building. Existing flooding analysis calculations have already reviewed the impact of a failure of six inch and eight inch RF piping, so failure of a two

inch hose is bounded. Due to the low volume in the closed loop, a break in the 1.5 inch chilled water loop is not a flooding concern.

Prior to using the alternate cooling, the modification test plan associated with the EC will ensure that the modified SSCs are properly installed and operational. The cooling water supply and discharge hoses will be inspected, the capability of the RF system to supply the required flowrate will be validated, and the ability of the AHU to provide air cooling will be verified. This testing plan will demonstrate that the alternate cooling equipment is capable of performing its function before the extended AOT being requested is entered.

Although the power for both the chiller and the AHU is not safety-related, it is drawn from a permanent station power source, SMXA, which can be fed from either Unit 1 or Unit 2. Therefore, it is reasonably assured that the power will be available under conditions where the temporary forced cooling equipment would be needed.

All alternate forced cooling equipment will be seismically mounted, and the hoses will be restrained appropriately. This will ensure that the equipment itself does not affect other plant SSCs. Additionally, operation of the equipment does not represent any adverse impact on the connecting systems; use of RF water for the chiller does not adversely impact normal RF design functions, and discharging RF water to the WZ sump will not cause the sumps to overflow.

The post-LOCA dose rates in the areas where the equipment will be installed does not pose a concern. The equipment does not contain components that could deteriorate under the radiation levels. Further, the dose rates would not prevent personnel from opening the RF water supply or manually starting the chiller.

3.4 Compliance with Current Regulations

This LAR itself does not propose to deviate from existing regulatory requirements, and compliance with existing regulations is maintained by the proposed one-time change to the plant's TS requirements. Additional details may be found in the Regulatory Evaluation section of this LAR.

3.5 Defense-in-Depth Considerations

This proposed LAR meets the defense-in-depth principle described in Regulatory Guide 1.174, which consist of a number of elements. These elements and the impact of the proposed change on these elements are as follows:

- A reasonable balance is preserved among prevention of core damage, prevention of containment failure, and consequence mitigation.

By installing temporary forced cooling equipment, the 1A RHR pump will remain capable of performing its ECCS function while the normal AHU is being repaired. This approach prevents core damage. Prevention of containment failure during an event is mitigated by other systems (Ice Condenser and Containment Spray) that are not impacted by this repair evolution. No additional actions are necessary to prevent containment failure or to mitigate consequences

since the defense-in-depth measure effectively offsets any reduction in mitigation capability introduced by the 1A RHR AHU repair evolution.

- Over-reliance on programmatic activities as compensatory measures associated with the change in the licensing basis is avoided.

The proposed LAR involves a one-time extension to TS 3.5.2 to facilitate repairs to the 1A RHR AHU. During the repair evolution, important equipment will be protected and compensatory measures will be in place. These activities are controlled by Duke Energy's normal risk management program,. These compensatory measures are described in Section 3.6 and do not over-rely on programmatic activities.

- System redundancy, independence, and diversity are preserved commensurate with the expected frequency, consequence of challenges to the system, and uncertainties (e.g., no risk outliers).

The installation of alternate cooling to the 1A RHR pump motor helps ensure that the 1A RHR train will remain capable of performing its ECCS safety function. Therefore, although the 1A RHR train will be considered inoperable during this repair evolution, it will be considered available.

However, even if the 1A RHR train were considered unavailable during the entire evolution (up to the requested time of 240 hours), the limits on unavailability established for Maintenance Rule purposes would not be exceeded for the current fuel cycle. As defined by Duke Energy's Maintenance Rule program, this system is monitored to ensure that each train maintains 96% availability for a given fuel cycle. In accordance with 10 CFR 50.65, this performance goal was established commensurate with safety.

- Defenses against potential common-cause failures are preserved, and the potential for the introduction of new common-cause failure mechanisms is assessed.

As previously discussed, important equipment will be protected and compensatory measures will be in place to offset the impact on system redundancy and potential common cause failures. These measures will include avoiding (to the extent possible) severe weather conditions and periods of system grid instability during the proposed TS CT extension. Additionally, fire watches will be established to minimize the chance of fire-induced LOCAs. By minimizing the potential for a LOCA, the inoperability of the RHR pump represents less of a risk. The fire sprinkler system inside the 1A RHR pump room will remain functional during the evolution.

As such, appropriate measures will be taken to preserve defenses against potential common cause failures and no new common cause failure mechanisms will be introduced.

- Independence of barriers is not degraded.

The proposed 1A RHR AHU repair activity does not directly impact the three principal barriers or otherwise cause their degradation. Independence of barriers is not degraded because the proposed TS CT extension has no impact on the physical barriers.

- Defenses against human errors are preserved.

Appropriate guidance will be provided to Operations and Maintenance personnel for the 1A

RHR AHU repair evolution and, as discussed in Section 3.6 below, equipment protection and compensatory measures will be in place.

The 1A RHR AHU repairs will be controlled in accordance with AD-WC-ALL-0410, "Work Activity Integrated Risk Management." The key components of risk plans include plans for accomplishing the activity, a designated activity manager, contingency plans if problems develop, clear criteria for terminating the activity, training needs evaluated, pre-job briefings, and plan review and approval by a management review team. As such, defenses against human errors are preserved.

- The intent of the plant's design criteria is maintained.

The EC process was used to evaluate the impact of the temporary cooling on SSCs other than the 1A RHR system train. The evaluation concluded there were no adverse impacts.

This activity is a TS CT extension to allow for the repair of the 1A RHR AHU. As such, this activity does not modify the plant design or the design criteria applied to SSCs during the licensing process. Additional details regarding compliance with the GDCs are provided in Section 4.1.

3.6 Compensatory Measures and Commitments

1. The alternate forced cooling equipment (chiller and AHU) will be installed and tested in accordance with the EC process prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1.

2. At least one WZ C sump pump will be available prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1.

3. The following SSCs will be protected prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, and elective maintenance to them will be deferred during the repairs to the 1A RHR pump motor AHU:

   - 1B RHR train
   - 1B Nuclear Service Water System (NSWS) train
   - 1B Component Cooling Water System (CCWS) train
   - 1B Emergency Diesel Generator (EDG)
   - Power supply to the alternate cooling equipment
   - One WZ C sump pump

4. Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, McGuire will monitor the National Weather Service for potential severe weather conditions. To the extent practical, severe weather conditions will be avoided.

5. Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, and daily thereafter, McGuire will contact the Transmission Control Center (TCC) regarding system grid stability. To the extent practical, system grid instability will be avoided.

6. Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, roving fire watches will be established in the following areas to minimize the chance of fire-induced LOCAs:

   - Unit 1 4.16kV Switchgear Rooms
   - Unit 1 Auxiliary Feedwater Pump Room
   - 1B Diesel Generator Room
   - Fire Area 14 – vicinity of 1/2EMXB1
   - Fire Area 19 – vicinity of 1/2EMXG
   - Fire Area 25 – vicinity of 1IC02

7. Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, procedures will have been developed to start the alternate cooling when required, and personnel will be designated to ensure that the equipment is started before room temperatures exceed the limits.

3.7 Evaluation of Safety Margins

- Codes and standards or alternatives approved for use by the NRC are met (e.g., proposed LAR not in conflict with approved codes and standards).

The design and operation of the 1A RHR system train is not altered by the proposed TS CT extension. The 1A RHR train is periodically removed from service for maintenance and testing.

- Safety analysis acceptance criteria in the plant licensing basis are met or proposed revisions provide sufficient margin to account for analysis and data uncertainties.

The safety analysis acceptance criteria stated in the UFSAR are not impacted by this change. The proposed change will not allow plant operation in a configuration outside the design basis. The requirements regarding the ECCS functions credited in the accident analysis will remain the same. As also discussed in this LAR, a defense-in-depth measure will assure the 1A RHR pump remains available to perform its ECCS function even while the 1A RHR AHU is out of service.

As such, it can be concluded that safety margins are not impacted by the proposed change.

3.8 Configuration Risk Management

10 CFR 50.65 (a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," requires 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.

The proposed LAR will not result in any changes to the current configuration risk management program. The existing program uses a blended approach of quantitative and qualitative evaluation of each configuration assessed. The McGuire on-line computerized risk software, Electronic Risk Assessment Tool (ERAT), 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 considering the proposed amendment.

McGuire has Duke Energy's Work Management and Execution procedures that are in place to ensure that risk significant plant configurations are avoided. 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. The key documents are as follows:

- AD-WC-ALL-410, "Work Activity Integrated Risk Management"
- NSD 403, "Shutdown Risk Assessment (Modes 4, 5, 6, and No-Mode) per 10 CFR 50.65 (a)(4)"
- NSD 415, "Operational Risk Management (Modes 1-3) per 10 CFR 50.65 (a)(4)"
- WPM-608, "Outage Risk Assessment Utilizing Electronic Risk Assessment Tool (ERAT)"
- WPM-609, "On-Line Risk Assessment Utilizing Electronic Risk Assessment Tool (ERAT)"

More specifically, the directives referenced above address the process; define the program, and state individual group responsibilities to ensure compliance with the Maintenance Rule. The Work Process Manual procedures provide a consistent process for utilizing the computerized software assessment tool (ERAT), which manages the risk associated with equipment inoperability.

ERAT is a computer program used to facilitate risk informed decision making associated with station work activities. Its guidelines are independent of the requirements of the TS and SLCs, and they are based on probabilistic risk assessment studies and deterministic approaches.

The 1A RHR system train will remain in its normal alignment and will be capable of mitigating the accidents that are modeled in ERAT. The 1B RHR system train and supporting equipment will be protected. Because the installation of alternate forced cooling ensures that the train is available, the station would remain in "Green" risk condition.

Additionally, prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, 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 (WCC) 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 (RP/0/A/5700/006, "Natural Disasters" and AP/1/A/5500/005, "Generator Voltage and Grid Disturbances").

The key safety significant systems impacted by this proposed LAR are currently included in the Maintenance Rule program, and as such, availability and reliability performance criteria have been established to assure that they perform adequately.

3.9 Conclusion

The results of the deterministic engineering analyses and evaluations described above provide assurance that ECCS safety function is fully maintained by the defense-in-depth measure that establishes alternate forced cooling of the 1A RHR pump motor during the repair of the 1A RHR AHU. Furthermore, the proposed extension of the CT will not impact performance against the baseline maintenance rule unavailability time for the 1A RHR system train even if the 1A RHR system train were considered unavailable.

The use of alternate forced cooling as a defense-in-depth measure does not create adverse impacts on other SSCs required to be operable.

The proposed TS CT extension is consistent with NRC guidance and meets the following principles:

1. Meets the current regulations
2. Consistent with the defense-in-depth philosophy
3. Maintains sufficient safety margins

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 NRC 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

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

During the extended AOT proposed by this LAR, McGuire will maintain the ability to meet the applicable General Design Criteria (GDC) as outlined in 10 CFR 50, Appendix A. Pertinent criteria are discussed below.

Criterion 1—Quality standards and records
Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Where generally recognized codes and standards are used, they shall be identified and evaluated to determine their applicability, adequacy, and sufficiency and shall be supplemented or modified as necessary to assure a quality product in keeping with the required safety function. A quality assurance program shall be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety functions. Appropriate records of the design, fabrication, erection, and testing of structures, systems, and components important to safety shall be maintained by or under the control of the nuclear power unit licensee throughout the life of the unit.

The analysis and evaluation of the defense-in-depth measure to establish alternate forced cooling was performed in accordance with the Duke Energy EC process. The EC process adheres to 10 CFR 50 Appendix B criteria. The EC addressed the impact on any applicable codes and standards and found no adverse impact. The EC package and supporting calculations will be stored per the McGuire 10 CFR 50 Appendix B program.

Criterion 3—Fire protection
Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems shall be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components.

The installation of a temporary chiller and the use of rubber hosing represents an addition of combustible materials to the area. The presence of the combustibles has been evaluated by the site fire protection engineer in accordance with approved procedures, and it has been determined to represent no threat.

Additionally, the use of RF water for the chiller does not adversely impact the site's ability to provide fire protection water as necessary.

Criterion 35—Emergency core cooling
A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.

Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

The proposed TS CT extension only affects the amount of time the 1A RHR system train can be considered inoperable and does not change the design of the system. NRC Generic Letter 80-30, "Clarification of the Term 'Operable' as it Applies to Single Failure Criterion for Safety Systems Required by TS," states that the specified TS action time is a temporary relaxation of the single failure criterion. Therefore, there will be no effect on the analysis of any accident or the progression of the accident since the operable 1B RHR system train remains capable of addressing all the required heat loads.

4.2 Precedent

McGuire has identified the following precedent licensing actions applicable to this submittal. Insights from these precedents have been incorporated into the proposed change as appropriate.

1. Vogtle submitted an emergency LAR (Reference 6.1) on August 18, 2010, to allow a one-time CT extension for TS 3.7.14, "Engineered Safety Features Room Cooler and Safety-

Related Chiller System." The NRC approved the change on August 19, 2010. This extension allowed one safety-related chiller train to remain inoperable for 14 days instead of 72 hours. The emergency LAR was requested because of water leakage into the chiller's refrigerant, which required repairs with an expected duration longer than 72 hours.

2. Branch Technical Position 8-8 (Reference 6.2) documents that commercial-grade (i.e., non-safety) equipment may be credited in order to facilitate NRC approval of a requested AOT extension.
3. TSTF-430, Revision 2, provided a basis for extending the CT for a single inoperable low pressure injection train at Babcock & Wilcox plants (comparable to McGuire's RHR train) from 72 hours to seven days.

4.3 Significant Hazards Consideration

Pursuant to 10 CFR 50.90, Duke Energy proposes a LAR for the Renewed FOL and TS for McGuire Nuclear Station, Unit 1.

The proposed LAR requests a one-time change to TS 3.5.2 as it pertains to Required Action A.1. This Required Action applies with one ECCS train inoperable. The 1A RHR pump motor AHU testing results indicate an adverse trend over the last two quarterly tests. Repair and testing of this condition cannot be completed within the 72 hour CT mandated by TS 3.5.2, Required Action A.1. Therefore, this LAR is being submitted to request an extension of the CT by 168 hours for a total of 240 hours.

Duke Energy has concluded that operation of McGuire Nuclear Station Unit 1 in accordance with the proposed changes to the TS does not involve a significant hazards consideration. Duke Energy's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92, as discussed below:

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

   Response: No.

   The ECCS provides a mitigating function, and as such, it does not impact the probability of an accident. The consequences of an accident requiring the ECCS function will continue to be mitigated by the operable 1B RHR system train during the extended period in which the 1A RHR system train is considered inoperable. Each of the two RHR trains are redundant, so the 1B RHR pump is capable of performing the necessary mitigating function.

   Additionally, engineering evaluations, as documented in the EC process, demonstrate that the 1A RHR pump will continue to be capable of performing its mitigating ECCS function using a defense-in-depth measure that establishes alternate forced cooling to the room. As such, the proposed amendment does not result in an increase in consequences of an accident.

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

   Response: No.

No new accident causal mechanisms are created as a result of this proposed LAR. No changes are being made to any SSC that will introduce any new accident causal mechanisms. The defense-in-depth measure to install alternate forced cooling to the 1A RHR pump motor during the repair evolution has been analyzed and evaluated using the Duke Energy EC process. The EC concludes the installation of alternate forced cooling equipment would not adversely impact other components such that a new or different accident scenario is created.

3. Does the proposed amendment involve a significant reduction in the margin of safety?

   Response: 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 an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. The performance of the fuel cladding, reactor coolant and containment systems will not be impacted by the proposed LAR.

   The proposed activity only impacts the amount of time that the 1A RHR system train can be considered inoperable. The amount of inoperable time still remains small relative to the total operating time, and the 1A RHR train would still be considered available (i.e., capable of performing its ECCS function) during the period of extended inoperability. However, even if the train were considered unavailable, the total hours of unavailability would remain bounded by the limits established by the Maintenance Rule program.

   Therefore, it is concluded that the proposed changes do not involve a significant reduction in the margin of safety.

Based upon the above evaluation, Duke Energy concludes that the proposed amendment presents 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.

5.0 ENVIRONMENTAL CONSIDERATIONS

A review 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. 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 onsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

6.0 REFERENCES

6.1 Vogtle LAR dated August 18, 2010 (accession number ML102300574); supplemented on August 18, 2010 (accession number ML102310142); approved on August 19, 2010 (accession number ML102310044).

6.2 Branch Technical Position 8-8, "Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions"

6.3 TSTF-430, Revision 2, "AOT Extension to 7 Days for LPI and Containment Spray (BAW-2295-A, Rev. 1)

ATTACHMENT 1

McGuire Technical Specifications Page Markups

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS — Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

----------NOTE----------
In MODE 3, both safety injection (SI) pump or RHR pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable. AND At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	A.1 Restore train(s) to OPERABLE status.	72 hours *
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

* For Unit 1 only, the Completion Time that one train of ECCS can be inoperable as specified by Required Action A.1 may be extended beyond the "72 hours" for up to 10 days during the 1A RHR AHU repair evolution. This allowance may be used one-time for the 1A RHR AHU repair and is contingent on meeting the compensatory measures and commitments described in MNS LAR submittal correspondence letter MNS-15-069. Upon completion of the repair and restoration, this footnote is no longer applicable and will expire on March 31, 2016.

ATTACHMENT 2

McGuire Technical Specifications Bases Page Markups
(Provided for Information Only)

BASES

ACTIONS (continued)

An event accompanied by a loss of offsite power and the failure of an EDG can disable one ECCS train until power is restored. A reliability analysis (Ref. 6) has shown that the impact of having one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

Reference 7 describes situations in which one component, such as an RHR crossover valve, can disable both ECCS trains. With one or more component(s) inoperable such that 100% of the flow equivalent to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be immediately entered.

INSERT A

B.1 and B.2

If the inoperable trains cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Misalignment of these valves could render both ECCS trains inoperable. Securing these valves using the power disconnect switches in the correct position ensures that they cannot change position as a result of an active failure or be inadvertently misaligned. These valves are of the type, described in Reference 7, that can disable the function of both ECCS trains and invalidate the accident analyses. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing,

INSERT A:

As part of the 1A RHR AHU repair evolution, the Completion Time that one train of ECCS can be inoperable as specified by Required Action A.1 may be extended beyond the "72 hours" for up to 10 days (on Unit 1 only). This allowance may be used one-time for the 1A RHR AHU repair. Upon completion of the repair and restoration, the Completion Time footnote is no longer applicable and will expire on March 31, 2016. The commitments from the LAR submittal are as follows:

Commitment	Description
1	The alternate forced cooling equipment (chiller and AHU) will be installed and tested in accordance with the EC process prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1.
2	At least one WZ C sump pump will be available prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1.
3	The following SSCs will be protected prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, and elective maintenance to them will be deferred during the repairs to the 1A RHR pump motor AHU: • 1B RHR train • 1B Nuclear Service Water System (NSWS) train • 1B Component Cooling Water System (CCWS) train • 1B Emergency Diesel Generator (EDG) • Power supply to the alternate cooling equipment • One WZ C sump pump
4	Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, McGuire will monitor the National Weather Service for potential severe weather conditions. To the extent practical, severe weather conditions will be avoided.
5	Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, and daily thereafter, McGuire will contact the Transmission Control Center (TCC) regarding system grid stability. To the extent practical, system grid instability will be avoided.
6	Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, roving fire watches will be established in the following areas to minimize the chance of fire-induced LOCAs: • Unit 1 4.16kV Switchgear Rooms • Unit 1 Auxiliary Feedwater Pump Room • 1B Diesel Generator Room • Fire Area 14 – vicinity of 1/2EMXB1 • Fire Area 19 – vicinity of 1/2EMXG • Fire Area 25 – vicinity of 1IC02
7	Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, procedures will have been

	developed to start the alternate cooling when required, and personnel will be designated to ensure that the equipment is started before room temperatures exceed the limits.

ATTACHMENT 3

Regulatory Commitments

The following table identifies the regulatory commitments made by Duke Energy in support of the requested license amendment. Any other statements made in this licensing submittal are provided for informational purposes only and are not considered to be regulatory commitments. Please direct any questions related to this matter to Brian Richards at (980) 875-5171.

Commitment	Description
1	The alternate forced cooling equipment (chiller and AHU) will be installed and tested in accordance with the EC process prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1.
2	At least one WZ C sump pump will be available prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1.
3	The following SSCs will be protected prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1,, and elective maintenance to them will be deferred during the repairs to the 1A RHR pump motor AHU: • 1B RHR train • 1B Nuclear Service Water System (NSWS) train • 1B Component Cooling Water System (CCWS) train • 1B Emergency Diesel Generator (EDG) • Power supply to the alternate cooling equipment • One WZ C sump pump
4	Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, McGuire will monitor the National Weather Service for potential severe weather conditions. To the extent practical, severe weather conditions will be avoided.
5	Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, and daily thereafter, McGuire will contact the Transmission Control Center (TCC) regarding system grid stability. To the extent practical, system grid instability will be avoided.
6	Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, roving fire watches will be established in the following areas to minimize the chance of fire-induced LOCAs: • Unit 1 4.16kV Switchgear Rooms • Unit 1 Auxiliary Feedwater Pump Room • 1B Diesel Generator Room • Fire Area 14 – vicinity of 1/2EMXB1 • Fire Area 19 – vicinity of 1/2EMXG • Fire Area 25 – vicinity of 1IC02
7	Prior to exceeding the normal 72 hour AOT associated with TS 3.5.2, Required Action A.1, procedures will have been developed to start the alternate cooling when required, and personnel will be designated to ensure that the equipment is started before room temperatures exceed the limits.