Southern Nuclear

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NL-21-0845
10 CFR 50.90

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555-0001

Vogtle Electric Generating Plant Units 1&2
Docket Nos. 50-424, 50-425

Subject: License Amendment Request: Revise Technical Specification 3.7.2 Limiting Condition for Operation to Remove One Main Steam Isolation Valve System

Pursuant to the provisions Section 50.90 of Title 10 Code of Federal Regulations (CFR), Southern Nuclear Operating Company (SNC) hereby requests a license amendment to Vogtle Electric Generating Plant (VEGP) Unit 1 renewed facility operating license NPF-68 and Unit 2 renewed facility operating license NPF-81. The proposed amendment revises Technical Specification (TS) 3.7.2, “Main Steam Isolation Valves (MSIVs)”. The TS Limiting Condition for Operation (LCO) currently requires two MSIV systems per main steam line be Operable in Mode 1, and Modes 2 and 3 with exceptions. SNC proposes to change TS 3.7.2, LCO, to require four MSIVs and their associated actuators and associated bypass valves be Operable in Mode 1, and Modes 2 and 3 with exceptions. Conditions and Required Actions are proposed to be changed and added to incorporate the change in LCO scope. The existing Surveillance Requirement (SR) is updated and a new SR is added to reflect the change in the LCO requirements.

The reduction from two MSIV systems per steam line to one MSIV per steam line is requested to improve the design and reliability of the system. There have been six plant trips since 2012 related to the inadvertent closure of one MSIV in a steam line.

Approval of the proposed amendment is requested within one year of the date of this letter to support implementation of the Unit 1 MSIV elimination modification to the main steam system scheduled for the Spring 2023 outage. The Unit 2 MSIV elimination modification will follow during the Fall 2023 outage. Implementation of the TS will occur during start up from the outage where the MSIV elimination modifications occurred.

In accordance with 10 CFR 50.91, a copy of this application is being provided to the designated Georgia Official.

This letter contains no regulatory commitments. If you have any questions, please contact Ryan Joyce at 205.992.6468.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 30th day of September 2021.

Respectfully submitted,

Cheryl A. Gayheart
Director, Regulatory Affairs
Southern Nuclear Operating Company

CAG/kgl/cg

Enclosure: Evaluation of Proposed Changes
Attachment 1: Proposed Technical Specification Changes (Marked-up Pages)
Attachment 2: Revised Technical Specification Pages
Attachment 3: Proposed Technical Specification Bases Changes (Marked-Up) for Information Only

cc: Regional Administrator, Region ll
NRR Project Manager – Vogtle 1 & 2
Senior Resident Inspector – Vogtle 1 & 2
State of Georgia Environmental Protection Division
RType: CVC7000

ENCLOSURE

Southern Nuclear Operating Company
Vogtle Electric Generating Plant – Units 1 and 2

License Amendment Request: Revise Technical Specification 3.7.2 Limiting Condition for Operation to Remove One Main Steam Isolation Valve System

Evaluation of the Proposed Change

Contents

Basis for Proposed Changes

1.0 SUMMARY DESCRIPTION

Southern Nuclear Operating Company (SNC) requests an amendment to Renewed Facility Operating Licenses NPF-68 and NPF-81 for Vogtle Electric Generating Plant (VEGP) Units 1 and 2, respectively. The proposed amendment revises Technical Specification (TS) 3.7.2, "Main Steam Isolation Valves (MSIVs)". The TS Limiting Condition for Operation (LCO) currently requires two MSIV systems per main steam line be Operable in Mode 1, and Modes 2 and 3 with exceptions. SNC proposes to change TS 3.7.2, LCO, to require four MSIVs and their associated actuators and associated bypass valves be Operable in Mode 1, and Modes 2 and 3 with exceptions. Conditions and Required Actions are proposed to be changed and added to incorporate the change in LCO scope. The existing Surveillance Requirement (SR) is updated and a new SR is added to reflect the change in the LCO requirements.

2.0 DETAILED DESCRIPTION

2.1 Background

VEGP has two MSIVs and two bypass valves installed in each main steam line. The decision to install two MSIVs and bypass valves, instead of the typical one MSIV and bypass valve, dates to initial plant construction decisions made in the mid-1970's. Plant design documentation discussing this design decision was unable to be located. However, the secondary system design including the two-valve MSIV and bypass valve design was presented to the NRC during initial plant licensing and was approved in NUREG-1137, rev 0 (Reference 1). The NRC approval does not address any special design characteristic of the main steam system that might be responsible for the two-valve design. The secondary system design from the steam generators to the turbine stop valves is typical of Westinghouse pressurized water reactor (PWR) design. No known design attributes of the secondary system would have required two MSIVs and two bypass valves to compensate for them.

2.2 System Design and Operation

The function of the main steam supply system is to supply steam from the steam generators to the high-pressure turbine over a range of flows and pressures covering the entire operating range from system warmup to valves wide open turbine conditions.

The main steam supply system includes the following major components:

A. Main steam piping from the steam generator outlet steam nozzles to the main turbine stop valves.
B. Two MSIVs and two MSIV bypass valves per main steam line.
C. Main steam safety valves.
D. Power-operated atmospheric relief valves.

The power operated atmospheric relief, safety, MSIVs, and MSIV bypass valves are located outside the containment and are installed as close as possible to the containment wall.

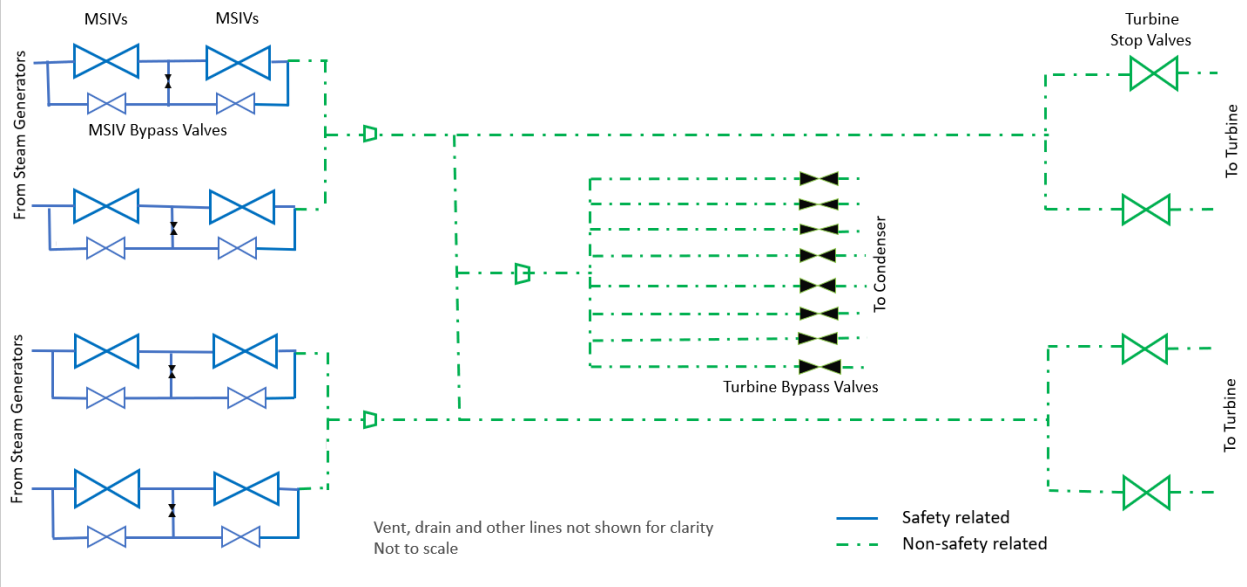
Each main steam line contains two MSIVs in parallel with two MSIV bypass valves. These valves isolate the secondary side of the steam generators to deal with leakage and malfunction and to prevent the uncontrolled blowdown of two steam generators and isolate non-safety-related portions of the main steam system. This constitutes the design function of the main steam isolation system.

The steam line to the auxiliary feedwater pump turbine is connected to a cross connecting header upstream of the MSIVs for steam generators 1 and 2. This arrangement ensures a supply of steam to this turbine when the steam generators are isolated. Check valves are provided in each supply line from the main steam lines to preclude potential backflow during a postulated main steam line break (MSLB).

Branch piping downstream of the main steam line isolation valves provides steam to the single stage reheaters, steam seal system, main feedwater pump turbines, turbine bypass system, auxiliary steam system, steam jet air ejectors, and condenser spargers.

Turbine bypass valves are provided between the MSIVs and turbine-generator stop valves.

Steam from each of four steam generators enters the high- pressure turbine through four stop valves and governing control valves. Crossties are provided upstream of the turbine stop valves to provide pressure equalization with one or more stop valves closed. Each stop valve is controlled by an electrohydraulic actuator, so that the stop valve is either fully open or fully closed. The function of the stop valves is to shut off the steam flow to the turbine, when required.



2.3 Reason for the Proposed Change

The reduction from two MSIV systems per steam line to one MSIV per steam line is requested to improve the design and reliability of the system. The current MSIV actuators are Rockwell A-290 hydraulic actuators. These actuators utilize a compressed nitrogen hemisphere as the motive force to push hydraulic fluid from the valve cylinder, driving the valve to the closed position. In order for the valve to remain open, adequate hydraulic pressure must be maintained at all times to overcome the force of the compressed nitrogen. As a result, there are many mechanisms by which these valves can fail closed. The station has 16 MSIV actuators in service across both units.

There have been six plant trips since 2012 due to inadvertent closure of one or more MSIVs. They are listed below.

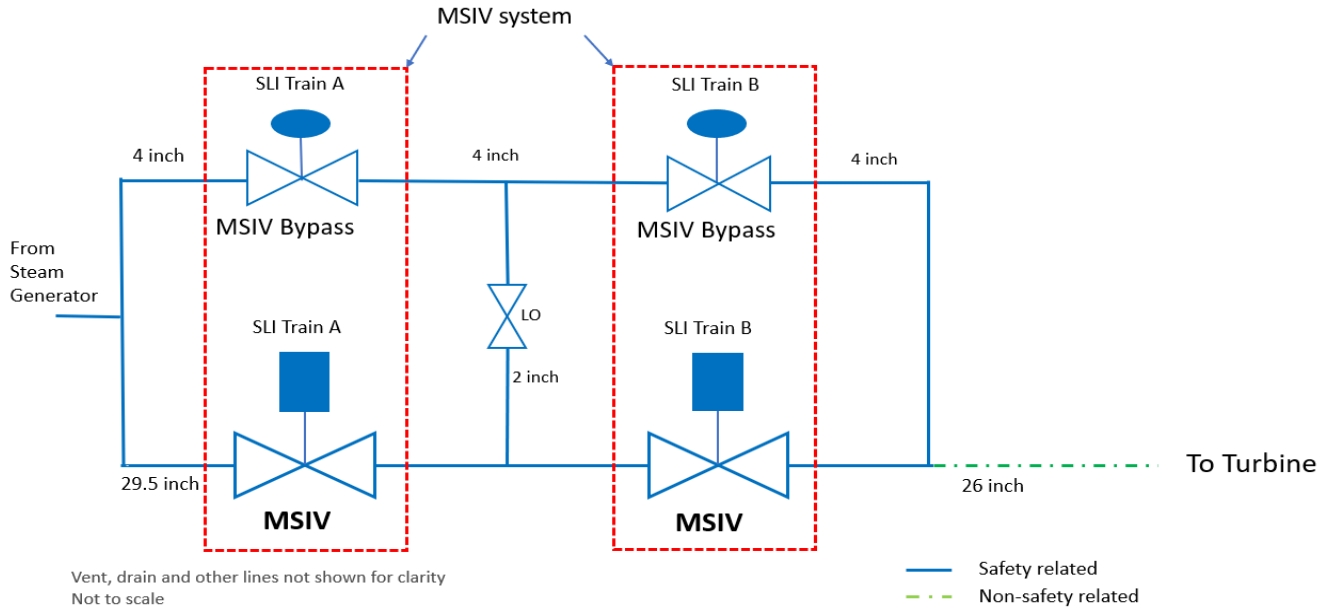
Plant	Event Date	LER #	ADAMS #	Cause
Vogtle, Unit 1	10/8/2012	2012-005	ML12339A190	Loop 2 and 3 outboard MSIVs were closed but indicated open. Due to stem fracture.
Vogtle, Unit 1	4/12/2014	2014-002	ML14156A521	Loop 1 outboard MSIV closed due to loss of hydraulic pressure. Cause was misalignment during reassembly.
Vogtle, Unit 2	3/14/2015	2015-001	ML15133A299	Loop 3 outboard MSIV closed due to failure of a hydraulic dump solenoid valve. This resulted in a reactor trip and safety injection actuation.
Vogtle, Unit 1	2/3/2017	2017-001	ML17093A605	Loop 1 outboard MSIV was drifting closed due to hydraulic oil leak. Cause was misalignment during reassembly.
Vogtle, Unit 2	3/30/2019	2019-001	ML19148A469	Loop 4 inboard MSIV closed due to failure of a control relay coil. Failed during initial use.
Vogtle, Unit 2	7/19/2019	2019-002	ML19247C285	Loop 2 outboard MSIV closed due to microswitch failure. Failure due to water intrusion and corrosion.

2.4 Description of the Proposed Change

Current TS 3.7.2

Current TS 3.7.2 requires two Operable MSIV systems in each main steam line. It includes the Conditions and SRs for the MSIV systems.

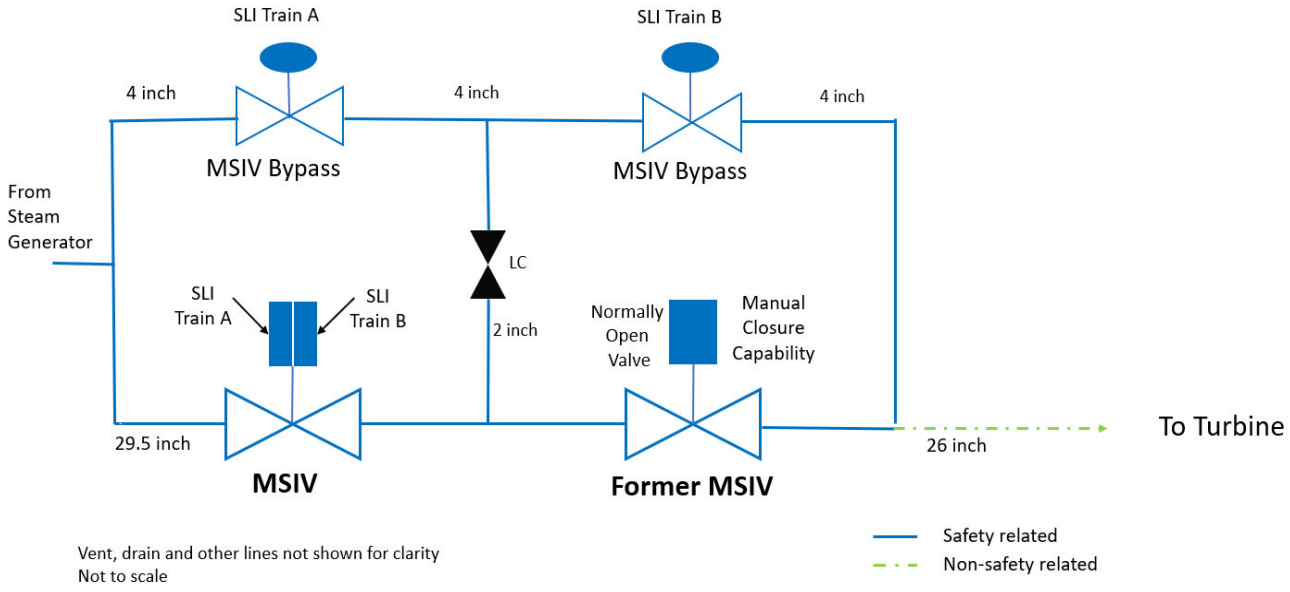
It is important to note that an MSIV system in the current TS is defined as an MSIV and its related bypass valve. An MSIV system is either a Train A or Train B system, that is, the signals to the MSIV and its related bypass valve come from the same train (steam line isolation (SLI)-A or SLI-B). The Figure below shows the existing design and shows the MSIV system as defined in the TS Bases. This design is repeated for each main steam line. There are four main steam lines at VEGP.



Proposed TS 3.7.2

SNC proposes to change TS 3.7.2 as described below. These changes bring TS 3.7.2 closer to conformance with NUREG-1431, rev. 4, Improved Standard Technical Specifications for Westinghouse Plants (Reference 2). Additionally, changes are made to add dual train actuators and the bypass valves to the LCO, Conditions and SRs. Changes to each part of the TS are described below and discussed in detail in Section 3.

To better understand the proposed TS changes, the Figure below shows the change in the physical plant that supports the proposed TS changes. There will no longer be MSIV systems. Each main steam line will have one MSIV with a dual train actuator. Two bypass valves remain in each main steam line, each closed by a different train of the SLI signal.



LCO 3.7.2	Four~~Two~~ MSIVs and their associated actuator trains and associated bypass valves ~~systems per steam line sh~~shall be OPERABLE.
APPLICABILITY:	MODE 1, MODES 2 and 3 except when one MSIV and one bypass valve ~~system~~ ~~s~~in each steam line ~~is~~are closed.

The LCO is changed from two MSIV systems per steam line to four MSIVs and their associated actuator trains and associated bypass valves. There are four main steam lines in each VEGP unit. This equates to one MSIV and associated components per main steam line. The Applicability exception is changed to reflect the change from two MSIV systems per steam line closed to one MSIV and one bypass valve per steam line closed. An MSIV system currently consists of an MSIV and its associated bypass valve. The plant condition of the Applicability remains the same, as each steam line is isolated by an MSIV and at least one bypass valve.

ACTIONS

~~NOTE~~
~~Separate Condition entry is allowed for each steam line.~~

The Note allowing separate Condition entry for all Actions is removed from its current location. It is no longer appropriate to allow separate Condition entry for each steam line with the change to the LCO from two MSIV systems to one MSIV and associated actuators and bypass valves per steam line. This Note is added to Conditions H and I as shown below. This conforms to NUREG-1431.

A. One MSIV with one actuator train inoperable	A.1	Restore MSIV actuator train to OPERABLE status.	7 days
B. Two MSIV actuator trains inoperable on different MSIVs and on different trains.	B.1	Restore one MSIV actuator train to OPERABLE status.	72 hours
C. Two MSIV actuator trains inoperable on different MSIVs on the same train.	C.1	Restore one MSIV actuator train to OPERABLE status.	24 hours
D. Two MSIV actuator trains inoperable on the same MSIV.	D.1	Declare the affected MSIV inoperable.	Immediately
E. Three or more MSIV actuator trains inoperable. OR Required Action and associated Completion	E.1	Declare each affected MSIV inoperable.	Immediately

New Conditions A through E are added to address the Operability of the dual train actuators to be installed on the MSIVs. These Conditions are consistent with Conditions approved for other plants with dual train actuators. Additional discussion is provided below in section 3.5.2.

~~A~~F. One ~~or more steam line with one~~ MSIV ~~system~~ inoperable in MODE 1.	~~A~~F.1 Restore MSIV to OPERABLE status.	~~72~~8 hours ~~OR~~ ~~In accordance with the Risk Informed Completion Time Program~~

Condition A is modified to reflect the change from two MSIV systems per steam line to one MSIV per steam line. It is relabeled as Condition F. In addition, the allowance for more than one main steam line to have an inoperable MSIV system is removed. The Completion Time for restoration of the inoperable MSIV is changed from 72 hours to 8 hours. The RICT is eliminated. This Condition is consistent with NUREG-1431.

B. NOTES 1. Not applicable when the second MSIV in one steam line is intentionally made inoperable. 2. The following Section 5.5.22 constraints are applicable: parts b, c.2, c.3, d, e, f, g, and h. One or more steam lines with two MSIV systems inoperable in MODE 1.	B.1 Restore one MSIV system to OPERABLE status in affected steam line.	4 hours OR In accordance with the Risk Informed Completion Time Program

Condition B is deleted. With only one MSIV per steam line, it no longer applies.

CG. Required Action and associated Completion Time of Condition FA or B not met.	CG.1 Be in MODE 2.	6 hours

Current Condition C is relabeled G and now applies only to Condition F. The reference to the previous Condition B is removed. This Condition is consistent with NUREG-1431.

D. One or more steam lines with one MSIV system inoperable in MODE 2 or 3.	D.1 Verify one MSIV system closed in affected steam line.	7 days AND Once per 7 days thereafter.

Current Condition D is removed. It is no longer applicable with one MSIV per steam line.

H. ----------NOTE---------- Separate Condition entry is allowed for each bypass valve. ---------- One or more bypass valves inoperable.	H.1	Close or isolate the bypass valve.	7 days
	AND		
	H.2	Verify the bypass valve is closed or isolated.	Once per 7 days thereafter

A new Condition H is added to address an inoperable bypass valve. Separate Condition entry is allowed for each bypass valve because it operates independently of other bypass valves. If the bypass valve is closed or isolated, it is performing the safety function. Therefore, the bypass valve can remain closed or isolated indefinitely. The addition of this Condition is discussed below in section 3.5.3.

I~~E~~. ----------NOTE---------- Separate Condition entry is allowed for each MSIV. ---------- One or more ~~steam lines with two~~ MSIVs ~~systems~~ inoperable in MODE 2 or 3.	I.1	Close or isolate MSIV.	8~~4~~ hours
	AND		AND
	I~~E~~.2~~1~~	Verify ~~one~~ MSIV is ~~system~~ closed or isolated ~~in affected steam line~~.	Once per 7 days thereafter

Current Condition E is relabeled as Condition I. The Note for separate Condition entry is added to Condition I. The Condition is changed to reflect the change from two MSIV systems per steam line to one MSIV per steam line. The effect on the Condition remains the same as it reflects the inoperability of all MSIVs in a steam line. Required Action I.1 is added to close or isolate the inoperable MSIV. The MSIV can be isolated by closing the outboard valve in the same main steam line. This ensures the main steam line flow is isolated supporting the assumptions in the safety analysis. The Completion Time is changed from 4 hours to 8 hours. Condition I.2 is modified to reflect the change from two MSIV systems per steam line to one MSIV per steam line. It requires verification that the MSIV is closed or isolated. The verification frequency remains the same. This Condition is consistent with NUREG-1431.

J~~F~~. Required Action and associated Completion Time of Condition H or I~~D or E~~ not met.	~~F~~J.1	Be in MODE 3.	6 hours
	AND		
	~~F~~J.2	Be in MODE 4.	12 hours

Current Condition F is relabeled as Condition J and the reference to the previous Conditions D and E are changed to Condition H and I.

SR 3.7.2.1	----------NOTE---------- Only required to be performed in MODES 1 and 2. --- Verify closure time of each MSIV and bypass valve ~~system~~ is within limits on an actual or simulated actuation signal.	In accordance with the INSERVICE TESTING PROGRAM

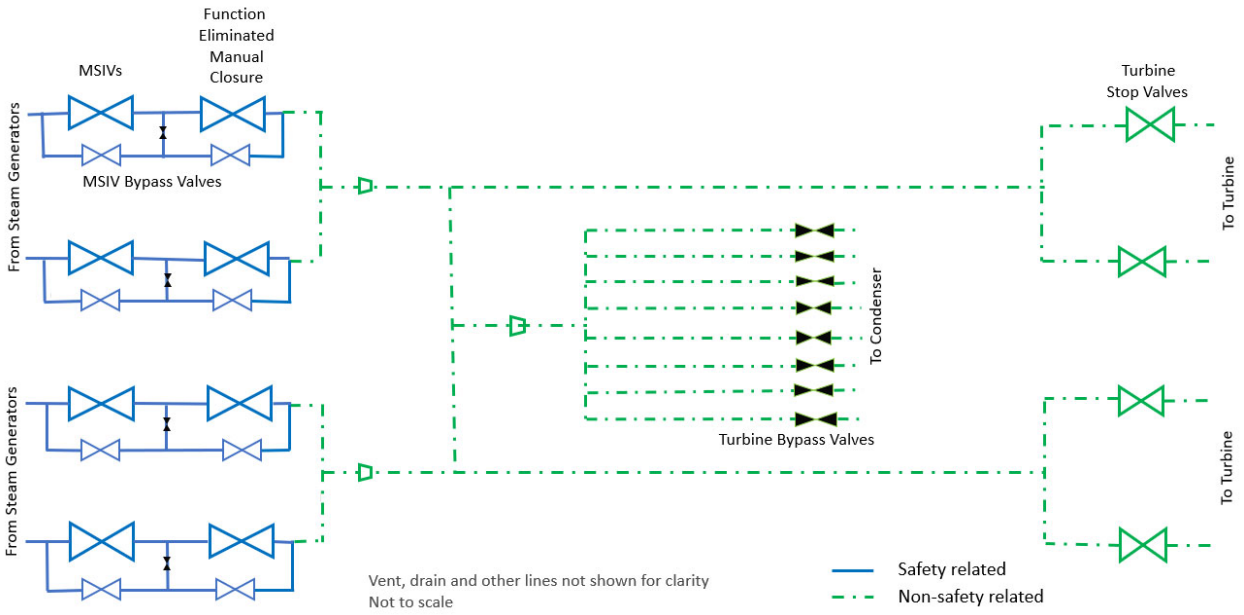
The SR is changed to reflect the change from an MSIV system to an MSIV and bypass valve. This is consistent with separate Conditions for MSIVs and bypass valves. The testing is still performed as currently required.

SR 3.7.2.2	----------NOTE---------- Only required to be performed in MODES 1 and 2. --- Verify each actuator train actuates the MSIV to the isolation position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

This SR is added to address the dual train actuators on the MSIVs. The SR is needed to provide assurance that the actuators are Operable per the LCO. This SR is consistent with the SRs approved for other plants that have dual train actuators.

3.0 TECHNICAL EVALUATION

SNC proposes to change the licensing basis to eliminate the requirement for the automatic closure function from the outboard MSIV in each main steam line. The change to the plant design will be implemented upon approval of this licensing change. Both MSIVs will remain in the main steam line, in their current location. The inboard MSIV will have a new dual train actuator installed with redundant actuation signals and redundant power supplies. The existing actuator will remain on the outboard valve (former MSIV) and will be capable of manual valve closure. Automatic closure of the outboard valve will be precluded by removal of the automatic actuation signal and depressurization of the nitrogen accumulator. The outboard valve will still be capable of manual closure using the existing actuator upon charging of the nitrogen accumulator. The MSIV bypass valves remain in place with their existing closure signals. The non-safety related valves downstream of the outboard valve are not altered by this change.



3.1 Description of Physical Plant Change

The physical plant change that is to occur to support the design basis change is the replacement of the current MSIV actuator with a different type of actuator. This physical plant change has been evaluated against the criteria of 10 CFR 50.59 and determined to not require prior NRC approval. Details of the change in the actuator type are provided here for a more complete understanding of the final system configuration.

MSIV Design

Each MSIV is a bidirectional, wedge-type gate valve composed of a valve body which is welded into the system pipeline. Since the disks are completely independent of each other and the design is essentially symmetrical, positive sealing can be maintained in either direction. The inboard MSIV is not changed as part of the proposed design change. The existing valve remains in the main steam line and remains capable of providing positive sealing in either direction. It remains capable of closing against full steam flow. No change to the design characteristics of this valve have occurred. The outboard valve is not changed except for removal of the actuation signal and depressurization of the nitrogen accumulator. The outboard valve remains capable of closure and sealing against steam flow from either direction. It can be closed manually following operator action to charge the nitrogen accumulator for the existing actuator.

MSIV Actuator Design

The existing MSIV actuators use a combination of nitrogen and spring pressure to operate the valve when needed. The actuator on the inboard MSIV will be changed to a system media actuator. It uses the main steam pressure to close the valve when needed. The new actuators are simple pistons, with the valve stem (referred to as piston rod) attached to both the discs and the piston. To open the valve, the upper piston chamber and lower piston chamber are simply vented. The hydraulic force of the steam in the process line exerts an upward force on the piston rod and opens the valve. When the MSIV receives a close signal, both solenoids that direct steam to the upper piston chamber, MV1 and MV2 (see figure below), de-energize, which closes the MSIV. With the upper piston chamber pressurized and the MSIV closed, some very

minor leakage through the stem (from the main steam line) and piston seals (from the upper piston chamber) is expected to enter the lower piston chamber. To isolate this leakage path, the lower piston chamber solenoid valve, MV3, is automatically isolated 50 seconds after initiation of the close signal. This actuator is internally redundant in that it uses two trains to provide the necessary steam pressure to close the MSIV. Either train is capable of closing the MSIV in the analyzed period of time.

The actuator train does not include any portion of the analog channels or protection system actuation logic and actuation relays that provide inputs to the valve actuator trains. The Engineered Safety Features Actuation System (ESFAS) Instrumentation TS 3.3.2 provides separate Conditions, Required Actions, and SRs for the analog channels and protection system logic and relays.

MSIV Isolation Signals

The MSIV actuator will receive redundant trains of isolation signals. The isolation signal inputs remain the same as are currently used. The two redundant train-oriented steam line isolation signals (SLI-A, SLI-B) are initiated upon receipt of any of the following signals:

a. Low steam line pressure in one of four loops.
b. Steam line pressure negative rate high.
c. High containment pressure.
d. Manual action.
e. Loss of control or actuation power.

A new relay panel and new inductive position indication system panels are installed in the auxiliary and control buildings in order to maintain the above functionality. These panels are qualified for the environment where they are located.

The output from these isolation signals is supplied to the solenoid valves that operate the actuator. SLI-A actuates the A train of solenoids and SLI-B actuates the B train solenoids. Each set of solenoids causes the actuator to operate, independent of the other set of solenoids. Either train A or B of the actuator is capable of causing the actuator to close the MSIV in the time assumed by the safety analysis.

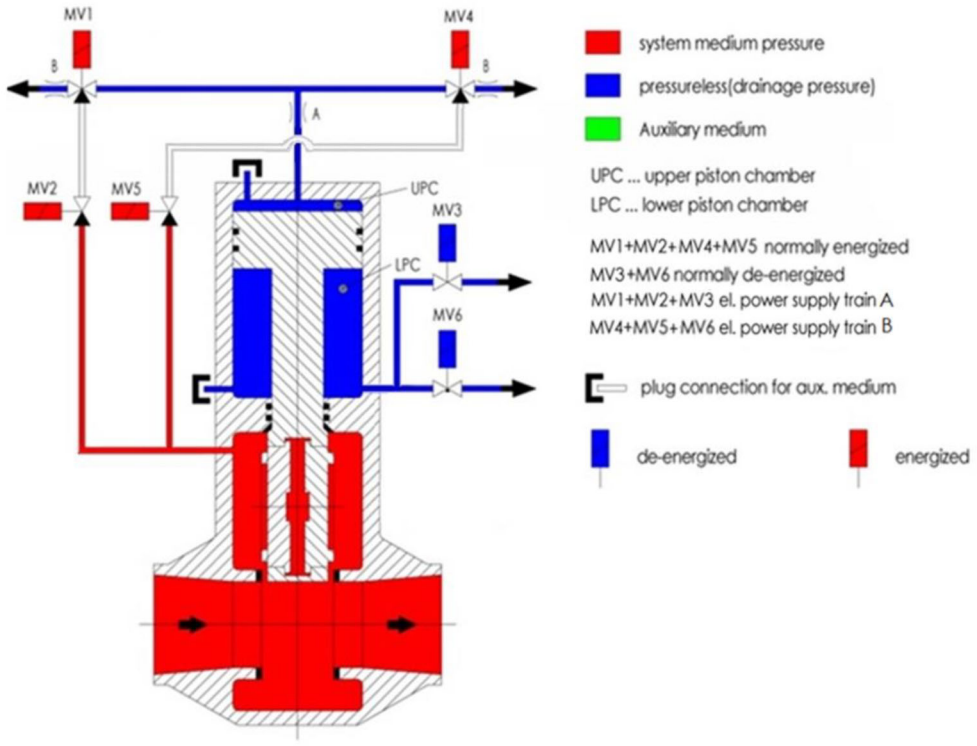


Figure 8. Keep Open Schematic

3.2 Impacts of the Physical Plant Change

The physical plant change is described above and consists of replacing the existing valve actuator on the inboard MSIV, associated changes to supports and platforms, and removal of initiating circuits from the outboard valve. Effects due to these changes are described below.

Seismic, Pipe Stress, High Energy Line Break Evaluations

Pipe stress analyses are performed on the main steam line to confirm that the main steam piping and supports continue to withstand appropriate dynamic effects following the installation of the new actuator. Pipe stress analyses are also performed on the new vent line piping routed to the main steam safety relief valve vent line. Existing pipe supports for the replacement MSIV actuators are re-evaluated accordingly, and small-bore pipe supports are installed for the new vent line piping. For each main steam line, the effects from the MSIV actuator replacement are limited to the approximately 30 ft of piping between the containment penetration and a forged 5-way support embedded in a double concrete wall in the Auxiliary Bldg. (Steam Lines 1 and 4) or the Control Building (Steam Lines 2 and 4). Both before and after MSIV actuator replacement, stresses in this section of piping are sufficiently low that, with other manufacturing restrictions (material grade and inspections, etc.), the piping remains exempt from the requirements for pipe break postulation. In other words, the piping containing the MSIVs qualifies as “No Break Zone” piping both before and after MSIV actuator replacement. Thus, there are no impacts on high energy line breaks in the main steam piping due to the MSIV actuator replacements.

Heating, Ventilation and Air Conditioning (HVAC)

The HVAC system has been evaluated to ensure that it provides appropriate conditions for the electrical components associated with the new MSIV actuators. The added heat load to the control building and the auxiliary building, specifically the engineering safety features room, due to the installation of new equipment panels was evaluated. The results conclude that the

existing HVAC systems have adequate capacity to accommodate the added heat load and maintain suitable room temperatures.

Fire Protection
Combustible loading of the affected fire zones and fire areas were evaluated due to the new materials and components added to support the installation of the new actuator on the MSIVs. The combustible loading remains within limits for the fire protection program.

Inservice Testing Program
The Inservice Test Program and Inservice Inspection Program will be evaluated in accordance with 10 CFR 50.55a to determine what, if any, program changes are required. The programs will be updated accordingly.

Electrical Supplies
Currently, redundant power supplies operate the MSIVs and MSIV bypass valves. The impact of the change in actuator on the inboard MSIV was evaluated for the electrical system. The battery chargers and 125-volt DC battery have adequate margin to accommodate the increase in load to provide power to the actuator solenoids. For the loss of offsite power/loss of coolant accident (LOOP/LOCA) design basis event and the station blackout (SBO) event, all Vogtle Class 1E batteries continue to have adequate capacity to support the required load profiles. Additionally, control circuit surge protection devices add a short time delay prior to the valve stroke. This short time delay is accounted for in the valve closure time.

3.3 Design Basis Changes

The design basis change, the closure of a single MSIV in response to a SLI signal, was reviewed for impacts to the existing design basis as described below. The outboard valve that previously had an automatic closure signal is now manually operated, if desired. The bypass valves are operated as currently, each with a SLI closure signal.

MSIV Bypass Valves
The existing MSIV bypass valves are unaffected by the proposed design change to eliminate the automatic closure function from the outboard valve in each main steam line. Both MSIV bypass valves remain in the bypass line around the remaining MSIV and the outboard valve. Each bypass valve retains a closure signal supplied by either SLI-A or SLI-B. The bypass valves are capable of closing within the time assumed in the safety analysis. The design basis of the bypass valves is not changed in any way by the change to the operation of the MSIV.

Containment Isolation
As described in UFSAR Section 6.2.4.2.1, the containment penetrations associated with the secondary side of the steam generators are not subject to General Design Criterion 57. The valves associated with these penetrations do not receive a containment isolation signal and are not credited with effecting containment isolation in the safety analyses. The barriers against fission product release to the environment are the steam generator tubes and the piping associated with the steam generators. These penetrations do have valves that are capable of remote manual operation and can serve to isolate these penetrations.

Single Failure
The Standard Review Plan (SRP) Section 10.3 (Reference 3) states, “Assure that, in the event of a postulated break in a main steam line in a PWR plant, the design will preclude the blowdown of more than one steam generator, assuming a concurrent single active component

failure. In this regard, all main steam shutoff valves downstream of the MSIVs, the turbine stop valves, and the control valves are considered to be functional."

The design change from two automatic MSIVs per steam line to one automatic MSIV per steam line changes the result of a single failure analysis. The current design basis assumes a failure of one MSIV in one of the steam lines to close when required. Currently, there are two automatic MSIVs in each steam line and the failure of one of them to close (single failure) would be mitigated by the second MSIV in the affected steam line closing as required. The current plant design accommodates a single failure without the need to assume operation of any downstream valves.

With the removal of the automatic function from the current outboard MSIV, only one automatic MSIV will remain in each steam line. A single failure of one of the MSIVs to isolate when required results in the blowdown of a steam generator following a MSLB. To limit these blowdown effects to one steam generator, downstream valves, such as the turbine stop valves are assumed to function as expected. The other secondary system valves, including the MSIV bypass valves and the turbine bypass valves would function as designed. The mass and energy release analyses have been reperformed assuming blowdown from one steam generator. The results are described in the Safety Analysis section below.

Safety Analyses

Removal of one MSIV per steam line has the potential to impact safety analyses documented in the UFSAR. Specifically, MSIV isolation is credited in events modeled in Chapter 6.2 and Chapter 15 of the UFSAR. With two MSIVs per steam line, there is no credible single failure that could occur that would prevent isolation of a steam line in the safety analyses.

To support the change in the design basis from two MSIVs per steam line to one MSIV per steam line, SNC in conjunction with the fuel vendor, Westinghouse, reviewed the totality of safety analyses that model or credit an MSIV closure time documented in the UFSAR. Analyses like loss of coolant accidents (LOCAs) that do not specifically model the MSIVs are not impacted by this change. The following analyses that model the MSIVs were identified as potentially impacted:

- MSLB Containment Pressure and Temperature (P/T) Response
- Steam Generator Tube Rupture (SGTR) Transient Response and Margin to Overfill (MTO)
- SGTR Offsite Dose Consequences
- MSLB Offsite Dose Consequences

The MSLB reactivity accidents documented in UFSAR Section 15.1.5 are not impacted by this change. This is because the stroke time of the MSIV assumed in the safety analysis remains bounding compared to the tested valve performance. For the hot zero power events, peak linear heat rate occurs at 101.8 sec and 253 sec which is after MSIV closure at 10.7 sec (UFSAR Table 15.1.2-1). Also, the limiting hot zero power events assume the reactor coolant system is at no load conditions (minimal steam production) with the turbine stop valves closed. As a result, a single failure of an MSIV would not result in the uncontrolled blowdown of more than one steam generator. The hot full power event doesn't credit MSIV closure as the reactor trip on Overpower ΔT mitigates the event.

Outside containment sub-compartment response resulting from a MSLB outside containment is also not impacted by this change. Per UFSAR Section 3.11.B.1, a single failure is not assumed for this analysis. Also, the analysis discussed in UFSAR Section 3.11.B.1 is biased to maximize superheat due to steam generator tube uncovery as this is conservative for maximizing equipment qualification temperature of components in the compartment. Reverse flow of saturated steam into the compartment from the intact steam generators after MSIV closure is conservatively neglected.

LOCAs are not impacted by the removal of 1-MSIV per loop. The 10 CFR Appendix K small break LOCA and large break LOCA analyses performed in accordance with the approved methodologies for VEGP do not model the MSIV. This is conservative as the analyses assume the SG secondary side is isolated at time zero which maximizes the stored energy available for energy transfer to the RCS.

MSLB Containment Pressure and Temperature Response

Removal of the function of one MSIV per steam line has an adverse impact on the containment pressure and temperature analyses due to allowing for reverse flow from the steam header into containment. This phenomenon didn't need to be considered in a two MSIV per steam line configuration as there was no credible single failure that could cause this to occur.

The current analysis of record (AOR) assumes simultaneous, dual single failures. These include a loss of one emergency diesel generator (equates to a loss of 1-train of containment sprays/1-train of fan coolers), and a failure of one feedwater isolation valve, consistent with UFSAR Section 6.2.1.4.6. While not required, assuming dual single failures did not have a significant impact on the containment pressure and temperature analysis results and allowed for the number of cases documented in the UFSAR to remain at a minimum (16 case break spectrum, UFSAR Table 6.2.1-65).

Consistent with the current AOR approach, the MSIV single failure is included along with the emergency diesel generator and main feedwater isolation valve failures. This approach is conservative and bounding as it assumes three single failures occur simultaneously in the event. The updated analysis results show a slight increase in peak calculated containment temperature (303°F to 309°F) and pressure (36.5 psig to 39 psig). These results are less than the containment design limits of 52 psig and 381°F (UFSAR Table 6.2.1-1), which indicates the analysis and associated change is acceptable.

SGTR Transient Response and Margin to Overfill

In 2006, Westinghouse issued Nuclear Safety Advisory Letter (NSAL)-06-15 advising plants with a single MSIV per steam line that they may need to consider the impact of branch line steam flows downstream of the MSIVs in a single failure MSIV scenario for a SGTR event. An audit of the main steam system was performed to identify the magnitude of branch line steam flows downstream of the MSIVs. The audit documented an analysis of a single failure of an MSIV for the SGTR MTO event in accordance with the approved methodology and consistent with the analysis discussed in UFSAR Section 15.6.3. The results of this analysis indicate the single failure MSIV is non-limiting (more margin to overfill) compared to the current AOR that assumes a loss of control room control of an atmospheric relief valve (ARV) on the faulted steam generator. Additionally, the analysis documented that the SGTR mass releases associated with the single failure MSIV scenario were non-limiting with respect to input to the SGTR offsite dose consequence analysis

SGTR Offsite Dose Consequences
As discussed above, the branch line steam flow (both instantaneous flow and integrated flow) resulting from a single failure of an MSIV is less than that from a single failure due to a loss of control room control of an ARV on the faulted steam generator. Therefore, the offsite dose consequences currently documented in UFSAR Section 15.6.3 resulting from a SGTR event remain bounding.

MSLB Offsite Dose Consequences
The MSLB offsite dose consequence analysis communicated in UFSAR Section 15.1.5.3 is not impacted as the AOR currently assumes the faulted steam generator blows down completely to the environment (unisolable break discharging to atmosphere, i.e. - no credit for MSIV closure). A failure of an MSIV to close in an intact loop would prevent use of the ARV in that loop for cooldown until the branch lines were isolated. The AOR currently assumes a cooldown rate assuming only 2 of 4 ARVS are available, and the ARVs are assumed to discharge to the atmosphere for 20 hours. As a result, a failure of an MSIV in an intact loop would not impact the 20-hour cooldown time before switchover to the Residual Heat Removal system assumed in the AOR. Therefore, the current AOR remains bounding and is not impacted by this change.

Conclusions
The impacted or potentially impacted safety analyses documented in the UFSAR were reviewed and evaluated where necessary to understand the impact of the change from two MSIVs per steam line to one MSIV per steam line. The results indicate all of the current AORs with the current assumed single failures remain bounding. The exception to this is the containment pressure and temperature analysis. Due to the conservative approach of multiple simultaneous single failures in the analysis a slight increase in peak containment temperature and pressure has been shown to occur. These increases result in containment pressure and temperature magnitudes less than the containment design limits of 52 psig and 381°F. As a result, the design basis change from two MSIVs per steam line to one MSIV per steam line is acceptable with the impact to the safety analyses.

Environmental Qualification of Equipment
As described above, the containment pressure and temperature are changed slightly due to additional mass and energy released into the containment following a MSLB. These changes are compared to the environmental qualification bounding curves for the containment vapor region to determine the updated post-accident parameters. The updated parameters are compared to the tested values for all equipment inside containment to determine impacts to qualification. This review has determined that there are no impacts to the environmental qualification of equipment inside containment.

3.4 Justification of Single MSIV Design

SRP 10.3 was reviewed to ensure appropriate aspects of the change from two MSIVs to one MSIV per main steam line were properly considered. How the acceptance criteria from the SRP are met are described below.

1. Acceptance of GDC 2 is based on meeting the guidance of Regulatory Guide 1.29, Position C.1 for safety-related portions and Position C.2 for non-safety-related portions.

DISCUSSION

The structures, systems, and components important to safety are designed either to withstand the effects of natural phenomena without loss of the capability to perform their safety functions or are designed such that their response or failure will be in a safe condition. Those structures, systems, and components vital to the shutdown capability of the reactor are designed to withstand the maximum probable natural phenomena at the site, determined from recorded data for the site vicinity, with appropriate margin to account for uncertainties in historical data. Appropriate combinations of structural loadings from normal, accident, and natural phenomena are considered in the plant design.

VEGP conforms with Regulatory Guide 1.29, Rev. 3 for the main steam system. With regard to regulatory position C.1, each nuclear steam supply system component important to safety is classified as Safety Class 1, 2, or 3; these classes are qualified to remain functional in the event of the safe shutdown earthquake. The following components are designed in accordance with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code Section III, Class 2, and Seismic Category 1 requirements and are considered the safety-related portion of the system.

1. All piping and valves from the steam generators up to and including the pipe restraints provided downstream of each outboard MSIV to maintain piping loads upstream of the restraint in accordance with Branch Technical Position MEB 3-1. This safety related piping is designed to meet the no-break zone criteria of Nuclear Regulatory Commission Branch Technical Position MEB 3-1 so that the piping failures need not be postulated. The portion of the system designated as safety-related is not changed due to this design change.

2. Branch lines from the above portions of the main steam lines up to and including the first valve (including a safety or relief valve) that is either normally closed or capable of automatic/remote manual closure during all modes of normal reactor operation.

The main steam system and MSIVs continue to meet the requirements of GDC 2.

2. Acceptance of GDC 4 is based on the guidance of Regulatory Guide 1.115, Position C.1, as it relates to the protection of SSCs important to safety from the effects of turbine missiles. In addition, the system design should adequately consider water (steam) hammer and relief valve discharge loads to assure that system safety functions can be performed and should assure that operating and maintenance procedures include adequate precautions to prevent water (steam) hammer and relief valve discharge loads. The system design should also include protection against water entrainment.

DISCUSSION

Structures, systems, and components important to safety are designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including LOCAs. These structures, systems, and components are appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit.

The turbine-generator stores large amounts of rotational kinetic energy in its rotor. In the unlikely event of a major mechanical failure, this energy may be transformed into both rotational and translational energy of rotor fragments. These fragments may impact the surrounding stationary parts. If the energy-absorbing capability of these stationary turbine-generator parts is insufficient, external missiles will be released. These ejected missiles may impact various plant structures, including those housing safety-related equipment. The UFSAR describes the inspection requirements and the testing of valves which prevent turbine overspeed that would cause the missile generation.

The main steam system is not subject to turbine missiles because they are precluded from occurring. Therefore, the main steam system continues to meet GCD 4.

3. Compliance with GDC 5 requires that structures, systems, and components important to safety shall not be shared by nuclear power units unless it can be shown that such sharing will not significantly impair their ability to perform their intended safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units. Meeting the requirements of GDC 5 provides assurance that the main steam system and its associated components will continue performing their required safety functions even if they are shared by multiple nuclear power units.

DISCUSSION

The VEGP is a two-unit plant with the following common safety-related structures:

A. Control building.
B. Auxiliary building.
C. Fuel handling building.

Within these buildings are shared spaces, such as the control room, which contain physically separated safety-related equipment. Safety-related systems are not shared, with the exception of the fuel handling building post-accident exhaust system. Common heating, ventilation, and air conditioning (HVAC) system ducting headers are used in some instances for redundant HVAC units.

The main steam system is not shared between Units and is not affected by the requirements of GDC-5.

4. Acceptance of GDC 34 is based on the following:

   A. The positions in Branch Technical Position 5-4, as they relate to the design requirements for residual heat removal (RHR).

   B. Issue Number 1 of NUREG-0138, as it relates to credit being taken for all valves downstream of the main steam isolation valves (MSIVs) to limit blowdown of a second steam generator if a steam line were to break upstream of the MSIV.

DISCUSSION

   A. The residual heat removal (RHR) system, in conjunction with the steam and power conversion system, is designed to transfer the fission product decay heat and other residual heat from the reactor core at a rate which keeps the fuel within acceptable

limits. The RHR system functions when temperature and pressure are below approximately 350°F and 400 psig, respectively. Redundancy of the RHR system is provided by two residual heat removal pumps (located in separate flood-proof compartments, with means available for draining and monitoring leakage), two heat exchangers, and associated piping, cabling, and electric power sources. The RHR system is able to operate on either the onsite or offsite electrical power system. Redundancy of heat removal at temperatures above approximately 350°F is provided by the four steam generators, four atmospheric relief valves, and the auxiliary feedwater system.

B. A review was performed of the main steam system to consider the isolation capability downstream of the MSIVs. In those cases when an MSIV fails to close, isolation of the main steam system must be performed downstream of the MSIVs. This can involve closure of a number of valves either automatically, remotely from the control room, or locally depending on the system design. These valves may be considered non-safety class in some cases. Potential leakage through certain valves was identified and considered in the SGTR analysis.

The main steam system meets GDC 34 with one MSIV per main steam line.

5. Acceptance of 10 CFR 50.63 is based on meeting Regulatory Guide 1.155 as it relates to the main steam supply system

DISCUSSION

VEGP conforms to Regulatory Guide 1.155, Rev. 0. Main steam isolation can be achieved by closing the MSIVs and closure of bypass valves. The MSIVs close on loss of control or actuation power. Therefore, they will close following a station blackout. The bypass valves are not changed from the existing design.

The main steam system continues to conform to Regulatory Guide 1.155, Rev. 0, therefore, it meets 10 CFR 50.63.

6. Regulatory Guide 1.29, Positions C.1.a, C.1.e, C.1.f, C.2 and C.3, as it relates to the seismic design classification of system components.

DISCUSSION

VEGP conforms with Regulatory Guide 1.29, Rev. 3 for the main steam system. Additional details are discussed above under GDC 2.

7. Regulatory Guide 1.117, Appendix Position 2 and 4, as it relates to the protection of SSCs important to safety from the effects of tornado missiles.

DISCUSSION

VEGP conforms with Regulatory Guide 1.117, Rev. 1, with the exception of the nuclear service cooling water tower fans, main steam safety valve exhausts, atmospheric relief valve (loop 2), atmospheric relief valve exhaust stacks, turbine-driven auxiliary feedwater pump exhaust, and condensate storage tank vents which are not missile protected.

The main steam system and MSIVs are otherwise protected. This level of protection has not changed from the current design basis.

8. SECY 93-087, as it applies to BWR plants…

DISCUSSION

This acceptance criterion does not apply to VEGP, since both units are PWRs.

Conclusion

The proposed design change from two MSIVs to one MSIV per main steam line has been compared to the acceptance criteria of SRP 10.2. This comparison concludes that the main steam system will continue to perform its function and the MSIVs will continue to perform their safety function with one MSIV in each main steam line. Therefore, the proposed design change is acceptable.

3.5 Justification of Technical Specification Changes

3.5.1 LCO and Applicability

The current LCO 3.7.2 includes two MSIV systems in each steam line. As described in the TS Bases for TS 3.7.2, a MSIV system consists of an MSIV and its associated bypass valve. As noted above, the MSIV systems in each steam line are in a train configuration (i.e., there is a train A MSIV combined with a train A bypass valve, etc). MSIV actuators are considered integral to the MSIV and the inoperability of an MSIV actuator comprises inoperability of the MSIV and appropriate MSIV Conditions are required to be entered.

Two modifications described above impact the structure of the LCO. A new style dual train actuator is installed on the inboard MSIV. The dual train actuator allows the MSIV to close with a single failure of one train of the actuator. In addition, the dual train actuator receives closure signals from both trains of SLI, with each train of the actuator receiving a train signal. The final design of the MSIV closure for each steam line will consist of a single MSIV with a dual train actuator and two bypass valves. The bypass valves will retain a single train of SLI closure signal to each valve. Therefore, both bypass valves are required to be in the LCO for each steam line.

The new LCO specifically includes the MSIV, the dual train actuators and both bypass valves in each steam line. This LCO structure allows for the addition of actuator Conditions and a bypass valve Condition as described below. A new SR is needed to address operability of the dual train actuators.

The Applicability continues to address the MSIV and bypass valves. The current Applicability covers the MSIV system, which consists of the MSIV and associated bypass valve. The revised Applicability specifies the MSIV and the bypass valves separately. This ensures that all required valves are closed, if needed, for the exception to the Applicability.

3.5.2 Addition of Actuator Conditions, Required Actions and Completion Times

Currently, TS 3.7.2 does not specifically address or reflect two dual train actuators for one MSIV. Inoperability of one of the two actuator trains associated with an MSIV will not by itself

make the valve incapable of closing since the remaining Operable actuator train can alone close the valve on demand. Declaring an MSIV inoperable and entering the Condition for an inoperable MSIV due only to one inoperable actuator train is unnecessarily restrictive. Therefore, SNC proposes to incorporate appropriate Conditions and Required Actions to address inoperable MSIV actuator trains in TS 3.7.2.

Consistent with other Standard Technical Specifications format, the proposed Completion Times for inoperable MSIV actuator trains are based on a hierarchy of Conditions such that shorter Completion Times would be specified for increasingly degraded conditions. Conditions addressing inoperable actuator trains would be specified first in TS 3.7.2, (i.e., listed before the Conditions that are currently in place for addressing inoperability of the MSIVs themselves). Therefore, TS 3.7.2 specifies that when only an actuator train is declared inoperable, the applicable Condition for the inoperable actuator train would be entered first. Then, depending on the number of actuator trains that are concurrently inoperable and the associated Required Action for the applicable Condition, or if the applicable Required Action and Completion Time cannot be met, the MSIV(s) associated with the inoperable actuator train(s) would be declared inoperable so that the Condition(s) addressing inoperability of the MSIV(s) would be entered.

Specifically, the changes proposed for TS 3.7.2 would add new Conditions A through E (to address inoperable MSIV actuator trains) and relabel the existing Conditions (that address inoperable MSIVs). The proposed, new Conditions related specifically to the MSIV actuator trains would address various degrees or combinations of inoperable MSIV actuator trains, as follows:

* Condition A addresses the situation when one MSIV actuator train is inoperable on one MSIV. Required Action A.1 requires restoring the inoperable MSIV actuator train to Operable status within a specified Completion Time of 7 days.

* Condition B addresses the situation when two MSIV actuator trains are inoperable such that there is one actuator train inoperable for each of two MSIVs and the actuator trains are not in the same train (A or B). Required Action B. 1 requires restoring at least one of the inoperable MSIV actuator trains to Operable status within a specified Completion Time of 72 hours.

* Condition C addresses the situation of when two MSIV actuator trains are inoperable (again, such that there is one actuator train inoperable for each of two MSIVs) and the actuator trains are in the same train. Required Action C.1 requires restoring at least one of the inoperable MSIV actuator trains to Operable status within the specified Completion Time of 24 hours.

* Condition D addresses the situation when two (both) actuator trains on one MSIV are inoperable. Required Action D.1 requires immediately declaring the affected MSIV inoperable. A Completion Time of "Immediately" is specified. If no other MSIV or MSIV actuation train inoperability existed at the time of this Condition, this would result in new Condition F or I (depending on the applicable plant Mode) being immediately entered for a single inoperable MSIV.

* Condition E addresses the condition of having three or more MSIV actuator trains inoperable, OR the condition when (after entering Conditions A, B or C) it is determined that the Required Action and Completion Time of Condition A, B, or C cannot be met. Required Action E.1 for this Condition would require immediately declaring each affected MSIV inoperable. Declaring only a single MSIV inoperable (due to the Required Action and Completion Time of Condition A not being met), would result in entry into Condition F (for MODE 1) or Condition I (for MODE 2 or 3).

Declaring more than one MSIV inoperable would result in entry into LCO 3.0.3 (for MODE 1) or Condition I (for MODE 2 or 3), since (for the former) there is no Condition under TS 3.7.2 that addresses having more than one MSIV inoperable during MODE 1. Like Required Action D.1, a Completion Time of "Immediately" would be specified.

Justification for the Completion Times to be specified for Required Actions A.1, B.1, and C.1 is as follows:

* Condition A - With only a single actuator train inoperable on one MSIV, a Completion Time of 7 days for Required Action A. 1 is reasonable because with one actuator train inoperable, and because of the dual train actuator design, the affected MSIV would still be capable of closing on demand (assuming no additional failures) via the remaining Operable actuator. The proposed 7-day Completion Time takes into account the design redundancy, reasonable time for repairs, and the low probability of a design basis accident occurring during this period.

* Condition B - With an inoperable actuator train on one MSIV and one inoperable actuator train on another MSIV, such that the actuator trains are not in the same train (A or B), a Completion Time of 72 hours for Required Action B.1 is reasonable since, again, the dual train actuator design ensures that with only one actuator train inoperable on each of the affected MSIVs, each MSIV would still be capable of closing on demand, assuming no additional failures. Compared to Condition A however, it is appropriate to have a shorter allowed outage time for Condition B since with an actuator train inoperable on each of two MSIVs, there is an increased likelihood that an additional failure (such as the failure of an actuation logic train) would cause an MSIV to fail to close.

* Condition C - With one inoperable actuator train on one MSIV and one inoperable actuator train on another MSIV, but with both inoperable actuator trains in the same train, a Completion Time of 24 hours for Required Action C.1 is appropriate. Like the above cases, the dual train actuator design for each MSIV ensures that a single inoperable actuator train for any MSIV would not prevent the affected MSIVs from closing on demand. In this regard, 24 hours is reasonable and conservative since only one actuator train per MSIV is permitted to be inoperable (for two MSIVs), so that the remaining operable actuator train on each affected MSIV remains capable of effecting valve closure on demand (assuming no additional failures). A Completion Time of 24 hours is also considered conservative with respect to the low probability of an event occurring during such an interval that would demand MSIV closure. However, compared to the Required Action for Condition B above, a shorter Completion Time for Condition C is appropriate since with two actuator trains inoperable in the same train, an additional failure such as the failure of actuation logic in the other train could cause both affected MSIVs to fail to close on demand.

For Conditions D and E, the Completion Time of "Immediately" is conservative and appropriate. For Condition D, for example, when both actuator trains for one MSIV are inoperable, it is appropriate to require immediately declaring the MSIV inoperable since having both actuator trains inoperable would constitute a condition that renders the affected MSIV incapable of closing on demand.

For Condition E, when the Required Action and associated Completion Time of Condition A, B, or C is not met, it follows that the affected MSIV(s) should immediately be declared inoperable since the assumption is that the Completion Time(s) of Condition A, B, or C has expired or cannot be met. This "default" Condition is in keeping with the intent that when only the actuator trains for affected MSIVs are inoperable (and not the valves themselves), the Conditions and

Required Actions for the inoperable MSIV actuator trains should be entered first, and then if those Required Actions cannot be met, the affected MSIVs should be declared inoperable so that the Conditions and Required Actions for the inoperable valves are then entered. Required Action E.1 ensures the affected MSIV(s) is promptly declared inoperable. This format or approach is consistent with other Technical Specifications and the format of the Standard Technical Specifications (NUREG-1431).

For the other part of Condition E, i.e., for the condition when three or more actuator trains are inoperable, it is conservative and appropriate as well to immediately declare the affected MSIVs inoperable for this condition. For the situation of having three actuator trains inoperable, for example, such a condition could involve two inoperable actuator trains on one MSIV and one inoperable actuator train on another MSIV, or an inoperable actuator train on each of three MSIVs. In each case, the inoperable actuator trains could all be in the same train or be staggered among the two trains. In the former case, a single assumed failure such as an instrument logic train failure could cause one or two MSIVs to fail to close on demand. In the latter case, such a single failure could cause all three MSIVs to fail to close on demand. Therefore, immediately declaring the affected MSIVs inoperable is appropriate and conservative. In any case, the conditions addressed by Condition E would constitute an inoperability that exceeds the scope of any of the conditions addressed by Conditions A, B, or C, and it is conservative in this case to simply require declaring the affected MSIVs inoperable.

A new SR is added, SR 3.7.2.2, to address the ability of the each of the dual train actuators to close the MSIV as required. Proposed SR 3.7.2.2 includes verification that each dual train actuator is capable of independently closing its associated MSIV on an actual or simulated actuation signal. The frequency of actuator testing is in accordance with the Surveillance Frequency Control Program. The initial Frequency in the Surveillance Control Program is set to be every 36 months consistent with the current actuator testing cycle and the VEGP refueling cycle.

3.5.3 Separate TS Condition for Bypass Valves

The proposed change will revise Technical Specifications (TS) 3.7.2, "Main Steam Isolation Valves (MSIVs)," to add a separate Condition for the main steam isolation valve bypass valves. The proposed change includes revising the LCO and Applicability sections of TS 3.7.2 and adding a Condition and Required Actions as necessary to address the bypass valves. Additionally, SR 3.7.2.1 is modified to address the bypass valves separately from the MSIVs.

The proposed change adds new Condition H and associated Required Actions for the bypass valves. New Condition H is modified by a Note indicating that, when one or more bypass valves are inoperable, separate Condition entry is allowed for each bypass valve. New Condition H addresses one or more bypass valves inoperable and Required Actions H.1 and H.2 require the inoperable bypass valves to be closed or isolated within 7 days and verified closed or isolated once per seven days.

The bypass valves are normally open during plant operation, while the MSIVs are also open. The bypass valves are open to minimize condensation in the steam line and to support maintenance and testing at power. They may also be opened when the MSIVs are closed for warming of the steam lines and equalizing steam pressure across the MSIVs. The normally open bypass valves could allow a potential release flow path to exist following a postulated

accident scenario. Therefore, the bypass valves have been subject to the same requirements for isolation as the MSIVs.

The current LCO requires two MSIV systems to be Operable for each steam line. As defined in the TS Bases, an MSIV system consists of an MSIV and its associated bypass valve. This design has two MSIVs and two bypass valves in each steam line. One MSIV in each steam line will have its associated automatic actuation removed and will no longer be credited as an MSIV. Both existing bypass valves will remain Operable as currently described in the TS. They will continue to each have a separate train closure signal (SLI-A or SLI-B), ensuring that one of the two bypass valves will close following a single failure. The proposed LCO and Applicability identify that bypass valves are associated with each MSIV. The proposed changes to the LCO and Applicability enhance the current wording by more clearly conveying the requirements and provisions on a "for each main steam line" basis. This is effective for providing clear exceptions to the Applicability (as further explained below) which are permitted on the basis that isolation or isolation capability is still ensured when the exception is involved.

Under the proposed change, the bypass valves are required to be Operable in MODES 1, 2, and 3. The bypass valves are considered Operable when their isolation times are within limits and they are capable of closing on an isolation actuation signal. All bypass valves can be closed at power. Consistent with the Westinghouse Standard Technical Specifications (Reference 2), exceptions to the Applicability are allowed for the MSIVs in MODES 2 and 3. In MODES 2 and 3, with all MSIVs closed, the MSIVs are assured of performing their specified safety functions. Likewise, with one bypass valve in each steam line closed, the bypass valves are assured of performing their specified safety function. With the assurance that the specified safety function is being met, it is acceptable to exempt the MSIVs and bypass valves from the Applicability of TS 3.7.2 under such conditions. Therefore, in MODES 2, and 3, exceptions to the Applicability for TS 3.7.2 are allowed for the bypass valves when they are assured of performing their specified safety function.

With one or more bypass valves inoperable, the valve(s) must be closed or isolated within 7 days and verified closed or isolated once per 7 days. The bypass valve can be isolated by closing the redundant bypass valve in the same main steam line or valves in the bypass line downstream of the bypass valves. This ensures the bypass line flow is isolated supporting the assumptions in the safety analysis. The 7-day Completion Time is reasonable, considering the low probability of an accident occurring during this time that would require a closure or isolation of the bypass valve and less significant consequences from a postulated accident following failure of a bypass valve to isolate. For an inoperable bypass valve that cannot be restored to Operable status within the specified Completion Time, but is closed or isolated, the inoperable bypass valve must be verified on a periodic basis to be closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7-day Completion Time is consistent with the Completion Time for an inoperable, but closed MSIV in MODE 2 or 3, and is reasonably based on engineering judgment.

The current SR 3.7.2.1 contains surveillance requirements for the MSIVs and bypass valves (called the MSIV system). The proposed change to SR 3.7.2.1 separately specifies the MSIV and bypass valves in the SR but does not change the testing requirement or Frequency. The bypass valves will continue to be tested as they are currently. This change supports the separation of the MSIVs and bypass valves in the LCO and the addition of a separate bypass valve Condition.

3.5.4 Risk Insight

Although this license amendment request is not a risk-informed request and therefore a risk evaluation is not required, SNC is providing risk insights related to the proposed change. The proposed TS changes and new Completion Times for 3.7.2, Conditions A, B, C, and F were evaluated in a probabilistic assessment to provide risk insights. The risk assessment does not establish the basis for the proposed Completion Times. The probabilistic assessment instead supports the validity of the proposed Completion Times by applying a similar methodology to that utilized in the VEGP Risk Informed Completion Time (RICT) program (cumulative quantification of internal events, flooding, and fire with a seismic penalty and using the RICT program thresholds) to determine an estimation of what the RICT time would be if the Conditions were included within the RICT scope. In addition, the probabilistic assessment evaluates estimated average risk increase for the base models against the 1E-06/yr change in Core Damage Frequency (CDF) and 1E-07/yr change in Large Early Release Frequency (LERF) criteria representing a small change in risk per Regulatory Guide 1.174.

The probabilistic analysis examined two sets of risk metrics: the expected change in annual average CDF and LERF, and the Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP). The assessment determined that the proposed design modification results in a small increase in CDF and LERF, and the expected impact was found to be significantly below a 1E-06/yr change in CDF and 1E-07/yr change in LERF. This criteria represents a very small increase in risk per Regulatory Guide 1.174. In addition, the assessment did not result in significant risk insights.

The assessment also determined the proposed Completion Times are significantly less than what would be allowed if applying RICT program methodology. The evaluation conservatively did not credit local, manual operator action to provide backup isolation capability, and the evaluation found the RICT times would reach the RICT program backstop of 30 days using a bounding configuration.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The following NRC requirements and guidance documents are applicable to the review of the proposed changes.

10 CFR 50, Appendix A, General Design Criterion (GDC) 2, "Design bases for protection against natural phenomena," requires that the safety related portion of the Main Steam Supply System be protected from the effects of natural phenomena, such as earthquakes, tornadoes, hurricanes, floods, and external missiles.

10 CFR 50, Appendix A, GDC 4, "Environmental and dynamic effects design bases," requires that the Main Steam Supply System be designed to remain functional after a safe shutdown earthquake or to perform its intended function following postulated hazards such as internal missiles, or pipe break.

10 CFR 50, Appendix A, GDC 34, "Residual heat removal," requires that component redundancy be provided for the Main Steam Supply System so that safety functions can be performed, assuming a single active component failure coincident with the loss of offsite power.

The proposed design basis changes affect the MSIVs and associated actuators design and operation, which continue to meet the GDC requirements as described above. The proposed TS changes are consistent with and in compliance with the above regulatory requirements and criteria. Therefore, the proposed changes will assure safe operation by continuing to meet applicable regulations and requirements.

4.2 Precedent

Design Basis Change and LCO Change

There is no similar precedent for the design basis change and LCO change requested. The use of two MSIVs in each main steam line is very limited in the pressurized water reactor industry. No other plant has requested a reduction in the number of automatically closing MSIVs in a steam line to date. However, it should be noted that NUREG 1431, TS 3.7.2 is structured assuming a single MSIV in each steam line. Other plants with valves capable of stopping flow in either direction also have only a single MSIV in their TS. Additionally, SRP 10.3 acceptance criteria makes allowance for a design with only one MSIV in a steam line.

Actuators

The plants listed below have added MSIV actuators to their TS. They have used the same Conditions, Required Actions and Completion Times. The proposed actuator portion of the VEGP TS conforms to these precedents.

1. Letter from Union Electric Company to NRC, dated May 26, 2005, Revision to Technical Specification (TS) 3.7.2, “Main Steam Isolation Valves (MSIVs),” to Add Conditions for Inoperable MSIV Actuator Trains (ML051590442)

2. Letter from NRC to Union Electric Company, dated June 16, 2006, Issuance of Amendment Re: Main Steam Isolation Valve Actuator Trains (ML060810169).

3. Letter from Wolf Creek Nuclear Operating Corporation to NRC, dated August 25, 2006, Revision to Technical Specification (TS) 3.7.2, “Main Steam Isolation Valves (MSIVs),” and TS 3.7.3, “Main Feedwater Isolation Valves (MFIVs)” (ML062430528)

4. Letter from NRC to Wolf Creek Nuclear Operating Corporation, dated November 7, 2006, Issuance of Amendment Re: Addition of Actuator Trains to Main Steam and Feedwater Isolation Valves Technical Specifications (ML062610085).

5. Letter from Exelon Generation Company to NRC, dated August 21, 2013, License Amendment Request to Revise Technical Specification Section 3.7.2, “Main Steam Isolation Valves (MSIVs) (ML13235A095)

6. Letter from NRC to Exelon Generation Company, dated January 30, 2015, Issuance of Amendments Regarding Main Steam Isolation Valve Technical Specifications (ML15007A555)

7. Letter from Indiana Michigan Power to NRC, dated March 24, 2017, License Amendment Request to Revise Technical Specification Section 3.7.2, “Steam Generator Stop Valves (SGSVs)” (ML17087A012)

8. Letter from NRC to Indiana Michigan Power, dated December 19, 2017, Issuance of Amendments Re: License Amendment Request to Revise Technical Specification 3.7.2, "Steam Generator Stop Valves" (ML17312B030)

Bypass valves

Callaway and Wolf Creek have added bypass valves to their MSIV TS as contained in the precedents below. However, these requests included additional changes that VEGP is not requesting. But the bypass valve portion of these precedents is similar to the proposed Condition added to the VEGP TS.

1. Letter from Union Electric Company to NRC, dated May 4, 2009, Revision of Technical Specification 3.3.2 and 3.7.2 and Addition of New Technical Specification 3.7.19 (ML091310167)

2. Letter from NRC to Union Electric Company, dated May 28, 2010, Issuance of Amendment Re: Revise Technical Specification (TS) 3.7.2, Main Steam Isolation Valves (MSIVs), and TS 3.3.2, ESFAS Instrumentation, and Add New TS 3.7.19, Secondary System Isolation Valves (SSIVs) (ML101121025)

3. Letter from Wolf Creek Nuclear Operation Corporation to NRC, dated August 14, 2008, Revision to Technical Specification (TS) 3.3.2, "Engineered Safety Features Actuation System (ESFAS) Instrumentation," TS 3.7.2, "Main Steam Isolation Valves (MSIVs)," and Addition of New TS 3.7.19, "Secondary System Isolation Valves (SSIVs)" (ML082350068)

4. Letter from NRC to Wolf Creek Nuclear Operating Corporation, dated July 31, 2009, Issuance of Amendment Re: Revise Technical Specification 3.3.2, ESFAS Instrumentation, and 3.7.2, MSIVs and Addition of TS 3.7.19, Secondary System Isolation Valve (ML091540083)

4.3 No Significant Hazard Consideration Determination Analysis

Southern Nuclear Operating Company (SNC) has evaluated the proposed changes to the Technical Specifications (TS) using the criteria in 10 CFR 50.92 and has determined that the proposed changes do not involve a significant hazards consideration.

The proposed amendment revises Technical Specification (TS) 3.7.2, "Main Steam Isolation Valves (MSIVs)". The TS Limiting Condition for Operation (LCO) currently requires two MSIV systems per main steam line be Operable in Mode 1, and Modes 2 and 3 with exceptions. SNC proposes to change TS 3.7.2, LCO, to require four MSIVs and their associated actuators and associated bypass valves be Operable in the same Modes. Conditions and Required Actions are proposed to be changed and added to incorporate the change in LCO scope. The existing Surveillance Requirement (SR) is updated, and a new SR is added to reflect the change in the LCO requirements.

As required by 10 CFR 50.91(a), the SNC analysis of the issue of no significant hazards consideration is presented below:

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

Response: No

The function of the MSIVs (including the actuators and bypass valves) is to limit blowdown to one steam generator in the event of a steam line break. The probability of occurrence of a steam line break is not affected by the number of MSIVs in a steam line, the MSIV actuators or the MSIV bypass valves. The MSIVs (including the actuators and bypass valves) also provide controls for reducing accidental releases following a steam generator tube rupture (SGTR). The probability of occurrence of a SGTR is not affected by the number of MSIVs in a steam line, the MSIV actuators or the MSIV bypass valves. Therefore, the probability of an accident previously evaluated has not increased due to the proposed changes.

The consequences of an accident previously evaluated have changed due to the change in the number of MSIVs in a steam line being reduced from two automatic MSIVs to one automatic MSIV. A single failure of an MSIV to close following an accident now allows one steam generator to blowdown during the accident. This can affect the cooldown of the primary system, radiological releases and containment pressure and temperature. The effects of a blowdown of one steam generator have been reviewed for the existing accidents assuming all main steam shutoff valves downstream of the MSIVs are functional and perform their function as required. These effects were compared to the analyses of record and were found to be acceptable. The containment temperature and pressure increased slightly, but remain well within design limits, and these changes were used to evaluate any impact on plant equipment. No impact was found. Therefore, no significant increase in the consequences of an accident previously evaluated exist.

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

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

Response: No

The change in the number of MSIVs in a steam line being reduced from two automatic MSIVs to one automatic MSIV does not introduce a new or different type of accident. The MSIV valves are not changed, both valves remain in each steam line. However, one of the MSIVs will no longer receive an automatic closure signal. Both actuation signal trains will be relocated to a single MSIV in a steam line. That MSIV will have a new dual train actuator installed, so it will close the MSIV using closure signals from either safety train. These physical and operational changes ensure that the MSIVs will continue to perform their required safety function. These changes do not impact the types of accidents that could occur.

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 change involve a significant reduction in a margin of safety?

Response: No

The proposed changes to incorporate the new design of the main steam isolation system (reduction in number of automatic MSIVs and change in actuator design on the active MSIV) do not alter the manner in which safety limits or limiting safety system settings are determined. No

changes to instrument/system actuation setpoints are involved. The safety analysis acceptance criteria are not affected by this change and the proposed changes will not permit plant operation in a configuration outside the design basis. Radiological consequences of accidents previously evaluated have been reviewed and determined that there is no significant increase in radiological dose due to these changes.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

4.4 Conclusion

In conclusion, based on the considerations discussed above, SNC concludes: (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 the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

The proposed change would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR Part 20, and would change an inspection or surveillance requirement. However, the proposed change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed change.

6.0 REFERENCES

1. NUREG-1137, Safety Evaluation Report Related to the Operation of Vogtle Electric Generating Plant Units 1 and 2, June 1985 (ADAMS 8507030707)

2. NUREG 1431, Standard Technical Specifications – Westinghouse Plants, Revision 4, April 2012 (ML12100A222)

3. Standard Review Plan, Revision 4, Section 10.3, Main Steam Supply System, March 2007 (ML070380206)

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License Amendment Request: Revise Technical Specification 3.7.2 Limiting Condition for Operation to Remove One Main Steam Isolation Valve System

Attachment 1

Proposed Technical Specification Changes (Marked-up Pages)

3.7 PLANT SYSTEMS

3.7.2 Main Steam Isolation Valves (MSIVs)

LCO 3.7.2 Four~~Two~~ MSIVs and their associated actuator trains and associated bypass valves ~~systems per steam line~~ shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 except when one MSIV and one bypass valve ~~system~~ in each steam line ~~is~~are closed.

ACTIONS

~~NOTE~~
~~Separate Condition entry is allowed for each steam line.~~

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One MSIV with one actuator train inoperable	A.1 Restore MSIV actuator train to OPERABLE status.	7 days
B. Two MSIV actuator trains inoperable on different MSIVs and on different trains.	B.1 Restore one MSIV actuator train to OPERABLE status.	72 hours
C. Two MSIV actuator trains inoperable on different MSIVs on the same train.	C.1 Restore one MSIV actuator train to OPERABLE status.	24 hours
D. Two MSIV actuator trains inoperable on the same MSIV.	D.1 Declare the affected MSIV inoperable.	Immediately
E. Three or more MSIV actuator trains inoperable. OR Required Action and associated Completion	E.1 Declare each affected MSIV inoperable.	Immediately

CONDITION	REQUIRED ACTION	COMPLETION TIME
Time of Condition A, B, or C not met.		
FA. One ~~or more steam line with one~~ MSIV ~~system~~ inoperable in MODE 1.	FA.1 Restore MSIV to OPERABLE status.	8~~72~~ hours ~~OR~~ ~~In accordance with the Risk Informed Completion Time Program~~
~~B. ---------NOTES-------- 1. Not applicable when the second MSIV in one steam line is intentionally made inoperable. 2. The following Section 5.5.22 constraints are applicable: parts b, c.2, c.3, d, e, f, g, and h. --- One or more steam lines with two MSIV systems inoperable in MODE 1.~~	~~B.1 Restore one MSIV system to OPERABLE status in affected steam line.~~	~~4 hours~~ ~~OR~~ ~~In accordance with the Risk Informed Completion Time Program~~

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G~~C~~. Required Action and associated Completion Time of Condition F ~~A or B~~ not met.	G~~C~~.1	Be in MODE 2.	6 hours
~~D. One or more steam lines with one MSIV system inoperable in MODE 2 or 3.~~	~~D.1~~	~~Verify one MSIV system closed in affected steam line.~~	~~7 days~~ ~~AND~~ ~~Once per 7 days thereafter.~~
H. ----------NOTE---------- Separate Condition entry is allowed for each bypass valve. --- One or more bypass valves inoperable.	H.1 AND H.2	Close or isolate the bypass valve. Verify the bypass valve is closed or isolated.	7 days Once per 7 days thereafter
I~~E~~. ----------NOTE---------- Separate Condition entry is allowed for each MSIV. --- One or more ~~steam lines with two~~ MSIVs ~~systems~~ inoperable in MODE 2 or 3.	I.1 AND I~~E~~.2~~1~~	Close or isolate MSIV. Verify ~~one~~ MSIV ~~system~~ closed or isolated ~~in affected steam line~~.	8~~4~~ hours AND Once per 7 days thereafter
J~~F~~. Required Action and associated Completion Time of Condition H~~D~~ or I~~E~~ not met.	J~~F~~.1 AND J~~F~~.2	Be in MODE 3. Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	----------NOTE---------- Only required to be performed in MODES 1 and 2. ---------- Verify closure time of each MSIV and bypass valve ~~system~~ is within limits on an actual or simulated actuation signal.	In accordance with the INSERVICE TESTING PROGRAM
SR 3.7.2.2	----------NOTE---------- Only required to be performed in MODES 1 and 2. ---------- Verify each actuator train actuates the MSIV to the isolation position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

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License Amendment Request: Revise Technical Specification 3.7.2 Limiting Condition for Operation to Remove One Main Steam Isolation Valve System

Attachment 2

Revised Technical Specification Pages

3.7 PLANT SYSTEMS

3.7.2 Main Steam Isolation Valves (MSIVs)

LCO 3.7.2 Four MSIVs and their associated actuator trains and associated bypass valves shall be OPERABLE.

APPLICABILITY: MODE 1,
MODES 2 and 3 except when one MSIV and one bypass valve in each steam line are closed.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One MSIV with one actuator train inoperable	A.1 Restore MSIV actuator train to OPERABLE status.	7 days
B. Two MSIV actuator trains inoperable on different MSIVs and on different trains.	B.1 Restore one MSIV actuator train to OPERABLE status.	72 hours
C. Two MSIV actuator trains inoperable on different MSIVs on the same train.	C.1 Restore one MSIV actuator train to OPERABLE status.	24 hours
D. Two MSIV actuator trains inoperable on the same MSIV.	D.1 Declare the affected MSIV inoperable.	Immediately
E. Three or more MSIV actuator trains inoperable. OR Required Action and associated Completion Time of Condition A, B, or C not met.	E.1 Declare each affected MSIV inoperable.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One MSIV inoperable in MODE 1.	F.1 Restore MSIV to OPERABLE status.	8 hours
G. Required Action and associated Completion Time of Condition F not met.	G.1 Be in MODE 2.	6 hours
H. ----------NOTE---------- Separate Condition entry is allowed for each bypass valve. ---------- One or more bypass valves inoperable.	H.1 Close or isolate the bypass valve. AND H.2 Verify the bypass valve is closed or isolated.	7 days Once per 7 days thereafter
I. ----------NOTE---------- Separate Condition entry is allowed for each MSIV. ---------- One or more MSIVs inoperable in MODE 2 or 3.	I.1 Close or isolate MSIV. AND I.2 Verify MSIV is closed or isolated.	8 hours AND Once per 7 days thereafter
J. Required Action and associated Completion Time of Condition H or I not met.	J.1 Be in MODE 3. AND J.2 Be in MODE 4.	6 hours 12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	----------NOTE---------- Only required to be performed in MODES 1 and 2. ----------	
	Verify closure time of each MSIV and bypass valve is within limits on an actual or simulated actuation signal.	In accordance with the INSERVICE TESTING PROGRAM
SR 3.7.2.2	----------NOTE---------- Only required to be performed in MODES 1 and 2. ----------	
	Verify each actuator train actuates the MSIV to the isolation position on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

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License Amendment Request: Revise Technical Specification 3.7.2 Limiting Condition for Operation to Remove One Main Steam Isolation Valve System

Attachment 3

Proposed Technical Specification Bases Changes (Mark-Up) for Information Only

BASES

BACKGROUND

The MSIVs ~~systems~~ isolate steam flow from the secondary side of the steam generators following a high energy line break (HELB). MSIV ~~system~~ closure terminates flow from the unaffected (intact) steam generators.

~~The MSIV system consists of an MSIV and associated bypass valve. Two~~One MSIV ~~systems are~~is located ~~in series~~ in each main steam line outside, but close to, containment. The MSIVs ~~systems~~ are downstream from the main steam safety valves (MSSVs) and auxiliary feedwater (AFW) pump turbine steam supply, to prevent MSSV and AFW isolation from the steam generators by MSIV ~~system~~ closure. Closing the MSIVs ~~systems~~ isolate~~s~~ each steam generator from the others, and isolates the turbine, Steam Dump System, and other auxiliary steam supplies from the steam generators.

The MSIV is a gate valve with dual-redundant system media actuator trains. Either actuator train can independently perform the safety function to fast close the MSIV on demand. For each MSIV, one actuator train is associated with the A train, and one actuator train is associated with the B train.

An actuator train is composed solely of components at the MSIV location. The actuator train does not include any portion of the analog channels or protection system actuation logic and actuation relays that provide inputs to the valve actuator trains. LCO 3.3.2, "Engineered Safety Features Actuation System (ESFAS) Instrumentation" provides separate Conditions, Required Actions, and Surveillance Requirements for the analog channels and protection system logic and relays.

The MSIVs ~~systems~~ close on a main steam isolation signal which can be generated by low steam line pressure, steam line pressure negative rate high, or high containment pressure. The MSIVs fail closed on loss of control or actuation power. The MSIVs may also be actuated manually via the handswitch in the control room.

Each MSIV has ~~an~~two MSIV bypass isolation valves. The bypass valves are normally open and receive the same emergency closure signal as do their associated MSIVs. The bypass valves are normally left open to minimize condensation buildup in the bypass lines. The bypass valves may be manually closed via the handswitch. ~~An OPERABLE MSIV system may consist of an OPERABLE MSIV and an inoperable associated bypass valve provided the inoperable bypass valve is maintained closed~~

A description of the MSIVs is found in the FSAR, Section 10.3 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The design basis of the MSIVs is established by the containment analysis for the large steam line break (SLB) inside containment, discussed in FSAR, Section 6.2 (Ref. 2). It is also established by the analysis of the SLB core response events presented in FSAR Subsections 15.1.5 (Ref. 3) and 15.4.9 (Ref. 4) and by the analysis of the feedline break event presented in FSAR Subsection 15.2.8 (Ref. 5). The design basis of the MSIVs serves only a safety function which is to preclude the blowdown of more than one steam generator, assuming a single active component failure (e.g., the failure of one MSIV to close on demand), for any of the postulated events listed above. Closure of the MSIVs isolates the break (either SLB or feedline) from the unaffected steam generators. The MSIVs normally remain open during power operation.

~~Because of the redundant design, i.e., two MSIVs per steam line, multiple failures would have to occur in order for more than one steam generator to blow down during an SLB or feedline break event. Thus, the single failure of an MSIV will not result in a more limiting transient for any of the SLB or feedline break events.~~ The closure of the MSIVs occurs on either a low steam line pressure signal, a steam line pressure negative rate - high signal, a high - high containment pressure signal, or manually, isolating the break from the unaffected steam generators.

The MSIVs operate under the following situations:

a. For any SLB inside containment, steam is discharged into containment from all steam generators until the MSIVs close. In order to maximize the mass and energy release into containment, the analysis assumes that the MSIV in the affected steam generator remains open. For this accident scenario, steam is discharged into containment from all steam generators until the remaining MSIVs close. After MSIV closure, steam is discharged into containment only from the affected steam generator and from the residual steam in the main steam header downstream of the closed MSIVs in the unaffected loops. Closure of the MSIVs isolates the break from the unaffected steam generators. ~~After MSIV closure, steam is discharged into containment from only the affected steam generator. Closure of the MSIVs isolates the break from the unaffected steam generators.~~ This is also true for the feedline break event in

which feedwater from the faulted steam generator is discharged to containment.

b. An SLB outside containment and upstream from the MSIVs is not a containment pressurization concern. It is a concern with respect to offsite dose, although a break in this short section of piping has a very low probability. A break upstream of the MSIV is limiting with respect to the core response. The uncontrolled blowdown of more than one steam generator must be prevented to limit the potential for uncontrolled RCS cooldown and positivity reactivity addition. Closure of the MSIVs isolate the break and limits the blowdown to a single steam generator. SLBs from full power and zero power conditions are analyzed to demonstrate that the applicable acceptance criteria are satisfied. A break in this location is also limiting with respect to the steam releases used in meeting equipment qualification criteria. The failure of an MSIV has no effect on the results of these events.

c. A break downstream of the MSIVs will be isolated by the closure of the MSIVs. This is not a limiting scenario with respect to doses or with respect to the core response analyses.

d. For a steam generator tube rupture, closure of the MSIVs in the faulted loop isolates the ruptured steam generator from the intact steam generators to minimize radiological releases.

The MSIVs satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

This LCO requires that four ~~two~~ MSIVs ~~systems~~ and their associated actuator trains and associated bypass valves ~~in each steam line~~ be OPERABLE. The MSIVs ~~systems~~ are considered OPERABLE when the isolation times are within limits, and they close on an isolation actuation signal. ~~An OPERABLE MSIV system may consist of an OPERABLE MSIV and inoperable associated bypass valve provided the inoperable bypass valve is maintained closed.~~

This LCO provides assurance that the MSIVs ~~systems~~ will perform their design safety function to mitigate the consequences of accidents that could result in offsite exposures comparable to the 10 CFR 100 (Ref. 6) limits or the NRC staff approved licensing basis.

APPLICABILITY

The MSIVs ~~systems~~, their associated actuator trains and associated bypass valves must be OPERABLE in MODE 1. ~~, and i~~In MODES 2 and 3, the MSIVs, their associated actuator trains and their associated bypass valves must be OPERABLE except when one MSIV and one

bypass valve ~~system~~ in each steam line is closed, as~~when~~ there is significant mass and energy in the RCS and steam generators. When the MSIVs ~~systems~~ are closed, they are already performing the safety function.

In MODE 4, normally most of the MSIVs ~~systems~~ are closed, and the steam generator energy is low.

In MODE 5 or 6, the steam generators do not contain much energy because their temperature is below the boiling point of water; therefore, the MSIVs are not required for isolation of potential high energy secondary system pipe breaks in these MODES.

ACTIONS

~~NOTE~~

~~A Note has been added to the ACTIONS to clarify the application of the Completion Time rules. The Conditions of this Specification may be entered independently for each steam line. The Completion Time(s) of the inoperable MSIV systems will be tracked separately for each steam line starting from the time the Condition was entered for that steam line.~~

A.1

With only a single actuator train inoperable on one MSIV, action must be taken to restore the inoperable actuator train to OPERABLE status within 7 days. The 7-day Completion Time is reasonable in light of the dual-redundant actuator train design such that with one actuator train inoperable, the affected MSIV is still capable of closing on demand via the remaining operable actuator train. The 7-day Completion Time takes into account the design redundancy, reasonable time for repairs, and the low probability of a design basis accident occurring during this period.

B.1

With an actuator train on one MSIV inoperable and an actuator train on another MSIV inoperable, such that the inoperable actuator trains are not in the same ESFAS train, action must be taken to restore one of the inoperable actuator trains to OPERABLE status within 72 hours. With two actuator trains inoperable on two MSIVs, there is an increased likelihood that an additional failure (such as the failure of an actuation logic train) could cause one MSIV to fail to close. The 72-hour Completion Time is reasonable, however, since the dual-redundant actuator train design ensures that with only one actuator train on each of two affected MSIVs inoperable, each MSIV is still capable of closing on demand.

C.1

With an actuator train on one MSIV inoperable and an actuator train on another MSIV inoperable, but with both inoperable actuator trains in the same ESFAS train, action must be taken to restore one of the inoperable actuator trains to OPERABLE status within 24 hours. A reasonable amount of time for restoring at least one actuator train is

permitted since the dual-redundant actuator train design for each MSIV ensures that a single inoperable actuator train cannot prevent the affected MSIV(s) from closing on demand.

With two actuator trains inoperable in the same ESFAS train, however, an additional failure (such as the failure of an actuation logic train in the other ESFAS train) could cause both affected MSIVs to fail to close on demand. The 24-hour Completion Time takes into account the low probability of occurrence of an event that would require MSIV closure during such an interval.

D.1
With both (two) actuator trains for a single MSIV inoperable, the affected MSIV must immediately be declared inoperable. This is appropriate since such a condition renders the affected MSIV incapable of closing on demand.

E.1
With three or more MSIV actuator trains inoperable, or with the Required Action and associated Completion Time of Condition A, B, or C not met, the affected MSIVs must immediately be declared inoperable. Having three actuator trains inoperable could involve two inoperable actuator trains on one MSIV and one inoperable actuator train on another MSIV, or an inoperable actuator train on each of three MSIVs, for which the inoperable actuator trains could all be in the same ESFAS train or be staggered among the two ESFAS trains.

Depending on which of these conditions or combinations is in effect, the condition or combination could mean that all of the affected MSIVs remain capable of closing on demand (due to the dual-redundant actuator train design), or that at least one MSIV is inoperable, or that with an additional single failure up to all three MSIVs could be incapable of closing on demand. Therefore, in some cases, immediately declaring the affected MSIVs inoperable is conservative (when some or all of the affected MSIVs may still be capable of closing on demand even with a single additional failure), while in other cases it is appropriate (when at least one of the MSIVs would be inoperable, or up to all three could be rendered inoperable by an additional single failure). Since Condition E addresses all of these conditions or combinations, Required Action E.1 is conservatively based on the worst-case condition and therefore requires immediately declaring all of the affected MSIVs inoperable. It may be noted that declaring two or more MSIVs inoperable during Mode 1 requires entry into Specification 3.0.3.

~~A~~F.1

With one MSIV ~~system~~ inoperable ~~in one or more steam lines~~ in MODE 1, action must be taken to restore the MSIV ~~system~~ to OPERABLE status within ~~72~~8 hours. Some repairs to the MSIV can be made with the unit at power. The ~~72~~8 hour Completion Time is reasonable, considering the low probability of an accident occurring

during this time period that would require a closure of the MSIVs. ~~and the remaining OPERABLE MSIV system in the steam line~~. ~~This Completion Time is consistent with other ESF systems that contain redundant trains of equipment. Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program (Ref. 8).~~

~~B.1~~

~~With two MSIV systems inoperable in one or more steam lines in MODE 1, action must be taken to restore one MSIV system to OPERABLE status in the affected steam line(s) within 4 hours. In this condition, the affected steam line has no OPERABLE automatic isolation capability. The 4 hour Completion Time allows for minor repair or trouble shooting that may prevent a unit shutdown to MODE 2 and is reasonable considering the low probability of an accident occurring during this time period that would require a closure of the MSIV systems and the reduction in potential for a plant transient (shutdown to MODE 2) provided by the 4 hours allowed for repairs. Alternatively, a Completion Time can be determined in accordance with the Risk Informed Completion Time Program (Ref. 8).~~

~~The CONDITION is modified by two Notes. The first Note states it is not applicable when the second MSIV in one steam line is intentionally made inoperable. This Required Action is not intended for voluntary removal of redundant systems or components from service. The Required Action is only intended if the second MSIV in one steam line is found inoperable with one MSIV already inoperable, or if both MSIVs in one steam line are found inoperable at the same time. The second Note indicates the parts of Section 5.5.22, "Risk Informed Completion Time Program", which are applicable to this LCO Condition. The Risk Informed Completion Time for this LCO Condition can be no longer than 24 hours (Ref 8).~~

~~C~~G.1

If the MSIV ~~system~~ cannot be restored to OPERABLE status within the stated Completion Time, the unit must be placed in ~~a~~ ~~MODE in which the ACTIONS provide the option to close the inoperable MSIV system and thus accomplish the system's safety function. To achieve this status, the unit must be placed in~~ MODE 2 within 6 hours and Condition ~~D or E~~ entered. The Completion Time is reasonable, based on operating experience, to reach MODE 2 in an orderly manner without challenging unit systems.

~~D.1~~

~~Required Action D.1 applies when one or more steam lines have a single inoperable MSIV system in MODE 2 or 3.~~

~~Since the MSIV systems are required to be OPERABLE in MODES 2 and 3, the inoperable MSIV system may either be restored to~~

~~OPERABLE status or the affected steam line isolated by closing one MSIV system in that line. When closed, the MSIVs are already in the position required by the assumptions in the safety analysis.~~

~~The 7 day Completion Time is reasonable considering the remaining OPERABLE redundant MSIV system in each affected steam line.~~

~~For inoperable MSIV systems that cannot be restored to OPERABLE status within the specified Completion Time, and the steam line is isolated by a closed MSIV system, the MSIV systems must be verified on a periodic basis to be closed. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7 day Completion Time is reasonable, based on engineering judgment, in view of MSIV system status indications available in the control room, and other administrative controls, to ensure that these valves are in the closed position.~~

H.1 and H.2

Condition H is modified by a Note indicating that separate Condition entry is allowed for each bypass valve.

With one or more bypass valves inoperable, action must be taken to restore each bypass valve to OPERABLE status within 7 days or the inoperable bypass valve must be closed or isolated. When closed or isolated, the bypass line is already in the condition required by the assumptions in the safety analysis. The bypass valve can be isolated by closing the redundant bypass valve in the same main steam line or closing valves in the bypass line downstream of the bypass valves. This ensures the bypass line flow is isolated supporting the assumptions in the safety analysis. The 7-day Completion Time is reasonable, considering the low probability of an accident occurring during this time period that would require a closure of the bypass valves. For inoperable bypass valves that cannot be restored to OPERABLE status within 7 days, but are closed or isolated, the inoperable bypass valve must be verified on a periodic basis to be closed or isolated. This is necessary to ensure that the assumptions in the safety analysis remain valid. The 7-day Completion Time is reasonable, based on engineering judgment, in view of the valves' status indications available in the control room, and other administrative controls to ensure that these valves are in the closed position or isolated.

I~~E~~.1 and I.2

Condition I is modified by a Note indicating that separate Condition entry is allowed for each MSIV.

Since the MSIVs are required to be OPERABLE in MODES 2 and 3, the inoperable MSIVs may either be restored to OPERABLE status or closed or isolated. When closed or isolated, the main steam lines are already in the condition required by the assumptions in the safety analysis. The MSIV can be isolated by closing the outboard valve in

the same main steam line. This ensures the main steam line flow is isolated supporting the assumptions in the safety analysis.

The 8 hour Completion Time is consistent with that allowed in Condition F.

~~With two MSIV systems inoperable in one or more steam lines in MODES 2 or 3, action must be taken to restore one MSIV system to OPERABLE status or verify one MSIV system closed in the affected steam line(s) within 4 hours. In this condition, the affected steam line has no OPERABLE automatic isolation capability. Verifying one MSIV system closed ensures the safety function is accomplished for that steam line. The 4 hour Completion Time is reasonable considering the low probability of an accident occurring during this time period that would require a closure of the MSIV systems.~~

For inoperable MSIVs ~~systems~~ that cannot be restored to OPERABLE status within the specified Completion Time, but ~~and~~ are closed or isolated, the inoperable MSIVs ~~system~~ must be verified closed or isolated on a periodic basis. Verification of the MSIVs ~~system~~ closure or isolation on a periodic basis is necessary to ensure that the assumptions in the safety analysis remain valid. The 7-~~-~~day Completion Time is reasonable, based on engineering judgment, in view of MSIV ~~system~~ indications available in the control room, and other administrative controls, to ensure that these valves are in the closed position or isolated.

~~F~~J.1 and ~~F~~J.2

If the MSIVs ~~systems~~ or bypass valves cannot be restored to OPERABLE status or are not closed within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed at least in MODE 3 within 6 hours, and in MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from MODE 2 conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1

This SR verifies that the closure time of each MSIV and bypass valve ~~system~~ is within the limit given in Reference 9 on an actual or simulated actuation signal and is within that assumed in the accident and containment analyses. This SR also verifies the valve closure time is in accordance with the INSERVICE TESTING PROGRAM. This SR is normally performed upon returning the unit to operation following a refueling outage.

The Frequency is in accordance with the INSERVICE TESTING PROGRAM. Operating experience has shown that these components usually pass the Surveillance when performed in accordance with the

INSERVICE TESTING PROGRAM. Therefore, the Frequency is acceptable from a reliability standpoint.

This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. If desired, this allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.

SR 3.7.2.2

This SR verifies that each actuator train can close its respective MSIV on an actual or simulated actuation signal. This Surveillance is normally performed upon returning the plant to operation following a refueling outage. The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

This SR is modified by a Note that allows entry into and operation in MODE 3 prior to performing the SR. If desired, this allows a delay of testing until MODE 3, to establish conditions consistent with those under which the acceptance criterion was generated.

REFERENCES

1. FSAR, Section 10.3.
2. FSAR, Section 6.2.
3. FSAR, Subsection 15.1.5.
4. FSAR, Subsection 15.4.9.
5. FSAR, Subsection 15.2.8.
6. 10 CFR 100.11.
7. ASME Code for Operation and Maintenance of Nuclear Power Plants (OM Code).
8. Deleted ~~Vogtle Electric Generating Plant, Units 1 and 2 - Issuance of Amendments Regarding Implementation of Topical Report Nuclear Energy Institute NEI 06-09, "Risk-Informed Technical Specifications Initiative 4B, Risk-Managed Technical Specifications (RMTS) Guidelines," Revision 0-A (CAC Nos. ME9555 and ME9556)~~.
9. TRM, Section 13.7.6.