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A Duke Energy Company

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July 2, 2001

U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ATTENTION: Document Control Desk

SUBJECT: Duke Energy Corporation

McGuire Nuclear Station Units 1 and 2
Docket Nos. 50-369, 50-370
Application For Technical Specification Improvement To Eliminate Requirements For Post-Accident Sampling Systems (PASS) Using The Consolidated Line Item Improvement Process

Pursuant to 10CFR50.90, attached is a Duke Energy Corporation ("Duke") license amendment request (LAR) for the McGuire Nuclear Station ("McGuire") Facility Operating License and Technical Specification.

The proposed amendment would delete Technical Specification (TS) 5.5.4, "Post Accident Sampling," and thereby eliminate the requirements to have and maintain the Post Accident Sampling System (PASS) at the McGuire Nuclear Station. The changes are consistent with NRC approved Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Traveler, TSTF-366, "Elimination of Requirements for a Post Accident Sampling System (PASS)." The availability of this technical specification improvement was announced in the Federal Register on October 31, 2000 [65FR65018] as part of the Consolidated Line Item Improvement Process (CLIIP).

The contents of this amendment package are as follows:

Attachment 1 provides a description of the proposed changes, the requested confirmation of applicability, and plant-specific verifications.

Attachments 2a and 2b provide a marked copy of the existing Facility Operating License for McGuire Units 1 and 2,

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respectively. These marked copies show the proposed changes.

Attachments 3a and 3b provide reprinted Facility Operating License pages for McGuire Units 1 and 2, respectively.

Attachment 4 provides a marked copy of the existing Technical Specifications for McGuire Units 1 and 2. Related changes to Technical Specification Bases are also included. These marked copies show the proposed changes.

Attachment 5 provides the reprinted Technical Specifications pages for McGuire Units 1 and 2. Related reprinted Technical Specification Bases are also included.

Attachment 6 provides a summary of the regulatory commitments made in this submittal.

Duke requests an implementation period of 180 days following receipt of NRC approval of the proposed License Amendment Request.

Implementation of this LAR in the Facility Operating Licenses and Technical Specifications will impact the McGuire Updated Final Safety Analysis Report (UFSAR) and Site Emergency Plan. Permanent changes to the UFSAR and Emergency Plan will be made in accordance with 10CFR50.71(e) and 10CFR50.54(q), respectively.

This LAR has been categorized as a Cost Beneficial Licensing Action with an estimated cost savings in excess of $25,000 per year through the remainder of the 40-year life of the McGuire Nuclear Station.

In accordance with Duke administrative procedures and the Quality Assurance Program Topical Report, the changes contained in this LAR have been reviewed and approved by the McGuire Plant Operations Review Committee and the Duke Nuclear Safety Review Board.

Pursuant to 10CFR50.91, a copy of this proposed amendment is being sent to the appropriate State of North Carolina official. Inquiries on this matter should be directed to J. A. Effinger at (704) 382-8688.

Very truly yours,

M. S. Tuckman

M. S. Tuckman

Attachments:
1. Description and Assessment
2. Proposed Facility Operating License Changes
3. Revised Facility Operating License Pages
4. Proposed Technical Specification and Technical Specification Basis Changes
5. Revised Technical Specification and Technical Specification Basis Pages
6. Regulatory Commitments

xc w/Attachments:

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AFFIDAVIT

M. S. Tuckman, being duly sworn, states that he is Executive Vice President of Duke Energy Corporation; that he is authorized on the part of said corporation to sign and file with the Nuclear Regulatory Commission these amendments to the McGuire Nuclear Station Facility Operating Licenses Nos. NPF-9 and NPF-17 and associated Technical Specifications; and that all statements and matters set forth within this submittal dated July 2, 2001 are true and correct to the best of his knowledge.

M. S. Tuckman

M. S. Tuckman, Executive Vice President

Subscribed and sworn to me: July 2, 2001
Date

Mary P. Nelms, Notary Public

My commission expires: JAN 22, 2006

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Attachment 1

Description and Assessment

1.0 DESCRIPTION

The proposed License Amendment deletes the program requirements of Technical Specification (5.5.4) "Post Accident Sampling."

The changes are consistent with NRC approved Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-366. The availability of this technical specification improvement was announced in the Federal Register on October 31, 2000 [65FR65018] as part of the consolidated line item improvement process (CLIIP).

2.0 ASSESSMENT

2.1 Applicability of Published Safety Evaluation

Duke has reviewed the safety evaluation published on October 31, 2000 as part of the Consolidated Line Item Improvement Process. This verification included a review of the NRC staff's evaluation as well as the supporting information provided to support TSTF-366 (i.e., WCAP-14986A, Rev.2, "Post Accident Sampling System Requirements: A Technical Basis," submitted October 26, 1998, as supplemented by letters dated April 28, 1999, April 10, 2000, and May 22, 2000). Duke has concluded that the justifications presented in the TSTF proposal and the safety evaluation prepared by the NRC staff are applicable to the McGuire Nuclear Station, Units 1 and 2, and justify this amendment for the incorporation of the changes to the McGuire Nuclear Station Technical Specifications.

2.2 Optional Changes and Variations

The elimination of PASS results in changes to the discussion in the Bases section for TS 3.3.3(F.1). The current Bases mention the capabilities of PASS as part of the justification for allowing both hydrogen monitor channels to be out of service for a period of up to 72 hours. Marked up and revised Bases discussion for TS 3.3.3(F.1) are provided in Attachments 4, and 5, respectively.

Requirements for installing PASS are presently contained in the McGuire Unit 1 and 2 Facility Operating Licenses (FOL). This proposed amendment request includes the deletion of this

requirement from the McGuire FOL. Please note that Duke has previously proposed the elimination of this condition in a previous LAR dated June 13, 2000. Issuance of these two amendment requests will require coordination.

3.0 REGULATORY ANALYSIS

3.1 No Significant Hazards Determination

Duke has reviewed the proposed no significant hazards consideration determination published on October 31, 2000 as part of the CLIIP. Duke has concluded that the proposed determination presented in the notice is applicable to the McGuire Nuclear Station and the determination is hereby incorporated by reference to satisfy the requirements of 10CFR50.91(a).

3.2 Verification and Commitments

McGuire is not proposing any variations or deviations from the technical specification changes described in TSTF-366 or the NRC staff's model safety evaluation published on October 31, 2000.

As discussed in the notice of availability published in the Federal Register on October 31, 2000 for this technical specification improvement, plant-specific verifications were performed as follows:

1. McGuire will develop contingency plans for obtaining and analyzing highly radioactive samples of reactor coolant, containment sump, and containment atmosphere. The contingency plans will be contained in chemistry and radiation protection procedures and implemented within 180 days of the approval of the amendment. The establishment of these contingency plans is considered a regulatory commitment.

2. McGuire will develop the capability for classifying fuel damage events at the Alert level threshold at the radioactivity levels of ≥300 μCi/ml dose equivalent iodine. This capability will be described in McGuire emergency plans and applicable emergency classification procedures and

implemented within 180 days of the approval of the amendment. The capability for classifying fuel damage events is considered a regulatory commitment.

3. McGuire has established the capability to monitor radioactive iodines that have been released to offsite environs. This capability is described in the McGuire emergency plan and applicable emergency procedures. The capability to monitor radioactive iodines is considered a regulatory commitment.

4.0 ENVIRONMENTAL EVALUATION

Duke has reviewed the environmental evaluation included in the model safety evaluation published on October 31, 2000 as part of the CLIIP. Duke has concluded that the staff's findings presented in that evaluation are applicable to the McGuire Nuclear Station and the evaluation is hereby incorporated by reference for this application.

Attachment 2a

McGuire Unit 1 Facility Operating License

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As a reference, these conditions are further described in Supplement No. 4 to the SER (NUREG-0422), Appendix D, items 3b, 4a, 4f and 9b, respectively.

The licensee shall complete each of the following conditions to the satisfaction of the NRC by the times indicated. Each of the following conditions references the appropriate item in Section 22.3, "Full-Power Requirements", in SER Supplement 5, NUREG-0422:

a. NSSS Vendor Review Procedures (I.C.7)

Prior to exceeding 5% power, the licensee shall document that the Westinghouse review of the power ascension test procedures is complete.

b. Training During Low-Power Testing (I.G.1)

Prior to exceeding 5% power the licensee shall complete the required Special Tests and the low-power test training program. The results of the test program shall be provided to the NRC within 30 days.

c. ~~Post Accident Sampling (II.B.3)~~ DELETED

~~The licensee shall install a high radiation sampling system for obtaining reactor coolant and containment atmosphere sampling under degraded core accident conditions without excessive exposure by January 1, 1982.~~

d. Training for Mitigating Core Damage (II.B.4)

Prior to exceeding 5% power the licensee shall complete training for mitigating core damage.

e. Auxiliary Feedwater System Evaluation (II.E.1.1)

Prior to exceeding 5% power the licensee shall complete performance testing of the auxiliary feedwater system pumps and shall submit a report within 30 days after all tests are completed.

f. Inadequate Core Cooling Instruments (II.F.2)

(1) The licensee shall install a reactor vessel water level instrumentation system by Jan. 1, 1982;

Attachment 2b

McGuire Unit 2 Facility Operating License

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b. ~~Postaccident Sampling (II.B.3)~~ DELETED

~~Prior to exceeding 5% power, a high-radiation sampling system for obtaining reactor coolant and containment atmosphere sampling under degraded core accident conditions shall be operable.~~

c. Inadequate Core Cooling Instruments (II.F.2)

1) Prior to startup following the first refueling outage, the licensee shall install a reactor vessel water level instrumentation system, and

2) Prior to startup following the first refueling outage, the licensee shall upgrade the in-containment portion of the incore thermocouple system and provide a schedule for update of the remainder of the system.

d. Anticipatory Reactor Trip (II.K.3.10)

Prior to exceeding 50% power the licensee shall complete the described turbine trip tests to verify that PORVs will not be challenged when the anticipatory trip bypass is in effect.

e. Hydrogen Control Measures (II.B.7)

1) Prior to startup following the first refueling outage the Commission must confirm that an adequate hydrogen control system for the plant is installed and will perform its intended function in a manner that provides adequate safety margins, and

2) Operation of the hydrogen mitigation igniter system shall be activated upon a safety injection signal with accompanying indications of a loss of coolant accident.

f. Emergency Response Capability (I.C.1, I.D.1, I.D.2, III.A.1.2, III.A.2.2)

1) By April 15, 1983, the licensee shall submit a response to NRC generic letter 82-33, dated December 17, 1982, related to emergency response capabilities.

2) The licensee shall maintain interim emergency support facilities (Technical Support Center, Operations Support Center and the Emergency Operations Facility) until the upgraded facilities are completed.

Attachment 3a

McGuire Unit 1 Facility Operating License

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As a reference, these conditions are further described in Supplement No. 4 to the SER (NUREG-0422), Appendix D, items 3b, 4a, 4f and 9b, respectively.

The licensee shall complete each of the following conditions to the satisfaction of the NRC by the times indicated. Each of the following conditions references the appropriate item in Section 22.3, "Full-Power Requirements", in SER Supplement 5, NUREG-0422:

a. NSSS Vendor Review Procedures (I.C.7)

Prior to exceeding 5% power, the licensee shall document that the Westinghouse review of the power ascension test procedures is complete.

b. Training During Low-Power Testing (I.G.1)

Prior to exceeding 5% power the licensee shall complete the required Special Tests and the low-power test training program. The results of the test program shall be provided to the NRC within 30 days.

c. Deleted

d. Training for Mitigating Core Damage (II.B.4)

Prior to exceeding 5% power the licensee shall complete training for mitigating core damage.

e. Auxiliary Feedwater System Evaluation (II.E.1.1)

Prior to exceeding 5% power the licensee shall complete performance testing of the auxiliary feedwater system pumps and shall submit a report within 30 days after all tests are completed.

f. Inadequate Core Cooling Instruments (II.F.2)

(1) The licensee shall install a reactor vessel water level instrumentation system by Jan. 1, 1982;

Attachment 3b

McGuire Unit 2 Facility Operating License

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b. Deleted

c. Inadequate Core Cooling Instruments (II.F.2)

1) Prior to startup following the first refueling outage, the licensee shall install a reactor vessel water level instrumentaiton system, and

2) Prior to startup following the first refueling outage, the licensee shall upgrade the in-containment portion of the incore thermocouple system and provide a schedule for update of the remainder of the system.

d. Anticipatory Reactor Trip (II.K.3.10)

Prior to exceeding 50% power the licensee shall complete the described turbine trip tests to verify that PORVs will not be challenged when the anticipatory trip bypass is in effect.

e. Hydrogen Control Measures (II.B.7)

1) Prior to startup following the first refueling outage the Commission must confirm that an adequate hydrogen control system for the plant is installed and will perform its intended function in a manner that provides adequate safety margins, and

2) Operation of the hydrogen mitigation igniter system shall be activated upon a safety injection signal with accompanying indications of a loss of coolant accident.

f. Emergency Response Capability (I,C.1, I.D.1, I.D.2, III.A.1.2, III.A.2.2)

1) By April 15, 1983, the licensee shall submit a response to NRC generic letter 82-33, dated December 17, 1982, related to emergency repsonse capabilities.

2) The licensee shall maintain interim emergency support facilities (Technical Support Center, Operaitons Support Center and the Emergency Operations Facility) until the upgraded facilities are completed.

Attachment 4

McGuire Units 1 and 2 Technical Specifications
and
Technical Specification Bases

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5.5 Programs and Manuals

5.5.2 Containment Leakage Rate Testing Program (continued)

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 14.8 psig. The maximum allowable containment leakage rate, L_a, at P_a, shall be 0.3% of containment air weight per day.

Leakage Rate acceptance criteria are:

a. Containment leakage rate acceptance criterion is $\leq 1.0\ L_a$. During the first plant startup following testing in accordance with this program, the leakage rate acceptance criteria are $< 0.75\ L_a$ for Type A tests.

The provisions of SR 3.0.2 do not apply to the test frequencies specified in the Containment Leakage Rate Testing Program.

The provisions of SR 3.0.3 are applicable to the Containment Leakage Rate Testing Program.

5.5.3 Primary Coolant Sources Outside Containment

This program provides controls to minimize leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident to levels as low as practicable. The systems include Containment Spray, Safety Injection, Chemical and Volume Control, Nuclear Sampling, RHR, Boron Recycle, Refueling Water, Liquid Waste, and Waste Gas. The program shall include the following:

a. Preventive maintenance and periodic visual inspection requirements; and

b. Integrated leak test requirements for each system at refueling cycle intervals or less.

5.5.4 ~~Post Accident Sampling~~ DELETED

~~This program provides controls that ensure the capability to obtain and analyze reactor coolant, radioactive iodines, gases, and particulates in plant gaseous effluents, and containment atmosphere samples under accident conditions. The program shall include the following:~~

~~a. Training of personnel;~~

~~b. Procedures for sampling and analysis; and~~

~~c. Provisions for maintenance of sampling and analysis equipment.~~

(continued)

BASES

ACTIONS (continued)

discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative actions. This action is appropriate in lieu of a shutdown requirement since alternative actions are identified before loss of functional capability, and given the likelihood of unit conditions that would require information provided by this instrumentation.

D.1

Condition D applies when a single require channel is inoperable. Required Action D.1 requires restoring the required channel to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with the required channel inoperable is not acceptable. Therefore, requiring restoration of the required channel to OPERABLE status limits the risk that the PAM function will be in a degraded condition should an event occur.

E.1

Condition E applies when one or more Functions have two inoperable required channels (i.e., two channels inoperable in the same Function). Required Action E.1 requires restoring one channel in the Function(s) to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the PAM instrumentation. Therefore, requiring restoration of one inoperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur. Condition E does not apply to hydrogen monitor channels and functions with single channels.

F.1

Condition F applies when two hydrogen monitor channels are inoperable. Required Action F.1 requires restoring one hydrogen monitor channel to OPERABLE status within 72 hours. The 72 hour Completion Time is reasonable based on the ~~backup capability of the Post Accident Sampling~~

BASES

ACTIONS (continued)

~~System to monitor the hydrogen concentration for evaluation of core damage and to provide information for operator decisions. Also, it is unlikely that a LOCA (which would cause core damage)~~ would occur during this time.

LOW PROBABILITY THAT AN ACCIDENT CAUSING CORE DAMAGE

G.1 and G.2

If the Required Action and associated Completion Time of Conditions D, E, or F are not met, the unit must be brought to a MODE where the requirements of this LCO do not apply. To achieve this status, the unit must be brought to at least 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 unit conditions from full power conditions in an orderly manner and without challenging unit systems.

H.1

Alternate means of monitoring Containment Area Radiation have been developed and tested. These alternate means may be temporarily installed if the normal PAM channel cannot be restored to OPERABLE status within the allotted time. If these alternate means are used, the Required Action is not to shut down the unit but rather to follow the directions of Specification 5.6.7, in the Administrative Controls section of the TS. The report provided to the NRC should discuss the alternate means used, describe the degree to which the alternate means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels.

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that SR 3.3.3.1 and SR 3.3.3.3 apply to each PAM instrumentation Function in Table 3.3.3-1.

SR 3.3.3.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a

Attachment 5

McGuire Units 1 and 2 Technical Specifications
and
Technical Specification Bases

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Remove Page	Insert Page
B 3.3.3-1 thru 15	B 3.3.3-1 thru 15
5.5-2	5.5-2

B 3.3 INSTRUMENTATION

B 3.3.3 Post Accident Monitoring (PAM) Instrumentation

BASES

BACKGROUND

The primary purpose of the PAM instrumentation is to display unit variables that provide information required by the control room operators during accident situations. This information provides the necessary support for the operator to take the manual actions for which no automatic control is provided and that are required for safety systems to accomplish their safety functions for Design Basis Accidents (DBAs).

The OPERABILITY of the accident monitoring instrumentation ensures that there is sufficient information available on selected unit parameters to monitor and to assess unit status and behavior following an accident.

The availability of accident monitoring instrumentation is important so that responses to corrective actions can be observed and the need for, and magnitude of, further actions can be determined. These essential instruments are identified by unit specific documents (Ref. 1) addressing the recommendations of Regulatory Guide 1.97 (Ref. 2) as required by Supplement 1 to NUREG-0737 (Ref. 3).

The instrument channels required to be OPERABLE by this LCO include two classes of parameters identified during unit specific implementation of Regulatory Guide 1.97 as Type A and Category I variables.

Type A variables are included in this LCO because they provide the primary information required for the control room operator to take specific manually controlled actions for which no automatic control is provided, and that are required for safety systems to accomplish their safety functions for DBAs.

Category I variables are the key variables deemed risk significant because they are needed to:

- Determine whether other systems important to safety are performing their intended functions;
- Provide information to the operators that will enable them to determine the likelihood of a gross breach of the barriers to radioactivity release; and

BASES

BACKGROUND (continued)

- Provide information regarding the release of radioactive materials to allow for early indication of the need to initiate action necessary to protect the public, and to estimate the magnitude of any impending threat.

These key variables are identified by the unit specific Regulatory Guide 1.97 analyses (Ref. 1). These analyses identify the unit specific Type A and Category I variables and provide justification for deviating from the NRC proposed list of Category I variables.

The specific instrument Functions listed in Table 3.3.3-1 are discussed in the LCO section.

APPLICABLE SAFETY ANALYSES

The PAM instrumentation ensures the operability of Regulatory Guide 1.97 Type A and Category I variables so that the control room operating staff can:

- Perform the diagnosis specified in the emergency operating procedures (these variables are restricted to preplanned actions for the primary success path of DBAs), e.g., loss of coolant accident (LOCA);
- Take the specified, pre-planned, manually controlled actions, for which no automatic control is provided, and that are required for safety systems to accomplish their safety function;
- Determine whether systems important to safety are performing their intended functions;
- Determine the likelihood of a gross breach of the barriers to radioactivity release;
- Determine if a gross breach of a barrier has occurred; and
- Initiate action necessary to protect the public and to estimate the magnitude of any impending threat.

PAM instrumentation that meets the definition of Type A in Regulatory Guide 1.97 satisfies Criterion 3 of 10 CFR 50.36 (Ref. 4). Category I, non-Type A, instrumentation must be retained in TS because it is intended to assist operators in minimizing the consequences of accidents. Therefore, Category I, non-Type A, variables are important for reducing public risk.

BASES

LCO

The PAM instrumentation LCO provides OPERABILITY requirements for Regulatory Guide 1.97 Type A monitors, which provide information required by the control room operators to perform certain manual actions specified in the unit Emergency Operating Procedures. These manual actions ensure that a system can accomplish its safety function, and are credited in the safety analyses. Additionally, this LCO addresses Regulatory Guide 1.97 instruments that have been designated Category I, non-Type A.

The OPERABILITY of the PAM instrumentation ensures there is sufficient information available on selected unit parameters to monitor and assess unit status following an accident. This capability is consistent with the recommendations of Reference 1.

LCO 3.3.3 requires two OPERABLE channels for most Functions. Two OPERABLE channels ensure no single failure prevents operators from getting the information necessary for them to determine the safety status of the unit, and to bring the unit to and maintain it in a safe condition following an accident.

Furthermore, OPERABILITY of two channels allows a CHANNEL CHECK during the post accident phase to confirm the validity of displayed information.

In some cases, the total number of channels exceeds the number of required channels, e.g., pressurizer level has a total of three channels, however only two channels are required OPERABLE. This provides additional redundancy beyond that required by this LCO, i.e., when one channel of pressurizer level is inoperable, the required number of two channels can still be met. The ACTIONS of this LCO are only entered when the required number of channels cannot be met.

Category I variables are required to meet Regulatory Guide 1.97 Category I (Ref. 2) design and qualification requirements for seismic and environmental qualification, single failure criterion, utilization of emergency standby power, immediately accessible display, continuous readout, and recording of display.

Listed below are discussions of the specified instrument Functions listed in Table 3.3.3-1.

1. Neutron Flux - (Wide Range)

   Wide Range Neutron Flux indication is provided to verify reactor shutdown.

BASES

LCO (continued)

Neutron flux is used for accident diagnosis, verification of subcriticality, and diagnosis of positive reactivity insertion.

Two channels of wide range neutron flux are required OPERABLE.

2, 3. Reactor Coolant System (RCS) Hot and Cold Leg Temperatures

RCS Hot and Cold Leg Temperatures are Category I variables provided for verification of core cooling and long term surveillance.

RCS hot and cold leg temperatures are used to determine RCS subcooling margin. RCS subcooling margin will allow termination of safety injection (SI), if still in progress, or reinitiation of SI if it has been stopped. RCS subcooling margin is also used for unit stabilization and cooldown control.

In addition, RCS cold leg temperature is used in conjunction with RCS hot leg temperature to verify the unit conditions necessary to establish natural circulation in the RCS.

Reactor coolant hot and cold leg temperature inputs are provided by fast response resistance elements and associated transmitters in each loop.

Two channels of RCS Hot Leg Temperature and two channels of RCS Cold Leg Temperature are required OPERABLE by the LCO.

RCS Hot Leg and Cold Leg Temperature are diverse indications of RCS temperature. Core exit thermocouples also provide diverse indication of RCS temperature.

4. Reactor Coolant System Pressure (Wide Range)

RCS wide range pressure is a Category I variable provided for verification of core cooling and RCS integrity long term surveillance.

RCS pressure is used to verify delivery of SI flow to RCS from at least one train when the RCS pressure is below the pump shutoff head. RCS pressure is also used to verify closure of manually closed spray line valves and pressurizer power operated relief valves (PORVs).

BASES

LCO (continued)

In addition to these verifications, RCS pressure is used for determining RCS subcooling margin. RCS pressure can also be used:

- to determine whether to terminate actuated SI or to reinitiate stopped SI;
- to determine when to reset SI and shut off low head SI;
- to manually restart low head SI;
- as reactor coolant pump (RCP) trip criteria; and
- to make a determination on the nature of the accident in progress and where to go next in the procedure.

RCS pressure is also related to three decisions about depressurization. They are:

- to determine whether to proceed with primary system depressurization;
- to verify termination of depressurization; and
- to determine whether to close accumulator isolation valves during a controlled cooldown/depressurization.

A final use of RCS pressure is to determine whether to operate the pressurizer heaters.

RCS pressure is a Type A variable because the operator uses this indication to monitor the cooldown of the RCS following a steam generator tube rupture (SGTR) or small break LOCA. Operator actions to maintain a controlled cooldown, such as adjusting steam generator (SG) pressure or level, would use this indication. Furthermore, RCS pressure is one factor that may be used in decisions to terminate RCP operation.

Two channels of wide range RCS pressure are required OPERABLE.

BASES

LCO (continued)

5, 6. Reactor Vessel Water Level

Reactor Vessel Water Level is provided for verification and long term surveillance of core cooling. It is also used for accident diagnosis and to determine reactor coolant inventory adequacy.

The Reactor Vessel Water Level Monitoring System provides a direct measurement of the collapsed liquid level above the fuel alignment plate. The collapsed level represents the amount of liquid mass that is in the reactor vessel above the core. Measurement of the collapsed water level is selected because it is a direct indication of the water inventory.

Two channels of Reactor Vessel Water Level are provided in both the core region (lower range) and the head region (wide range) with indication in the unit control room. Each channel uses differential pressure transmitters and a microprocessor to calculate true vessel level or relative void content of the primary coolant.

7. Containment Sump Water Level (Wide Range)

Containment Sump Water Level is provided for verification and long term surveillance of RCS integrity.

Containment Sump Water Level is used to determine:

- containment sump level accident diagnosis;
- when to begin the recirculation procedure; and
- whether to terminate SI, if still in progress.

Two channels of wide range level are required OPERABLE.

8. Containment Pressure (Wide Range)

Containment Pressure (Wide Range) is provided for verification of RCS and containment OPERABILITY.

Containment pressure is used to verify closure of main steam isolation valves (MSIVs), and containment spray Phase B isolation when Containment Pressure - High High is reached.

BASES

LCO (continued)

Two channels of wide range containment pressure are required OPERABLE.

9. Containment Atmosphere Radiation (High Range)

Containment Atmosphere Radiation is provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans. Containment radiation level is used to determine if a high energy line break (HELB) has occurred, and whether the event is inside or outside of containment.

Two channels of high range containment atmosphere radiation are provided. One channel is required OPERABLE. Diversity is provided by portable instrumentation or by sampling and analysis.

10. Hydrogen Monitors

Hydrogen Monitors are provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. This variable is also important in verifying the adequacy of mitigating actions.

Two channels of hydrogen monitors are required OPERABLE.

11. Pressurizer Level

Pressurizer Level is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify the unit conditions necessary to establish natural circulation in the RCS and to verify that the unit is maintained in a safe shutdown condition.

Three channels of pressurizer level are provided. Two channels are required OPERABLE.

12. Steam Generator Water Level (Narrow Range)

SG Water Level is provided to monitor operation of decay heat removal via the SGs. The Category I indication of SG level is the narrow range level instrumentation.

BASES

LCO (continued)

SG Water Level (Narrow Range) is used to:

- identify the faulted SG following a tube rupture;
- verify that the intact SGs are an adequate heat sink for the reactor;
- determine the nature of the accident in progress (e.g., verify an SGTR); and
- verify unit conditions for termination of SI during secondary unit HELBs outside containment.

Four channels per SG of narrow range water level are provided. Only two channels are required OPERABLE by the LCO.

13, 14, 15, 16. Core Exit Temperature

Core Exit Temperature is provided for verification and long term surveillance of core cooling.

Adequate core cooling is ensured with two valid Core Exit Temperature channels per quadrant with two CETs per required channel. Core inlet temperature data is used with core exit temperature to give radial distribution of coolant enthalpy rise across the core. Core Exit Temperature is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Core Exit Temperature is also used for unit stabilization and cooldown control.

Two OPERABLE channels of Core Exit Temperature are required in each quadrant to provide indication of radial distribution of the coolant temperature rise across representative regions of the core. Two sets of two thermocouples (1 set from each redundant power train) ensure a single failure will not disable the ability to determine the radial temperature gradient.

17. Auxiliary Feedwater Flow

AFW Flow is provided to monitor operation of decay heat removal via the SGs.

LCO (continued)

The AFW Flow to each SG is determined by flow indicators, pump operational status indicators, and NSWS and condensate supply valve indicators in the control room. The AFW flow indicators are category 2, type D variables which are used to demonstrate the category 1 variable of AFW assured source.

AFW flow is used three ways:

- to verify delivery of AFW flow to the SGs;
- to determine whether to terminate SI if still in progress, in conjunction with SG water level (narrow range); and
- to regulate AFW flow so that the SG tubes remain covered.

18. RCS Subcooling Margin Monitor

RCS subcooling is provided to allow unit stabilization and cooldown control. RCS subcooling will allow termination of SI, if still in progress, or reinitiation of SI if it has been stopped.

The margin to saturation is calculated from RCS pressure and temperature measurements. The average of the five highest core exit thermocouples are used to represent core conditions and the wide range hot leg RTDs are used to measure loop hot leg temperatures. The plant computer performs the calculations and comparisons to saturation curves. A graphic display over the required range gives the operator a representation of primary system conditions compared to various curves of importance (saturation, NDT, etc.).

A backup program exists to ensure the capability to accurately monitor RCS subcooling. The program includes training and a procedure to manually calculate subcooling margin, using control room pressure and temperature instruments.

19. Steam Line Pressure

Steam Line Pressure is provided to monitor operation of decay heat removal via the SGs. Steam line pressure is also used to determine if a high energy secondary line rupture occurred and which SG is faulted.

BASES

LCO (continued)

Two channels of Steam Line Pressure are required OPERABLE.

20. Refueling Water Storage Tank Level

RWST level monitoring is provided to ensure an adequate supply of water to the safety injection and spray pumps during the switchover to cold leg recirculation.

Three channels of RWST level are provided. Two channels are required OPERABLE by the LCO.

21. DG Heat Exchanger NSWS Flow

Flow indicators are provided in each of the NSWS trains to indicate cooling water flow through the respective train DG. These indicators are provided for operators to manually control flow to the DG heat exchanger. One flow indicator is required OPERABLE on each train.

22. Containment Spray Heat Exchanger NSWS Flow

Flow indicators are provided in each of the NSWS trains to indicate cooling water flow through the respective train containment spray heat exchangers. These indicators are provided for operators to manually control flow to the heat exchanger. One flow indicator is required OPERABLE on each train.

APPLICABILITY

The PAM instrumentation LCO is applicable in MODES 1, 2, and 3. These variables are related to the diagnosis and pre-planned actions required to mitigate DBAs. The applicable DBAs are assumed to occur in MODES 1, 2, and 3. In MODES 4, 5, and 6, unit conditions are such that the likelihood of an event that would require PAM instrumentation is low; therefore, the PAM instrumentation is not required to be OPERABLE in these MODES.

ACTIONS

Note 1 has been added in the ACTIONS to exclude the MODE change restriction of LCO 3.0.4. This exception allows entry into the applicable MODE while relying on the ACTIONS even though the ACTIONS may eventually require unit shutdown. This exception is acceptable due to the

BASES

ACTIONS (continued)

passive function of the instruments, the operator's ability to respond to an accident using alternate instruments and methods, and the low probability of an event requiring these instruments.

Note 2 has been added in the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed on Table 3.3.3-1. When the Required Channels in Table 3.3.3-1 are specified (e.g., on a per steam line, per loop, per SG, etc., basis), then the Condition may be entered separately for each steam line, loop, SG, etc., as appropriate. The Completion Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to all PAM instrument Functions. Condition A addresses the situation when one or more required channels for one or more Functions are inoperable. The Required Action is to refer to Table 3.3.3-1 and take the appropriate Required Actions for the PAM instrumentation affected. The Completion Times are those from the referenced Conditions and Required Actions.

B.1

Condition B applies when one or more Functions have one required channel that is inoperable. Required Action B.1 requires restoring the inoperable channel to OPERABLE status within 30 days. The 30 day Completion Time is based on operating experience and takes into account the remaining OPERABLE channel, the passive nature of the instrument (no critical automatic action is assumed to occur from these instruments), and the low probability of an event requiring PAM instrumentation during this interval. Condition B is not applicable to functions with a single required channel.

C.1

Condition C applies when the Required Action and associated Completion Time for Condition B are not met. This Required Action specifies initiation of actions in Specification 5.6.7, which requires a written report to be submitted to the NRC immediately. This report

BASES

ACTIONS (continued)

discusses the results of the root cause evaluation of the inoperability and identifies proposed restorative actions. This action is appropriate in lieu of a shutdown requirement since alternative actions are identified before loss of functional capability, and given the likelihood of unit conditions that would require information provided by this instrumentation.

D.1

Condition D applies when a single require channel is inoperable. Required Action D.1 requires restoring the required channel to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with the required channel inoperable is not acceptable. Therefore, requiring restoration of the required channel to OPERABLE status limits the risk that the PAM function will be in a degraded condition should an event occur.

E.1

Condition E applies when one or more Functions have two inoperable required channels (i.e., two channels inoperable in the same Function). Required Action E.1 requires restoring one channel in the Function(s) to OPERABLE status within 7 days. The Completion Time of 7 days is based on the relatively low probability of an event requiring PAM instrument operation and the availability of alternate means to obtain the required information. Continuous operation with two required channels inoperable in a Function is not acceptable because the alternate indications may not fully meet all performance qualification requirements applied to the PAM instrumentation. Therefore, requiring restoration of one inoperable channel of the Function limits the risk that the PAM Function will be in a degraded condition should an accident occur. Condition E does not apply to hydrogen monitor channels and functions with single channels.

F.1

Condition F applies when two hydrogen monitor channels are inoperable. Required Action F.1 requires restoring one hydrogen monitor channel to OPERABLE status within 72 hours. The 72 hour Completion Time is reasonable based on the low probability that an accident causing core damage would occur during this time.

BASES

ACTIONS (continued)

G.1 and G.2

If the Required Action and associated Completion Time of Conditions D, E, or F are not met, the unit must be brought to a MODE where the requirements of this LCO do not apply. To achieve this status, the unit must be brought to at least 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 unit conditions from full power conditions in an orderly manner and without challenging unit systems.

H.1

Alternate means of monitoring Containment Area Radiation have been developed and tested. These alternate means may be temporarily installed if the normal PAM channel cannot be restored to OPERABLE status within the allotted time. If these alternate means are used, the Required Action is not to shut down the unit but rather to follow the directions of Specification 5.6.7, in the Administrative Controls section of the TS. The report provided to the NRC should discuss the alternate means used, describe the degree to which the alternate means are equivalent to the installed PAM channels, justify the areas in which they are not equivalent, and provide a schedule for restoring the normal PAM channels.

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that SR 3.3.3.1 and SR 3.3.3.3 apply to each PAM instrumentation Function in Table 3.3.3-1.

SR 3.3.3.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a

SURVEILLANCE REQUIREMENTS (continued)

similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION. The high radiation instrumentation should be compared to similar unit instruments located throughout the unit.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

As specified in the SR, a CHANNEL CHECK is only required for those channels that are normally energized.

The Frequency of 31 days is based on operating experience that demonstrates that channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.3.2

A CHANNEL CALIBRATION is performed every 92 days on the Hydrogen Monitor channels. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor using hydrogen gas mixtures to obtain calibration points at 0 volume percent (v/o) and 9 v/o hydrogen. The test verifies that the channel responds to measured parameter with the necessary range and accuracy. The Frequency is based on operating experience associated with these monitors.

SR 3.3.3.3

A CHANNEL CALIBRATION is performed every 18 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter with the

BASES

SURVEILLANCE REQUIREMENTS (continued)

necessary range and accuracy. This SR is modified by a Note that excludes neutron detectors. The calibration method for neutron detectors is specified in the Bases of LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation." The Frequency is based on operating experience and consistency with the typical industry refueling cycle.

REFERENCES

1. UFSAR Section 1.8.
2. Regulatory Guide 1.97, Rev. 2.
3. NUREG-0737, Supplement 1, "TMI Action Items."
4. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).

5.5 Programs and Manuals

5.5.2 Containment Leakage Rate Testing Program (continued)

The peak calculated containment internal pressure for the design basis loss of coolant accident, P_a, is 14.8 psig. The maximum allowable containment leakage rate, L_a, at P_a, shall be 0.3% of containment air weight per day.

Leakage Rate acceptance criteria are:

a. Containment leakage rate acceptance criterion is $\leq 1.0\ L_a$. During the first plant startup following testing in accordance with this program, the leakage rate acceptance criteria are $< 0.75\ L_a$ for Type A tests.

The provisions of SR 3.0.2 do not apply to the test frequencies specified in the Containment Leakage Rate Testing Program.

The provisions of SR 3.0.3 are applicable to the Containment Leakage Rate Testing Program.

5.5.3 Primary Coolant Sources Outside Containment

This program provides controls to minimize leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident to levels as low as practicable. The systems include Containment Spray, Safety Injection, Chemical and Volume Control, Nuclear Sampling, RHR, Boron Recycle, Refueling Water, Liquid Waste, and Waste Gas. The program shall include the following:

a. Preventive maintenance and periodic visual inspection requirements; and

b. Integrated leak test requirements for each system at refueling cycle intervals or less.

5.5.4 Deleted

Attachment 6

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Duke in this document. Any other statements in this submittal are provided for informational purposes and are not considered to be regulatory commitments. Please direct questions regarding these commitments to J. A. Effinger at (704) 382-8688.

REGULATORY COMMITMENTS	Due Date/Event
McGuire will develop contingency plans for obtaining and analyzing highly radioactive samples of reactor coolant, containment sump, and containment atmosphere. The contingency plans will be contained in chemistry and radiation protection procedures and implemented 180 days after amendment approval consistent with the overall implementation schedule for this LAR. The establishment of these contingency plans is considered a regulatory commitment.	180 days from date of approval
McGuire will develop the capability for classifying fuel damage events at the Alert level threshold at the radioactivity levels of ≥300 μCi/ml dose equivalent iodine. This capability will be described in emergency plan implementing procedures and implemented 180 days after amendment approval consistent with the overall implementation schedule for this LAR. The capability for classifying fuel damage events is considered a regulatory commitment.	180 days from date of approval
McGuire has established the capability to monitor radioactive iodines that have been released to offsite environs. This capability is described in the McGuire emergency plans and applicable emergency procedures. The capability to monitor radioactive iodines is considered a regulatory commitment.	Complete