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Serial No: MNS-18-017 10 CFR 50.90

February 26, 2018

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

ATTENTION: Document Control Desk

Subject: Duke Energy Carolinas, LLC (Duke Energy)
McGuire Nuclear Station, Units 1 and 2
Docket No. 50-369 and 50-370
Non-Voluntary License Amendment Request (LAR) to Correct
Non-Conservative Technical Specification 3.4.11 - PORVs

In accordance with the requirements of 10 CFR 50.90, Duke Energy hereby requests a license amendment to the McGuire Nuclear Station, Unit 1 Renewed Operating License NPF-9, and Unit 2 Renewed Operating License NPF-17. Specifically, this change is requested for Non-Conservative Technical Specification (TS) 3.4.11, "Pressurizer Power Operated Relief Valves (PORVs)," as described in the Enclosures to this letter.

TS 3.4.11 Limiting Condition for Operation (LCO) currently requires each PORV and associated block valve to be operable in Modes 1, 2 and 3. There is one Train A PORV and one associated Train A block valve. There are two Train B PORVs and two associated Train B block valves. The two Train B PORVs are not redundant. Conditions B and C Required Actions currently allow one PORV or one block valve, regardless of which train, to be inoperable in Modes 1, 2 and 3 without a time to return it to operable status. If the inoperable PORV or block valve is associated with Train A, this allowance could have an undesirable single failure impact since the Train B PORVs are not redundant.

Enclosure 1 provides an evaluation of the proposed changes. Enclosure 2 provides marked TS 3.4.11 pages showing the proposed changes. Enclosure 3 provides clean TS 3.4.11 pages. Enclosure 4 provides marked TS 3.4.11 Bases pages (for information only) showing the planned changes.

Duke Energy requests approval of the proposed LAR within a year of its submittal date. The amendments will be implemented within 60 days of issuance.

In accordance with Duke Energy internal procedures and the Quality Assurance Topical Report, the proposed LAR has been reviewed and approved by the McGuire On-Site Review Committee.

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NRR

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

This letter contains no NRC commitments. If you have any questions, please contact P.T. Vu at (980) 875-4302.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 26, 2018

Thomas D. Ray

Thomas D. Ray, P.E.
Site Vice President
McGuire Nuclear Station

Enclosures

1. Evaluation of the Proposed Changes
2. Marked Technical Specification Pages
3. Clean Technical Specification Pages
4. Marked Technical Specification Bases Pages (For Information Only)

cc w/ attachments:

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Enclosure 1

Evaluation of the Proposed Changes

Subject: License Amendment Request (LAR) to Revise Non-Conservative Technical Specification 3.4.11, "PORVs"

1.0 SUMMARY DESCRIPTION

Revision of TS 3.4.11, PORVs, is needed to resolve non-conservative Required Actions. TS 3.4.11 Limiting Condition for Operation (LCO) currently requires each PORV and associated block valve to be operable in Modes 1, 2 and 3. There is one Train A PORV and one associated Train A block valve. There are two Train B PORVs and two associated Train B block valves. The two Train B PORVs are not redundant. Conditions B and C Required Actions currently allow one PORV or one block valve, regardless of which train, to be inoperable in Modes 1, 2 and 3 without a time (Completion Time, Out of Service Time, or Allowed Outage Time (AOT)) to return it to operable status. If the inoperable PORV or block valve is associated with Train A, this allowance could have an undesirable single failure impact since the Train B PORVs are not redundant.

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

The pressurizer is equipped with two types of devices for pressure relief: pressurizer safety valves and PORVs. The safety valves are enclosed and self-actuating and provide, in conjunction with the Reactor Protection System, overpressure protection for the Reactor Coolant System (RCS). The safety valves are part of the primary success path and mitigate the effects of postulated accidents. The PORVs are air operated valves that are controlled to open at pressures below the safety valve setpoint values so as not to unnecessarily challenge the safety valves and also are used for RCS Low Temperature Overpressure Protection (LTOP).

The PORVs may also be manually operated from the control room. Each PORV is a fail closed (spring actuated) valve with gas assist. In order to open a given PORV, the solenoid on top of the piston must vent (energize) and the solenoid beneath the piston must supply gas (energize) against the force of the spring to open the valve. To close the PORV, the solenoid above the piston de-energizes to supply gas above the piston to assist the spring in closure while the solenoid beneath the piston vents (de-energizes) to allow the valve to close. There are three PORVs per unit (Unit 1: 1NC-32B, 1NC-34A, and 1NC-36B; Unit 2: 2NC-32B, 2NC-34A, and 2NC-36B). 1(2)NC-34A and 1(2)NC-32B are used for LTOP.

Block valves (Unit 1: 1NC-31B, 1NC-33A, and 1NC-35B; Unit 2: 2NC-31B, 2NC-33A, and 2NC-35B), which are normally open, are located between the pressurizer and the PORVs. The block valves are used to isolate the PORVs in case of excessive leakage or a stuck open PORV. Block valve closure is accomplished manually using controls in the control room. PORVs and block valves belong to either Train A or Train B as designated by the last letter in the valve number.

The PORVs and their associated block valves may be used by plant operators to depressurize the RCS to recover from certain transients if normal pressurizer spray is not available. Additionally, the series arrangement of the PORVs and their block valves permit performance of surveillances on the valves.

The PORVs, their block valves, and their controls are powered from the vital buses that normally receive power from offsite power sources, but are also capable of being powered from emergency power sources in the event of a loss of offsite power. The PORVs and their associated block valves are powered from two separate safety trains. For the Train B PORVs, all four solenoid valves are powered from the same breaker. Power can be independently

removed from a Train B PORV to prevent it from changing position.

For the Steam Generator Tube Rupture (SGTR) event, the safety analysis assumes that manual operator actions are required to mitigate the event. A loss of offsite power is assumed to accompany the event, and thus, normal pressurizer spray is unavailable to reduce RCS pressure. For a case in which the Instrument Air (VI) system is unavailable (this system provides normal motive force for the pressurizer spray valves and the pressurizer PORVs), the operator aligns the back-up RCS Cold Leg Accumulator (CLA) nitrogen gas as a motive force for the pressurizer PORVs. For the Train B PORVs, the nitrogen gas is supplied from CLA B through a common valve (1(2)NI-431B). The PORVs are assumed to be used for manual RCS depressurization, which is one of the steps performed to equalize the primary and secondary pressures in order to terminate the primary to secondary break flow and the radioactive releases from the affected steam generator.

2.2 Current Technical Specifications Requirements

TS 3.4.11 LCO currently requires each PORV and its associated block valve to be operable in Modes 1, 2 and 3. Conditions B and C Required Actions currently allow one PORV or one block valve, regardless of which train, to be inoperable in Modes 1, 2 and 3 without an AOT.

The LCO requires the PORVs and their associated block valves to be operable for manual operation to mitigate the effects associated with a SGTR event. By maintaining two trains of PORVs and their associated block valves operable, the single failure criterion is satisfied. Satisfying the LCO helps minimize challenges to fission product barriers.

2.3 Reason for the Proposed Change

The following table shows the power supply breaker and nitrogen gas supply valve for each PORV:

Train	Block Valve	PORV	PORV Power Supply	PORV Nitrogen Gas
A	1(2)NC-33A	1(2)NC-34A	1EVDA-8 / 2EVDA-9	A CLA -> 1(2)NI-430A
B	1(2)NC-31B	1(2)NC-32B	1EVDD-10 / 2EVDD-9	B CLA -> 1(2)NI-431B
B	1(2)NC-35B	1(2)NC-36B	1EVDD-10 / 2EVDD-9	B CLA -> 1(2)NI-431B

TS 3.4.11 Conditions B and C Required Actions currently allow one PORV or one block valve, regardless of which train, to be inoperable in Modes 1, 2 and 3 without a time to return it to operable status. If the inoperable PORV or block valve is associated with Train A, this allowance could have an undesirable single failure impact since the Train B PORVs are not redundant. The Train B PORVs are powered from the same breaker and share a common nitrogen supply valve. A failure of the breaker would de-energize all four of the Train B solenoids and close both Train B PORVs. Likewise, a failure of the nitrogen supply valve would affect both Train B PORVs. TS 3.4.11 Required Actions currently allow continued plant operation with only one train of PORV(s) operable which does not satisfy the single failure requirement for the PORVs. This is considered to be non-conforming to the requirements of 10 CFR 50.36.

The Safety Analysis credits the use of one PORV during a SGTR event. If TS 3.4.11 allows the Train A PORV to be inoperable without an AOT, a SGTR event would rely on a single breaker for operation of the Train B PORVs. Further, the SGTR analysis considers a loss of offsite

power which would also rely on a single common back-up nitrogen supply valve for both Train B PORVs.

Plant operations are currently administratively controlled consistent with the guidance in NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety." This LAR is required to resolve a non-conservative TS and is not a voluntary request from a licensee to change its licensing basis.

2.4 Description of the Proposed Change

Refer to Enclosure 2 for marked TS 3.4.11 showing the proposed changes and Enclosure 3 for clean TS 3.4.11.

1. The Note under current ACTION is revised to add "and each block valve" at the end of the sentence so that this note will also be applicable to the block valves.

2. Current Condition B for one or two PORVs inoperable and not capable of being manually cycled is revised to split it into three separate Conditions: (1) one Train B PORV inoperable and not capable of being manually cycled, (2) one Train A PORV inoperable and not capable of being manually cycled, and (3) two Train B PORVs inoperable and not capable of being manually cycled. Current Condition B is replaced by new Conditions B, C, and D.

3. Current Condition C for one block valve inoperable is revised to split it into two separate Conditions: (1) one Train B block valve inoperable and (2) one Train A block valve inoperable. Current Condition C is replaced by new Conditions G and H. A Note is added to new Condition G and Condition H Required Actions to clarify that closing and removing power from the associated PORV are not applicable to a block valve made inoperable when the associated PORV is inoperable.

4. Current Condition D is renamed new Condition E and revised to include additional applicable Conditions due to changes in Item 2 above.

5. Current Condition E for three PORVs inoperable and not capable of being manually cycled is renamed new Condition F.

6. Current Condition F for two block valves inoperable is revised to be new Condition I for two Train B block valves inoperable. A Note is added to new Condition I Required Actions to clarify that closing and removing power from the PORVs are not applicable to block valves made inoperable when the associated PORVs are inoperable. A required action is added to new Condition I Required Actions to require removing power from, besides closing, the associated PORVs.

7. New Condition J is added for one Train B PORV and the other Train B block valve inoperable. The Required Actions include performing the Required Actions of new Conditions B and G and restoring either the PORV or the block valve to operable status within 72 hours.

8. Current Condition G for three block valve inoperable is revised to be new Condition K. A Note is added to new Condition K Required Actions to clarify that closing the PORVs is not applicable to the block valves made inoperable when the associated PORVs are

inoperable.

9. Current Condition H is renamed new Condition L and revised to include additional applicable conditions due to changes in Items 3, 6, 7 and 8 above.

10. Surveillance Requirement (SR) 3.4.11.1 Note is revised to include additional Conditions when performing this SR is not required for inoperable block valves in these Conditions.

3.0 TECHNICAL EVALUATION

On June 25, 1990, the NRC issued Generic Letter (GL) 90-06, Resolution of Generic Issue 70, "Power-Operated Relief Valve and Block Valve Reliability", and Generic Issue 94, "Additional Low-Temperature Overpressure Protection for Light-Water Reactors", Pursuant to 10 CFR 50.54(f). The GL provided staff positions regarding actions which should be taken to improve the reliability of PORVs and block valves, specifically:

1. Including PORVs and block valves in the quality assurance program per 10 CFR 50, Appendix B;

2. Including PORVs, valves in PORV control air systems, and block valves within the scope of the inservice testing program; and

3. Modifying the Technical Specifications for the PORVs and Low-Temperature Overpressure Protection (LTOP) systems.

Attachment A-2 of the GL included a TS model as follows:

LIMITING CONDITION FOR OPERATION

3.4.4 All power-operated relief valves (PORVs) and their associated block valves shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one or more PORVs inoperable because of excessive seat leakage, within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) with power maintained to the block valve(s); otherwise, be in at least HOT STANDBY within the next 6 hours and HOT SHUTDOWN within the following 6 hours.

b. With one or two PORVs inoperable due to causes other than excessive seat leakage, within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) and remove power from the block valve(s); restore the PORV(s) to OPERABLE status within the following 72 hours or be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

c. With three PORVs inoperable due to causes other than excessive seat leakage, within 1 hour either restores at least one PORV to OPERABLE status or close the block valves and remove power from the block valve(s) and be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

d. With one or more block valves inoperable, within 1 hour restore the block valve(s) to OPERABLE status or place its associated PORV in manual control. Restore at least one block valve to OPERABLE status within the next hour if three block valves are inoperable; restore any remaining inoperable block valve(s) to operable status within 72 hours; otherwise, be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

e. The provisions of Specification 3.0.4 are not applicable.

By letter dated November 21, 1991, Duke Energy submitted a LAR to address GL 90-06 Action Item 3. The NRC approved this LAR by Amendments 150/132 dated October 27, 1994. The approved TS was as follows:

3.4.4 All power-operated relief valves (PORVs) and their associated block valves shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one or more PORV(s) inoperable because of excessive leakage, within 1 hour either restores the PORV(s) to OPERABLE status or close the associated block valve(s) and maintain power to the block valve(s); otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With one PORV inoperable due to causes other than excessive leakage, within 1 hour either restores the PORV to OPERABLE status or close the associated block valve and remove power from the block valve; otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

c. With two PORVs inoperable due to causes other than excessive leakage, within 1 hour either restores the PORVs to OPERABLE status or close the associated block valves and remove power from the block valves; otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours. If the block valves have been closed and power has been removed, restore at least one PORV to OPERABLE status within the following 72 hours or be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

d. With three PORVs inoperable due to causes other than excessive leakage, within 1 hour either restores at least one PORV to OPERABLE status or close the associated block valves and remove power from the block valves and be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

e. With one block valve inoperable, within 1 hour restore the block valve to OPERABLE status or place its associated PORV switch in the "close" position and remove power from its associated solenoid valve (do not enter action statement b for the resulting inoperable PORV); otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

f. With two block valves inoperable, within 1 hour restore the block valves to OPERABLE status or place their associated PORV switches in the "close" position (do not enter action statement c for the resulting inoperable PORVs); otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours. If the PORV switches have been placed in the "close" position, restore at least one block valve to OPERABLE status within 72 hours; otherwise, be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

g. With three block valves inoperable, within 1 hour restore the block valves to OPERABLE status or place their associated PORV switches in the "close" position (do not enter action statement d for the resulting inoperable PORVs). Restore at least one block valve to OPERABLE status within the next hour; otherwise, be in HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

h. The provisions of Specification 3.0.4 are not applicable.

The justification in the November 21, 1991 LAR included:

> "Action statements b., c., and d. govern the cases of PORV inoperability due to causes other than excessive leakage for the cases of one, two, or three inoperable PORVs, respectively. Action statement b. allows continued plant operation with one inoperable PORV, provided its block valve is closed and power is removed from the block valve. The basis for this position is that following a steam generator tube rupture with loss of offsite power, only one PORV is required to depressurize the Reactor Coolant System. All three of McGuire's PORVs have nitrogen backup capability to cope with a loss of instrument air to the valves. Therefore, even with one PORV inoperable for an extended period of time, redundant capability exists to depressurize the Reactor Coolant System following a SGTR event.
>
> The time allowed to restore the block valve(s) to operable status is based upon the remedial action time limits for inoperable PORVs. The same basis proposed for allowing continued plant operation with one inoperable PORV also applies to one inoperable block valve."

There were inconsistencies as far as the restoration times to operable status between some of the GL's TS Actions and the Duke Energy November 21, 1991 LAR's TS Actions as shown below:

GL 90-06's TS		
Inoperable Component	Action	Restoration Time from entering Condition
One or two PORVs	b	73 hrs - PORV(s)
Three PORVs	c	1 hr - at least one PORV
One or more Block Valves	d	2 hrs - at least one Block Valve if three Block Valves are inoperable; 72 hrs - any remaining Block Valve(s)

Duke Energy's November 21, 1991 LAR		
Inoperable Component	Action	Restoration Time from entering Condition
One PORV	b	None
Two PORVs	c	73 hrs - at least one PORV
Three PORVs	d	1 hr - at least one PORV
One Block Valve	e	None
Two Block Valves	f	73 hrs - at least one Block Valve
Three Block Valves	g	2 hrs - at least one Block Valve

TS 3.4.11, as approved by Amendments 150/132, was converted to NUREG-1431's improved TSs by Amendments 184/166 on September 30, 1998 and remains unchanged to date as far as these restoration times.

The current TS 3.4.11 restoration times are summarized below:

Current TS 3.4.11		
Inoperable Component	Condition/Required Actions	Restoration Time from entering Condition
One or Two PORVs	B.3	72 hrs - one PORV if two PORVs are inoperable; none - if one PORV is inoperable
Three PORVs	E.1 and E.2	1 hr - one PORV
One Block Valve	C	None
Two Block Valves	F.2	72 hrs - one Block Valve
Three Block Valves	G.2	2 hrs - one Block Valve

From the current TS 3.4.11 table above, Conditions B and C may allow the Train A PORV or block valve inoperable without a restoration time. This allowance can have an undesirable single failure impact since the Train B PORVs are not redundant. As previously described, the two Train B PORVs are not redundant since they are powered from the same breaker and share a common nitrogen supply valve.

The following statements in the November 21, 1991 LAR were therefore incorrect: "All three of McGuire's PORVs have nitrogen backup capability to cope with a loss of instrument air to the valves. Therefore, even with one PORV inoperable for an extended period of time, redundant capability exists to depressurize the Reactor Coolant System following a SGTR event."

With both trains of PORVs operable, the LCO and single failure criterion are met. When one train is inoperable without an AOT, the LCO is reduced to one train and thus the single failure criterion is no longer met. Per 10 CFR 50.36, the Limiting Conditions for Operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When one train of PORV(s) is allowed inoperable without an AOT, the single failure is no longer met. The Train B valves alone would not be able to meet the single failure criterion under the SGTR event of the safety analysis.

Current TS 3.4.11 Conditions and Required Actions are revised to allow only one Train B PORV or block valve inoperable without a restoration time. The proposed new restoration times are summarized below:

Proposed LAR		
Inoperable Component	Condition/Required Actions	Restoration Time from entering Condition
One Train B PORV	B	None
One Train A PORV	C.3	72 hrs
Two Train B PORVs	D.3	72 hrs - at least one Train B PORV
Three PORVs	F.1 and F.2	1 hr - at least one PORV
One Train B Block Valve	G	None
One Train A Block Valve	H.3	72 hrs
Two Train B Block Valves	I.3	72 hrs - one Train B Block Valve
One Train B PORV and the other Train B Block Valve	J.3.1 or J.3.2	72 hrs - Train B PORV or Train B Block Valve
Three Block Valves	K.2	2 hrs - one Block Valve

The justification for the TS Completion Time is based upon the deterministic evaluation. To supplement this evaluation and to gain insights concerning the proposed plant configuration, Duke Energy performed a risk assessment. The findings of the risk assessment confirm the risk impact of a 72-hour Completion Time for a PORV or block valve out of service is negligible. The relevant criteria are the Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP). The increase in these metrics resulting from taking a PORV or block valve out of service is determined to be negligible. In the quantitative analysis, no compensatory actions are credited and no adjustments are made for Human Reliability Analysis (HRA) when assessing the plant risk in the 72-hour TS configuration.

The basis for each new proposed Condition, associated Required Actions and Completion Time (refer to Enclosure 3) is as follows:

The Note prior to the Conditions and Required Actions clarifies that all pressurizer PORVs and block valves are treated as separate entities, each with separate Completion Times (i.e., the Completion Time is on a component basis). This change is consistent with NUREG-1431, Revision 4.

Condition A:

With a PORV inoperable and capable of being manually cycled, either the PORV must be restored to operable status or the flow path isolated within 1 hour. The block valve is closed but power is not removed, since removal of power would render the block valve inoperable. Although a PORV may be designated inoperable, it may be able to be manually opened and closed, and therefore, able to perform its function. PORV inoperability may be due to seat leakage or other causes that do not prevent manual use and do not create a possibility for a small break LOCA. For these reasons, the block valve may be closed but the Action requires power to be maintained to the valve. Quick access to the PORV for pressure control can be made when power remains on the closed block valve. The Completion Time of 1 hour is based on plant operating experience that has

shown that minor problems can be corrected or block valve closure accomplished in this time period.

Condition B:

If one Train B PORV is inoperable and not capable of being manually cycled, it must be either restored or isolated by closing and removing power from the associated block valve. The Completion Times of 1 hour are reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. Required Actions B.1 and B.2 are modified by a Note stating that these Required Actions are not applicable to a Train B PORV made inoperable by Required Action G.2. Because one Train B PORV and one Train A PORV remain OPERABLE, continued plant operation is allowed after the required actions are completed. If the Required Actions cannot be completed within the specified time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition E.

Condition C:

If one Train A PORV is inoperable and not capable of being manually cycled, it must be either restored or isolated by closing and removing power from the associated block valve. The Completion Times of 1 hour are reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. Required Actions C.1 and C.2 are modified by a Note stating that these Required Actions are not applicable to a Train A PORV made inoperable by Required Action H.2. Because at least one Train B PORV remains OPERABLE, an additional 72 hours is provided to restore the inoperable PORV to OPERABLE status. If the PORV cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition E.

Condition D:

If two Train B PORVs are inoperable and not capable of being manually cycled, they must be either restored or isolated by closing and removing power from the associated block valves. The Completion Times of 1 hour are reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. Required Actions D.1 and D.2 are modified by a Note stating that these Required Actions are not applicable to two Train B PORVs made inoperable by Required Action I.2. Because one Train A PORV remains OPERABLE, an additional 72 hours is provided to restore one of the inoperable PORVs to OPERABLE status. If the PORV cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition E.

Condition E:

If the Required Actions of Condition A, B, C or D is not met, then 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 at least MODE 3 within 6 hours and to 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.

Condition F:

If three PORVs are inoperable and not capable of being manually cycled, it is necessary to either restore at least one PORV within the Completion Time of 1 hour or isolate the flow paths by closing and removing power from the associated block valves. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator adequate time to correct the situation. If one PORV is restored and two PORVs remain inoperable, then the plant will be in Conditions B and C, or Conditions B and D, with the time clock started at the original declaration of having three PORVs inoperable. If PORVs are not restored within the Completion Times, then 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 at least MODE 3 within 6 hours and to MODE 4 within 12 hours.

Condition G:

If one Train B block valve is inoperable, then it is necessary to either restore the block valve to OPERABLE status within the Completion Time of 1 hour or place the associated PORV in the closed position and remove power from the solenoid to preclude its automatic opening. Required Actions G.1 and G.2 are modified by a Note stating that these Required Actions are not applicable to a Train B block valve made inoperable by Required Action B.2. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator time to correct the situation. Because one Train B PORV and associated block valve and one Train A PORV and associated block valve remain OPERABLE, continued plant operation is allowed after the Required Actions are completed. If the Required Actions cannot be completed within the specified time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

Condition H:

If the Train A block valve is inoperable and cannot be restored to OPERABLE status within 1 hour, the Required Action is to place the PORV in the closed position and remove power from the solenoid to preclude its automatic opening for an overpressure event and to avoid the potential for a stuck open PORV during the time the block valve is inoperable. Required Actions H.1 and H.2 are modified by a Note stating that these Required Actions are not applicable to a Train A block valve made inoperable by Required Action C.2. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator time to correct the situation. Because at least one Train B PORV and associated block valve remain OPERABLE, an additional 72 hours is provided to restore the inoperable block valve to OPERABLE status. If the block valve cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

Condition I:

If two Train B block valves are inoperable and cannot be restored to OPERABLE status within 1 hour, the Required Actions are to place the PORVs in the closed position and remove power from the solenoids to preclude their automatic opening for an overpressure event and to avoid the potential for stuck open PORVs during the time the block valves are inoperable. Required Actions I.1 and I.2 are modified by a Note stating that these Required

Actions are not applicable to two Train B block valves made inoperable by Required Action D.2. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator time to correct the situation. Because one Train A PORV and associated block valve remain OPERABLE, an additional 72 hours is provided to restore one of the two inoperable Train B block valves to OPERABLE status. If at least one Train B block valve cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

Condition J:

If one Train B PORV and the other Train B block valve are inoperable, then it is necessary to either restore the PORV or block valve to OPERABLE status within the Completion Time of 1 hour or perform the required actions of Conditions B and G. The Completion Times of 1 hour are reasonable, based on the small potential for challenges to the system during this time period, and provides the operator adequate time to correct the situation. Because one Train A PORV and associated block valve remain OPERABLE, an additional 72 hours is provided to restore either the PORV or block valve to OPERABLE status. If the PORV or block valve cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

Condition K:

If three block valves are inoperable, it is necessary to place the associated PORVs in the closed position and verify the PORVs closed within 1 hour and restore at least one block valve to OPERABLE status within 2 hours. Required Action K.1 is modified by a Note stating that this Required Action is not applicable to block valves made inoperable by Required Action E.2. The Completion Times are reasonable, based on the small potential for challenges to the system during this time period and provides the operator time to correct the situation. If the block valves cannot be restored within the specified times, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

Condition L:

If the Required Actions of Condition G, H, I, J or K are not met, then 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 at least MODE 3 within 6 hours and to 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 Requirement 3.4.11.1:

Since this SR requires the periodic cycling the block valve, it is exempted from being performed when the block valve is closed as required by the Required Actions. It is revised to reflect the additional applicable Conditions.

The proposed TS changes are supported by changes to the TS Bases. 10 CFR 50.36 states, "A summary statement of the bases or reasons for such specifications, other than those covering administrative controls, shall also be included in the application, but shall not become

part of the technical specifications." Changes to the TS Bases will be made in accordance with the TS Bases Control Program following approval of the requested amendment. The proposed TS Bases changes are consistent with the proposed TS changes and provide the purpose for each requirement in the specification. Therefore, the Bases changes are provided for information only and approval of the Bases changes is not requested.

By formulating TS 3.4.11 as proposed, the single failure criterion is preserved for the pressurizer PORVs and associated block valves. The proposed changes ensure the lowest functional capability or performance levels of equipment required for safe operation of the facility.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

Title 10 Code of Federal Regulations (10 CFR) 50.36(c)(2): Limiting Conditions for Operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a Limiting Condition for Operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the TS until the condition can be met.

GL 90-06 presents the staff position resulting from the resolution of Generic Issue (GI) 70. Based on the analysis and findings for GI-70, the staff concludes that the following actions should be taken to improve the reliability of PORVs and block valves:

...

3. For operating PWR plants, modify the limiting conditions of operation of PORVs and block valves in the technical specifications for Modes 1, 2, and 3 to incorporate the position adopted by the staff in recent licensing actions. Attachments A-1 through A-3 are provided for guidance. The staff recognizes that some recently licensed PWR plants already have technical specifications in accordance with the staff position. Such plants are already in compliance with this position and need merely state that in their response. These recent technical specifications require that plants that run with the block valves closed (e.g., due to leaking PORVs) maintain electrical power to the block valves so they can be readily opened from the control room upon demand. Additionally, plant operation in Modes 1, 2, and 3 with PORVs and block valves inoperable for reasons other than seat leakage is not permitted for periods of more than 72 hours.

Attachment A-2 to the GL included a model Technical Specification for Westinghouse plants with three PORVs.

GL 80-30: The NRC's STS were formulated to preserve the single failure criterion for systems that are relied upon in the safety analysis report. By and large, the single failure criterion is preserved by specifying LCOs that require all redundant components of safety related systems to be OPERABLE. When the required redundancy is not maintained, either due to equipment failure or maintenance outage, action is required, within a specified time, to change the operating mode of the plant to place it in a safe condition. The specified time to take action, usually called the equipment out-of-service time, is a temporary relaxation of the single failure criterion, which, consistent with overall system reliability considerations, provides a limited time to fix equipment or otherwise make it OPERABLE. If equipment can be returned to OPERABLE status within the specified time, plant shutdown is not required.

4.2 Precedent

None.

4.3 No Significant Hazards Consideration Determination Analysis

Revision of TS 3.4.11, PORVs, is needed to resolve non-conservative TS Required Actions. TS 3.4.11 Limiting Condition for Operation (LCO) currently requires each PORV and associated block valve to be operable in Modes 1, 2 and 3. There is one Train A PORV and one associated Train A block valve. There are two Train B PORVs and two associated Train B block valves. The two Train B PORVs are not redundant. Conditions B and C Required Actions currently allow one PORV or one block valve, regardless of which train, to be inoperable in Modes 1, 2 and 3 without a time to return it to operable status. If the inoperable PORV or block valve is associated with Train A, this allowance could have an undesirable single failure impact since the Train B PORVs are not redundant. Duke Energy has evaluated whether a significant hazards consideration is involved with the proposed LAR by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," 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 proposed change revises the TS for the purpose of correcting non-conservative TS Required Actions when PORVs and associated block valves are inoperable. By requiring inoperable PORVs and block valves be returned to operable status within specified completion times, the proposed change will increase the availability of equipment for performing safety-related functions. The proposed change ensures assumptions associated with accident analyses are met. The probability of an accident previously evaluated is not affected and there is no increase in the consequences of any accident previously evaluated.

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

   Response: No.

   The proposed change revises the TS for the purpose of correcting non-conservative TS Required Actions. The proposed change does not introduce new equipment or new equipment operating modes. The proposed change does not increase the likelihood of the malfunction of any system, structure, or component, or negatively impact any analyzed accident. The proposed change ensures assumptions made in the safety analyses are met. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

   Response: No.

   Overall plant safety would be enhanced as a result of the additional restrictions placed on the PORVs and associated block valves. The proposed change does not alter the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are

determined. The safety analysis assumptions and acceptance criteria are not affected by this change. Therefore, the proposed change does not involve a reduction in a margin of safety.

Based on the above, Duke Energy concludes that the proposed LAR does not involve a 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.

4.4 Conclusion

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

5.0 ENVIRONMENTAL CONSIDERATIONS

Duke Energy has evaluated the proposed LAR to change the McGuire TS and determined that the LAR does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed LAR meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed amendment is not required.

6.0 REFERENCES

1. NUREG-1316, Technical Findings and Regulatory Analysis Related to Generic Issue 70, Evaluation of Power-Operated Relief Valve and Block Valve Reliability in PWR Nuclear Power Plants, December 1989.

2. Resolution of Generic Issue 70, "Power-Operated Relief Valve and Block valve Reliability" and Generic Issue 94, "Additional Low-temperature Over Pressure Protection for Light-water reactors" Pursuant to 10 CFR 50.54(f) (Generic Letter 90-06), June 25, 1990.

3. McGuire Nuclear Station, Proposed Technical Specification Changes, Generic Letter 90-06, Power-Operated Relief Valve and Block Valve Reliability and Additional Low-Temperature Overpressure Protection for Light-Water Reactors, November 21, 1991.

4. Issuance of Amendments 150 and 132, McGuire Nuclear Station, Power-Operated Relief Valve and Block Valves and Low-Temperature Overpressure Protection Systems, October 27, 1994.

5. McGuire Nuclear Station, Conversion to the Improved Technical Specifications, May 27, 1997.

6. Issuance of Amendments 184 and 166, McGuire Nuclear Station, Improved Technical Specifications, September 30, 1998.

7. NRC Administrative Letter 98-10, Dispositioning of Technical Specifications That Are Insufficient to Assure Plant Safety, December 29, 1998.

8. NEI 15-03, Rev. 0, Licensee Actions to Address Non-Conservative Technical Specifications, April 2015.

9. NUREG-1431, Standard Technical Specifications, Revision 4.0, TS 3.4.11, Pressurizer Power Operated Relief Valves (PORVs).

10. MCC-1535.00-00-0237, Revision 0, PRA Risk Insights for McGuire Pressurizer PORV Technical Specification LAR Units 1 & 2.

11. UFSAR 15.6.3, Steam Generator Tube Failure, Revision 20.

ENCLOSURE 2

Marked Technical Specification Pages

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each PORV and each block valve.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more PORVs inoperable and capable of being manually cycled.	A.1 Close and maintain power to associated block valve.	1 hour
~~B. One or two PORVs inoperable and not capable of being manually cycled.~~	~~----------NOTE---------- Required Actions B.1 and B.2 are not applicable to a PORV made inoperable by Required Action C.2. ----------~~	
	~~B.1 Close associated block valves.~~	~~1 hour~~
	~~AND~~	
	~~B.2 Remove power from associated block valves.~~	~~1 hour~~
	~~AND~~	~~(continued)~~

Replaced by new Conditions B, C & D (see Enclosure 3)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~B. (continued)~~	~~B.3 Restore one PORV to OPERABLE status if two PORVs are inoperable.~~	~~72 hours~~
~~C. One block valve inoperable.~~	~~C.1 Place associated PORV switch in closed position and verify PORV closed.~~	~~1 hour~~
	~~AND~~	
	~~C.2 Remove power from associated PORV.~~	~~1 hour~~
~~D~~. E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	~~ED~~.1 Be in MODE 3.	6 hours
	AND	
	~~ED~~.2 Be in MODE 4.	12 hours
~~E~~.F. Three PORVs inoperable and not capable of being manually cycled.	~~FE~~.1 Close associated block valves.	1 hour
	AND	
	~~FE~~.2 Remove power from associated block valves.	1 hour
	AND	
	~~FE~~.3 Be in MODE 3.	6 hours
	AND	
	~~FE~~.4 Be in MODE 4.	12 hours

Replaced by new Conditions G & H (see Enclosure 3)

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~F. Two block valves inoperable.~~	~~F.1 Place associated PORV switches in closed position and verify PORVs closed.~~	~~1 hour~~
Replaced by new Conditions I & J (see Enclosure 3)	~~AND~~	
	~~F.2 Restore one block valve to OPERABLE status.~~	~~72 hours~~
~~G. Three block valves inoperable.~~	~~G.1 Place associated PORV switches in closed position and verify PORVs closed.~~	~~1 hour~~
Replaced by new Condition K (see Enclosure 3)	~~AND~~	
	~~G.2 Restore one block valve to OPERABLE status.~~	~~2 hours~~
~~H~~. L Required Action and associated Completion Time of Condition ~~F or~~ G, H, I, J or K not met.	~~LH~~.1 Be in MODE 3.	6 hours
	AND	
	~~LH~~.2 Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	----------NOTE---------- Not required to be met with block valve closed in accordance with the Required Action of Condition A, B, **C, D,** or E. ---------- Perform a complete cycle of each block valve.	In accordance with the Surveillance Frequency Control Program
SR 3.4.11.2	----------NOTE---------- Required to be performed in MODE 3 or MODE 4 when the temperature of all RCS cold legs is > 300°F and the block valve closed. ---------- Perform a complete cycle of each PORV.	In accordance with the Surveillance Frequency Control Program
SR 3.4.11.3	Verify the nitrogen supply for each PORV is OPERABLE by: a. Manually transferring motive power from the air supply to the nitrogen supply, b. Isolating and venting the air supply, and c. Operating the PORV through one complete cycle.	In accordance with the Surveillance Frequency Control Program

ENCLOSURE 3

Clean Technical Specification Pages

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each PORV and each block valve.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more PORVs inoperable and capable of being manually cycled.	A.1 Close and maintain power to associated block valve.	1 hour
B. One Train B PORV inoperable and not capable of being manually cycled	----------NOTE---------- Required Actions B.1 and B.2 are not applicable to a PORV made inoperable by Required Action G.2. ----------	
	B.1 Close associated block valve.	1 hour
	AND	
	B.2 Remove power from associated block valve.	1 hour

(continued)

ACTIONS (continued)

C. One Train A PORV inoperable and not capable of being manually cycled	----------NOTE---------- Required Actions C.1 and C.2 are not applicable to a PORV made inoperable by Required Action H.2. ----------	
	C.1 Close associated block valve.	1 hour
	AND	
	C.2 Remove power from associated block valve.	1 hour
	AND	
	C.3 Restore PORV to OPERABLE status.	72 hours
D. Two Train B PORVs inoperable and not capable of being manually cycled.	----------NOTE---------- Required Actions D.1 and D.2 are not applicable to PORVs made inoperable by Required Action I.2. ----------	
	D.1 Close associated block valves.	1 hour
	AND	
	D.2 Remove power from associated block valves.	1 hour
	AND	
	D.3 Restore one PORV to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

E.	Required Action and associated Completion Time of Condition A, B, C or D not met.	E.1	Be in MODE 3.	6 hours
		AND		
		E.2	Be in MODE 4.	12 hours
F.	Three PORVs inoperable and not capable of being manually cycled.	F.1	Close associated block valves.	1 hour
		AND		
		F.2	Remove power from associated block valves.	1 hour
		AND		
		F.3	Be in MODE 3.	6 hours
		AND		
		F.4	Be in MODE 4.	12 hours
G.	One Train B block valve inoperable.	----------NOTE---------- Required Actions G.1 and G.2 are not applicable to a block valve made inoperable by Required Action B.2. ----------		
		G.1	Place associated PORV switch in closed position and verify PORV closed.	1 hour
		AND		
		G.2	Remove power from associated PORV.	1 hour

(continued)

ACTIONS (continued)

H.	One Train A block valve inoperable.	----------NOTE---------- Required Actions H.1 and H.2 are not applicable to a block valve made inoperable by Required Action C.2. ----------	
		H.1 Place associated PORV switch in closed position and verify PORV closed.	1 hour
		AND	
		H.2 Remove power from associated PORV.	1 hour
		AND	
		H.3 Restore block valve to OPERABLE status.	72 hours
I.	Two Train B block valves inoperable.	----------NOTE---------- Required Actions I.1 and I.2 are not applicable to block valves made inoperable by Required Action D.2. ----------	
		I.1 Place associated PORV switches in closed position and verify PORVs closed.	1 hour
		AND	
		I.2 Remove power from associated PORVs.	1 hour
		AND	
		I.3 Restore one block valve to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

J.	One Train B PORV inoperable and not capable of being manually cycled AND The other Train B block valve inoperable.	J.1 Perform Required Actions B.1 and B.2. AND J.2 Perform Required Actions G.1 and G.2. AND J.3.1 Restore PORV to OPERABLE status. OR J.3.2 Restore block valve to OPERABLE status.	1 hour 1 hour 72 hours 72 hours
K.	Three block valves inoperable.	----------NOTE---------- Required Action K.1 is not applicable to block valves made inoperable by Required Action E.2. ---------- K.1 Place associated PORV switches in closed position and verify PORVs closed. AND K.2 Restore one block valve to OPERABLE status.	 1 hour 2 hours
L.	Required Action and associated Completion Time of Condition G, H, I, J or K not met.	L.1 Be in MODE 3. AND L.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.11.1	----------NOTE---------- Not required to be met with block valve closed in accordance with the Required Action of Condition A, B, C, D, or E. ---------- Perform a complete cycle of each block valve.	In accordance with the Surveillance Frequency Control Program
SR 3.4.11.2	----------NOTE---------- Required to be performed in MODE 3 or MODE 4 when the temperature of all RCS cold legs is > 300°F and the block valve closed. ---------- Perform a complete cycle of each PORV.	In accordance with the Surveillance Frequency Control Program
SR 3.4.11.3	Verify the nitrogen supply for each PORV is OPERABLE by: a. Manually transferring motive power from the air supply to the nitrogen supply, b. Isolating and venting the air supply, and c. Operating the PORV through one complete cycle.	In accordance with the Surveillance Frequency Control Program

ENCLOSURE 4

Marked Technical Specification Bases Pages

(For Information Only)

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

BASES

BACKGROUND

The pressurizer is equipped with two types of devices for pressure relief: pressurizer safety valves and PORVs. The PORVs are air operated valves that are controlled to open at a specific set pressure when the pressurizer pressure increases and close when the pressurizer pressure decreases. The PORVs may also be manually operated from the control room.

Block valves, which are normally open, are located between the pressurizer and the PORVs. The block valves are used to isolate the PORVs in case of excessive leakage or a stuck open PORV. Block valve closure is accomplished manually using controls in the control room. A stuck open PORV is, in effect, a small break loss of coolant accident (LOCA). As such, block valve closure terminates the RCS depressurization and coolant inventory loss.

The PORVs and their associated block valves may be used by plant operators to depressurize the RCS to recover from certain transients if normal pressurizer spray is not available. Additionally, the series arrangement of the PORVs and their block valves permit performance of surveillances on the valves during power operation.

The PORVs may also be used for feed and bleed core cooling in the case of multiple equipment failure events that are not within the design basis, such as a total loss of feedwater.

The PORVs, their block valves, and their controls are powered from the vital buses that normally receive power from offsite power sources, but are also capable of being powered from emergency power sources in the event of a loss of offsite power. Three PORVs and their associated block valves are powered from two separate safety trains (Ref. 1).

The plant has three PORVs, each having a relief capacity of 210,000 lb/hr at 2335 psig. The functional design of the PORVs is based on maintaining pressure below the Pressurizer Pressure—High reactor trip setpoint following a step reduction of 50% of full load with steam dump. In addition, the PORVs minimize challenges to the pressurizer safety valves and also may be used for low temperature overpressure protection (LTOP). See LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."

BASES

APPLICABLE SAFETY ANALYSES

Plant operators employ the PORVs to depressurize the RCS in response to certain plant transients if normal pressurizer spray is not available. For the Steam Generator Tube Rupture (SGTR) event, the safety analysis assumes that manual operator actions are required to mitigate the event. A loss of offsite power is assumed to accompany the event, and thus, normal pressurizer spray is unavailable to reduce RCS pressure. The PORVs are assumed to be used for manual RCS depressurization, which is one of the steps performed to equalize the primary and secondary pressures in order to terminate the primary to secondary break flow and the radioactive releases from the affected steam generator.

The PORVs are assumed to operate in safety analyses for events that result in increasing RCS pressure for which departure from nucleate boiling ratio (DNBR) criteria are critical. By assuming PORV automatic actuation, the primary pressure remains below the high pressurizer pressure trip setpoint; thus, the DNBR calculation is more conservative. Events that assume this condition include uncontrolled bank withdrawal at power, uncontrolled bank withdrawal from subcritical, and single rod withdrawal at power (Ref. 2).

Pressurizer PORVs satisfy Criterion 3 of 10 CFR 50.36 (Ref. 3).

LCO

The LCO requires the PORVs and their associated block valves to be OPERABLE for manual operation to mitigate the effects associated with an SGTR.

By maintaining two PORVs (one from each train), and their associated block valves OPERABLE, the single failure criterion is satisfied. Three PORVs are required to be OPERABLE to meet RCS pressure boundary requirements. The block valves are available to isolate the flow path through either a failed open PORV or a PORV with excessive leakage. Satisfying the LCO helps minimize challenges to fission product barriers.

APPLICABILITY

In MODES 1, 2, and 3, the PORV and its block valve are required to be OPERABLE to limit the potential for a small break LOCA through the flow path. The most likely cause for a PORV small break LOCA is a result of a pressure increase transient that causes the PORV to open. Imbalances in the energy output of the core and heat removal by the secondary system can cause the RCS pressure to increase to the PORV opening setpoint. The most rapid increases will occur at the higher operating power and pressure conditions of MODES 1 and 2.

BASES

APPLICABILITY (continued)

Pressure increases are less prominent in MODE 3 because the core input energy is reduced, but the RCS pressure is high. Therefore, the LCO is applicable in MODES 1, 2, and 3. The LCO is not applicable in MODE 4 when both pressure and core energy are decreased and the pressure surges become much less significant. The PORV setpoint is reduced for LTOP in MODES 4 ≤ 300°F, 5, and 6 with the reactor vessel head in place. LCO 3.4.12 addresses the PORV requirements in these MODES.

ACTIONS

A Note has been added to clarify that all pressurizer PORVs and block valves are treated as separate entities, each with separate Completion Times (i.e., the Completion Time is on a component basis).

A.1

With the PORVs inoperable and capable of being manually cycled, either the PORVs must be restored or the flow path isolated within 1 hour. The block valves should be closed but power must be maintained to the associated block valves, since removal of power would render the block valve inoperable. Although a PORV may be designated inoperable, it may be able to be manually opened and closed, and therefore, able to perform its function. PORV inoperability may be due to seat leakage or other causes that do not prevent manual use and do not create a possibility for a small break LOCA. For these reasons, the block valve may be closed but the Action requires power be maintained to the valve. This Condition is only intended to permit operation of the plant for a limited period of time not to exceed the next refueling outage (MODE 6) so that maintenance can be performed on the PORVs to eliminate the problem condition. Normally, the PORVs should be available for automatic mitigation of overpressure events and should be returned to OPERABLE status prior to entering startup (MODE 2).

Quick access to the PORV for pressure control can be made when power remains on the closed block valve. The Completion Time of 1 hour is based on plant operating experience that has shown that minor problems can be corrected or closure accomplished in this time period.

ACTIONS (continued)

B.1, B.2, and B.3

If one or two PORVs are inoperable and not capable of being manually cycled, it must be either restored or isolated by closing the associated block valve and removing the power to the associated block valve. If one PORV is inoperable as a result of the Required Action C.2, then Required Actions B.1 and B.2 are not applicable. The Completion Times of 1 hour are reasonable, based on challenges to the PORVs during this time period, and provide the operator adequate time to correct the situation. If the inoperable valve cannot be restored to OPERABLE status, it must be isolated within the specified time. Because there is one PORV that remains OPERABLE, an additional 72 hours is provided to restore an additional PORV to OPERABLE status when two PORVs are inoperable. If the PORV cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition D. With only one PORV inoperable, operation may continue provided Required Actions B.1 and B.2 are met.

See Insert 1

C.1 and C.2

If one block valve is inoperable, then it is necessary to either restore the block valve to OPERABLE status within the Completion Time of 1 hour or place the associated PORV in the closed position. The prime importance for the capability to close the block valve is to isolate a stuck open PORV. Therefore, if the block valve cannot be restored to OPERABLE status within 1 hour, the Required Action is to place the PORV in the closed position and remove power from the solenoid to preclude its automatic opening for an overpressure event and to avoid the potential for a stuck open PORV at a time that the block valve is inoperable. The actions for an inoperable PORV are not entered due to these actions, however, the associated PORV is inoperable and must be included in subsequent inoperability determinations. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator time to correct the situation.

E, E,
D.1 and D.2

If the Required Action of Condition A, B, ~~or~~ C or D is not met, then 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 at least MODE 3 within 6 hours and to MODE 4 within 12 hours. The allowed Completion Times

BASES

ACTIONS (continued)

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. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12.

E.1, E.2, E.3, and E.4

If three PORVs are inoperable and not capable of being manually cycled, it is necessary to either restore at least one valve within the Completion Time of 1 hour or isolate the flow path by closing and removing the power to the associated block valves. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time and provides the operator time to correct the situation. If one PORV is restored and two PORVs remain inoperable, then the plant will be in Condition B with the time clock started at the original declaration of having two PORVs inoperable. If no PORVs are restored within the Completion Time, then 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 at least MODE 3 within 6 hours and to 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. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12.

See Insert 2

F.1 and F.2

If two block valves are inoperable, it is necessary to either restore one block valve within the Completion Time of 1 hour, or place the associated PORVs in the closed position and restore one block valve within 72 hours. The Completion Times are reasonable, based on the small potential for challenges to the system during this time and provide the operator time to correct the situation.

G.1 and G.2

If three block valves are inoperable, it is necessary to place the associated PORVs in the closed position and verify the PORVs closed within 1 hour and restore at least one block valve within 2 hours. The Completion Times are reasonable, based on the small potential for challenges to the system during this time and provide the operator time to correct the situation.

BASES

ACTIONS (continued)

~~H~~ L.1 and ~~H~~ L.2

If the Required Actions of Condition ~~F or G~~ H, I, J, or K are not met, then 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 at least MODE 3 within 6 hours and to 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. In MODES 4 and 5, maintaining PORV OPERABILITY may be required. See LCO 3.4.12.

SURVEILLANCE REQUIREMENTS

SR 3.4.11.1

Block valve cycling verifies that the valve(s) can be closed if needed. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program. If the block valve is closed to isolate a PORV that is capable of being manually cycled, the OPERABILITY of the block valve is of importance, because opening the block valve is necessary to permit the PORV to be used for manual control of reactor pressure. If the block valve is closed to isolate an otherwise inoperable PORV, the maximum Completion Time to restore the PORV and open the block valve is 72 hours. Furthermore, these test requirements would be completed by the reopening of a recently closed block valve upon restoration of the PORV to OPERABLE status (i.e., completion of the Required Actions fulfills the SR).

The Note modifies this SR by stating that it is not required to be met with the block valve closed, in accordance with the Required Action of this LCO.

SR 3.4.11.2

SR 3.4.11.2 requires a complete cycle of each PORV. Operating a PORV through one complete cycle ensures that the PORV can be manually actuated for mitigation of an SGTR. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

The SR is modified by a Note which states that the SR is required to be performed in MODE 3 or 4 when the temperature of the RCS cold legs is > 300°F consistent with Generic Letter 90-06 (Ref. 5).

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.11.3

The Surveillance demonstrates that the emergency nitrogen supply can be provided and is performed by transferring power from normal air supply to emergency nitrogen supply and cycling the valves. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

REFERENCES

1. Regulatory Guide 1.32, February 1977.
2. UFSAR, Section 15.4.
3. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).
4. ASME Code for Operation and Maintenance of Nuclear Power Plants.
5. Resolution of Generic Issue 70, "Power-Operated Relief Valve and Block Valve Reliability," and Generic Issue 94, "Additional Low-Temperature Overpressure Protection for Light-Water Reactors," Pursuant to 10 CFR 50.54(f) (Generic Letter 90-06).

TS 3.4.11 Bases Changes Insert 1:

B.1 and B.2

If one Train B PORV is inoperable and not capable of being manually cycled, it must be either restored or isolated by closing and removing power from the associated block valve. The Completion Times of 1 hour are reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. Required Actions B.1 and B.2 are modified by a Note stating that these Required Actions are not applicable to a Train B PORV made inoperable by Required Action G.2. Because one Train B PORV and one Train A PORV remain OPERABLE, continued plant operation is allowed after the required actions are completed. If the Required Actions cannot be completed within the specified time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition E.

C.1, C.2, and C.3

If one Train A PORV is inoperable and not capable of being manually cycled, it must be either restored or isolated by closing and removing power from the associated block valve. The Completion Times of 1 hour are reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. Required Actions C.1 and C.2 are modified by a Note stating that these Required Actions are not applicable to a Train A PORV made inoperable by Required Action H.2. Because at least one Train B PORV remains OPERABLE, an additional 72 hours is provided to restore the inoperable PORV to OPERABLE status. If the PORV cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition E.

D.1, D.2, and D.3

If two Train B PORVs are inoperable and not capable of being manually cycled, they must be either restored or isolated by closing and removing power from the associated block valves. The Completion Times of 1 hour are reasonable, based on challenges to the PORVs during this time period, and provides the operator adequate time to correct the situation. Required Actions D.1 and D.2 are modified by a Note stating that these Required Actions are not applicable to two Train B PORVs made inoperable by Required Action I.2. Because one Train A PORV remains OPERABLE, an additional 72 hours is provided to restore one of the inoperable PORVs to OPERABLE status. If the PORV cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition E.

F.1, F.2, F.3, and F.4

If three PORVs are inoperable and not capable of being manually cycled, it is necessary to either restore at least one PORV within the Completion Time of 1 hour or isolate the flow paths by closing and removing power from the associated block valves. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator adequate time to correct the situation. If one PORV is restored and two PORVs remain inoperable, then the plant will be in Conditions B and C, or Conditions B and D, with the time clock started at the original declaration of having three PORVs inoperable. If PORVs are not restored within the

Completion Times, then 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 at least MODE 3 within 6 hours and to MODE 4 within 12 hours.

TS 3.4.11 Bases Changes Insert 2:

G.1 and G.2

If one Train B block valve is inoperable, then it is necessary to either restore the block valve to OPERABLE status within the Completion Time of 1 hour or place the associated PORV in the closed position and remove power from the solenoid to preclude its automatic opening. Required Actions G.1 and G.2 are modified by a Note stating that these Required Actions are not applicable to a Train B block valve made inoperable by Required Action B.2. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator time to correct the situation. Because one Train B PORV and associated block valve and one Train A PORV and associated block valve remain OPERABLE, continued plant operation is allowed after the Required Actions are completed. If the Required Actions cannot be completed within the specified time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

H.1, H.2, and H.3

If the Train A block valve is inoperable and cannot be restored to OPERABLE status within 1 hour, the Required Action is to place the PORV in the closed position and remove power from the solenoid to preclude its automatic opening for an overpressure event and to avoid the potential for a stuck open PORV during the time the block valve is inoperable. Required Actions H.1 and H.2 are modified by a Note stating that these Required Actions are not applicable to a Train A block valve made inoperable by Required Action C.2. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator time to correct the situation. Because at least one Train B PORV and associated block valve remain OPERABLE, an additional 72 hours is provided to restore the inoperable block valve to OPERABLE status. If the block valve cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

I.1, I.2, and I.3

If two Train B block valves are inoperable and cannot be restored to OPERABLE status within 1 hour, the Required Actions are to place the PORVs in the closed position and remove power from the solenoids to preclude their automatic opening for an overpressure event and to avoid the potential for stuck open PORVs during the time the block valves are inoperable. Required Actions I.1 and I.2 are modified by a Note stating that these Required Actions are not applicable to two Train B block valves made inoperable by Required Action D.2. The Completion Time of 1 hour is reasonable, based on the small potential for challenges to the system during this time period, and provides the operator time to correct the situation. Because one Train A PORV and associated block valve remain OPERABLE, an additional 72 hours is provided to restore one of the two inoperable Train B block valves to OPERABLE status. If at least one Train B block valve cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

J.1, J.2, J.3.1, and J.3.2

If one Train B PORV and the other Train B block valve are inoperable, then it is necessary to either restore the PORV or block valve to OPERABLE status within the Completion Time of 1 hour or perform the required actions of Conditions B and G. The Completion Times of 1 hour are reasonable, based on the small potential for challenges to the system during this time period, and provides the operator adequate time to correct the situation. Because one Train A PORV and associated block valve remain OPERABLE, an additional 72 hours is provided to restore either the PORV or block valve to OPERABLE status. If the PORV or block valve cannot be restored within this additional time, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.

K.1 and K.2

If three block valves are inoperable, it is necessary to place the associated PORVs in the closed position and verify the PORVs closed within 1 hour and restore at least one block valve to OPERABLE status within 2 hours. Required Action K.1 is modified by a Note stating that this Required Action is not applicable to block valves made inoperable by Required Action E.2. The Completion Times are reasonable, based on the small potential for challenges to the system during this time period and provides the operator time to correct the situation. If the block valves cannot be restored within the specified times, the plant must be brought to a MODE in which the LCO does not apply, as required by Condition L.