1717 Wakonade Drive
Welch, MN 55089

800.895.4999
xcelenergy.com

February 16, 2017

L-PI-17-002
10 CFR 50.90

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

Prairie Island Nuclear Generating Plant, Units 1 and 2
Docket Nos. 50-282 and 50-306
Renewed Facility Operating License Nos. DPR-42 and DPR-60

Response to Request for Additional Information Regarding License Amendment Request to Revise Technical Specification 3.8.7 to Remove Non-Conservative Required Action (CAC Nos. MF8319 and MF8320)

References:

1) Letter from NSPM to NRC, "License Amendment Request to Revise Technical Specification 3.8.7 to Remove Non-Conservative Required Action," dated August 31, 2016, (ADAMS Accession No. ML16244A493).

2) Email from NRC to NSPM, "Request for Additional Information: Prairie Island License Amendment Request to Revise Technical Specification 3.8.7 to Remove Non-Conservative Required Action (CAC Nos. MF83219 and MF8320)," dated January 18, 2017, (ADAMS Accession No. ML17018A427).

Pursuant to 10 CFR 50.90, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), requested in Reference 1 an amendment to the Technical Specifications (TS) for the Prairie Island Nuclear Generating Plant to remove a non-conservative Required Action from TS 3.8.7. By email dated December 20, 2016, the NRC provided a draft Request for Additional Information (RAI) regarding NSPM's application in Reference 1. On January 18, 2017, members of the NRC staff conducted a conference call with NSPM in order to provide clarification on the draft RAIs. Subsequently, the NRC provided the final RAIs in Reference 2. The Enclosure to this letter provides NSPM's response to the NRC RAIs.

The supplemental information provided herein does not change the conclusions of the No Significant Hazards Consideration and the Environmental Consideration evaluations provided in Reference 1.

If there are any questions or if additional information is required, please contact Mr. Shane Jurek at (612) 330-5788.

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.

I declare, under penalty of perjury, that the foregoing is true and correct.
Executed on February 16, 2017.

Scott Northard
Site Vice President, Prairie Island Nuclear Generating Plant
Northern States Power Company – Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Project Manager, Prairie Island, USNRC
Resident Inspector, Prairie Island, USNRC
State of Minnesota

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION:

LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATION 3.8.7 TO REMOVE NON-CONSERVATIVE REQUIRED ACTION

On August 31, 2016, Northern States Power Company, a Minnesota corporation, doing business as Xcel Energy (hereafter "NSPM"), submitted a license amendment request (LAR) proposing a change to the Technical Specifications (TS) for the Prairie Island Nuclear Generating Plant (PINGP) (Reference 1). The proposed change revises TS 3.8.7, "Inverters – Operating," by deleting existing site-specific Required Actions and associated Completion Times, thus reverting to the standard TS (STS) language contained in NUREG-1431 (Reference 2). By email dated January 18, 2017, the NRC requested the following additional information (Reference 3). The responses to this request for additional information (RAI) are provided below.

RAI 1

Section 3 of the LAR states the following:

> Each unit is also provided with a minimum interruptible bus, denoted as Panels 117 for Unit 1 and Panel 217 for Unit 2. These panels are fed from the Unit's A Train 480 Volt AC [alternating current] safeguards bus via safeguards MCC [motor control centers]. Inverter loads are transferred to these panels when the inverter fails or must be removed from service for maintenance. Panel 117 (217) can be aligned to any of the four Reactor Protection Instrument AC Panels [safety-related] in the associated unit
>
> . . .
>
> Panels 117 and 217 were downgraded from safety related to non-safety related in 2010, thereby eliminating the justification for considering the panels reliable to remain functional during a postulated DBA [Design Basis Accident].

PINGP Updated Safety Analysis Report (USAR) Section 8.6, "Instrumentation and Control AC Power Supply Systems," states "These panels [Panels 117 and 217] are fed from a 480 Volt safeguard bus via a safeguard MCC. Various important AC instrument and control loads that can tolerate an infrequent short interruption (approximately 10 seconds) are fed from these Panels. Inverter loads are transferred to these panels when the inverter fails or must be removed from service for maintenance."

PINGP USAR Section 7.10.2 "Equipment Classification Methodology," references Regulatory Guide [RG] 1.32 "Criteria for Power Systems for Nuclear Power Plants." RG 1.32, Revision (Rev.) 3 incorporates the Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 308-2001, "IEEE Standard Criteria for Class 1E Electrical Systems for Nuclear Power Generating Stations." IEEE Std. 308-2001 Section 5.2, "Alternating Current Power Systems," in part, states: "Features such as physical separation, electrical isolation, redundancy, and qualified equipment shall be included in the design to aid in preventing a mechanism by which a single design basis event could cause redundant equipment with the station's Class 1E power system to be inoperable."

PINGP USAR Section 7.1 "Summary Description," states, in part: "The reactor protection systems are designed in accordance with IEEE 279-1968. Furthermore, it is shown that the intent of the applicable criteria and codes at the time of construction, such as the GDCs [General Design Criteria] referenced in Sections 1.2 and 1.5 and IEEE 279-1971 … are reasonably met …"

Based on the above considerations, the NRC staff requests the following information.

Since Panels 117 and 217 are currently non-safety-related, are powered via safeguards MCCs, and can be aligned to safety-related Reactor Protection Instrument AC Panels and safety-related loads, please:

Question 1.a

Provide the technical basis including a summary of the failure modes and effects evaluations for having non-safety-related Panels 117 and 217 as back-up power supplies for the safety-related Reactor Protection Instrument AC Panels as opposed to safety-related back-up power sources as stated in NUREG-1431 STS Bases for TS 3.8.7 Required Action A.1.

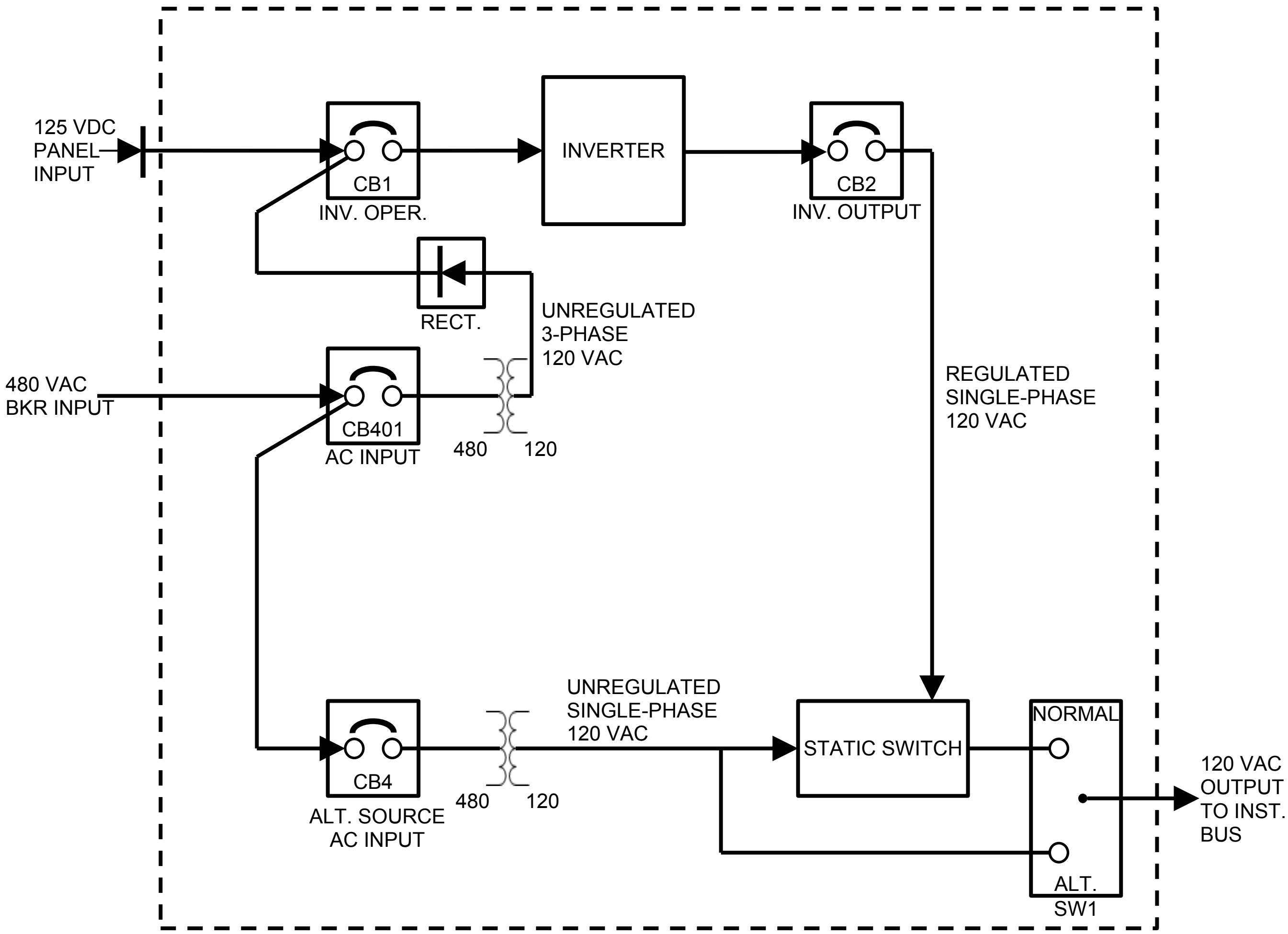
NSPM Response

The PINGP Reactor Protection Instrument AC inverters include an internal inverter bypass source, which is the safety-related backup source identified in Reference 2. Non safety-related Panels 117 and 217 are not the back-up power supplies for the safety-related Reactor Protection Instrument AC panels. For clarity, the Reactor Protection Instrument AC panels will be referred to as the "instrument buses" hereafter in NSPM's response. The manually operated supply breakers which feed the instrument buses from Panels 117 and 217 are kept open during normal operations and are interlocked with the supply breakers from the inverters so only one breaker can be closed at a time. The breakers' positions are verified weekly in accordance with TS Surveillance Requirements (SRs) 3.8.7.1 and SR 3.8.9.1 to ensure the inverters are always aligned to the instrument buses. Figure 1 below depicts the configuration of a typical PINGP inverter.

The primary flow path of power through the inverter during normal operations is shown through the upper branch in Figure 1. Power is transmitted from the upstream safeguards 480 V MCC to the inverter. The power is stepped down to 120 VAC and then rectified to Direct Current (DC) power. The rectified DC power is then compared to the 125 VDC battery power by means of blocking diodes. The higher voltage power supply is passed to the inverter. The DC power is then inverted to AC power and fed to the static switch.

The safety-related inverter bypass source is illustrated by the lower branch in Figure 1. An additional tap off of the safeguards 480 V MCC is stepped down to 120 VAC via a separate power transformer. The output from this transformer is then fed to the static switch. The normal output from the static switch is from the battery-backed inverter (i.e., the upper flow path). The safety-related backup output is from the alternate source transformer (i.e., the lower flow path). The static switch provides a virtually instantaneous transfer of power in the event that the preferred flow path becomes unavailable.

Figure 1, Schematic of Safety-Related PINGP Inverter



Any configuration other than the primary path described above would result in failing to meet TS Limiting Condition for Operation (LCO) 3.8.7 as proposed in Reference 1. This would result in NSPM taking actions to restore the inverter within 24 hours or shutting the plant down in the following 36 hours.

Question 1.b

Provide a discussion regarding how the electrical isolation, independence, and separation requirements are maintained between the non-safety-related panels 117 and 217 and the safety-related power sources and loads in accordance with IEEE Std. 308-2001 as endorsed by RG 1.32, Rev. 3, IEEE Std. 279-1968, IEEE Std. 279-1971, and the Atomic Energy Commission (AEC) General Design Criteria (GDC) criteria 12, 20, 21, 22, 24, 37, and 39 stated in PINGP UFSAR Section 1.2

NSPM Response

The electrical design requirements listed in the NRC's question are primarily associated with post-accident instrumentation and are not applicable to the Reactor Protection Instrument AC inverters.[1] The design basis of the Reactor Protection Instrument AC inverters is specified in PINGP USAR Section 7.1, which states, "The reactor protection systems are designed in accordance with IEEE 279-1968. Furthermore, it is shown that the intent of the applicable criteria and codes at the time of construction, such as the GDCs referenced in Sections 1.2 and 1.5 and IEEE 279-1971 … are reasonably met …"

IEEE Std. 279-1968, "Proposed IEEE Criteria for Nuclear Power Plant Protection Systems," Requirement 4.6, Channel Independence, states, "Channels that provide signals for the same plant protective function shall be independent and physically separated to accomplish de-coupling of the effects of unsafe environmental factors, electric transients, and physical accident consequences documented in the design basis, and to reduce the likelihood of interactions between channels during maintenance operations or in the event of channel malfunction."

Panels 117 and 217 are not normally aligned to supply power to the instrument buses. Their output breakers to each of the four instrument buses are kept open during normal operation. These breakers' positions are verified weekly in accordance with TS SRs 3.8.7.1 and 3.8.9.1 to ensure the inverters are always aligned to the instrument buses. Therefore, during normal operations, a fault on Panel 117 or 217 will not directly affect one of the instrument buses.

The required separation between the upstream safeguards MCC and Panel 117 or 217 is provided by a 100 Amp, safety-related circuit breaker on the output from the MCC to Panel 117 or 217. These circuit breakers provide the requisite de-coupling during electric transients.

Therefore, the design and operation of the PINGP instrument power system provides the necessary redundancy and separation required by IEEE 279-1968 and the applicable GDCs.

RAI 2

The LAR proposes a new Required Action and Completion time for an inoperable Reactor Protection Instrument AC inverter (TS 3.8.7 Condition A) to resolve a non-conservative TS. Section 3.2 of the LAR states:

> This non-conservatism exists based on a lack of train separation when Panel 117 [in Unit 1 Train A] (217 [in Unit 2 Train A]) is aligned to Reactor Protection Instrument AC panels 112 or 114 [in Unit 1 Train B] (212 or 214 [in Unit 2 Train B]) without a requirement to restore the inoperable inverter or to shutdown the plant. Specifically, for a worst-case single failure with Panel 117 (217) aligned to a Reactor Protection Instrument AC Panel, the required number of instrument

[1] The NRC's question references RG 1.32, Revision 3. NSPM notes that PINGP is not licensed to RG 1.32, Revision 3. Rather, PINGP is licensed to RG 1.32, Revision 2, through its licensing basis associated with RG 1.97, Revision 2, as described in PINGP USAR Section 7.10.

buses to initiate an automatic Containment Spray system start would not be energized, thus defeating the automatic start function.

The proposed TS 3.8.7 new Required Action A.1 would require restoring an inoperable Reactor Protection Instrument AC inverter to operable status within 24 hours. The affected Reactor Protection Instrument AC panel is considered inoperable until it is re-energized from either the inverter internal bypass source or the Unit 1 Panel 117 (or Unit 2 Panel 217) within 2 hours (TS 3.8.9 Condition C).

The NRC staff notes that, when the affected Reactor Protection Instrument AC panel is re-energized form Panel 117 (217), the lack of train separation issue as described in the above statement still exists. Therefore, the NRC staff requests the following information:

Question 2.a

Provide a diagram which would provide a depiction of the following statement: “for a worst-case single failure with Panel 117 (217) aligned to a Reactor Protection Instrument AC Panel, the required number of instrument buses to initiate an automatic Containment Spray system start would not be energized thus defeating the automatic start function.” For the case when one Train B Reactor Protection Instrument AC Inverter is inoperable, describe how independence/redundancy is maintained between Train A and Train B inverters and safety-related equipment while the affected Train B Reactor Protection Instrument AC panel is being powered by Train A Panel 117 (or Panel 217).

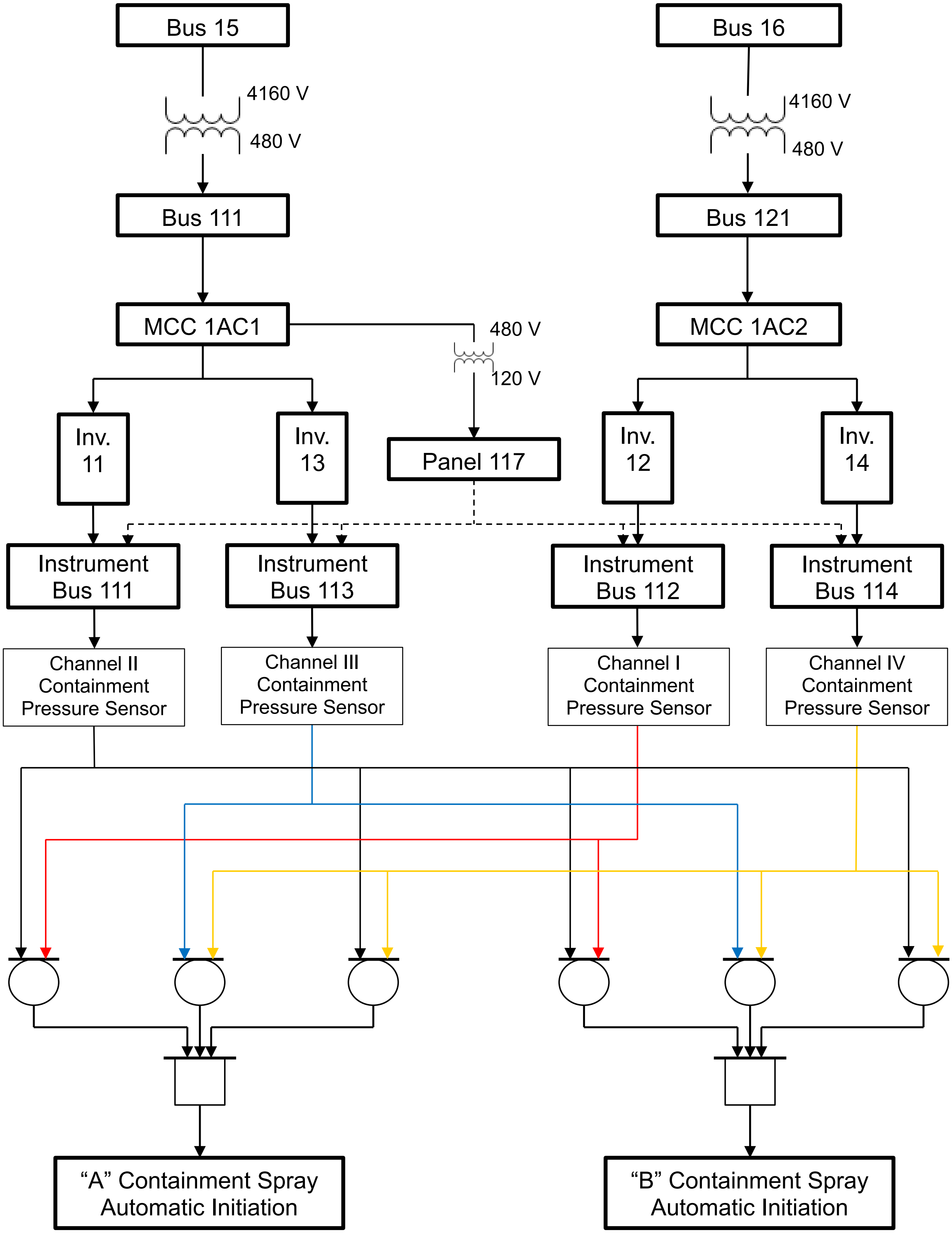
NSPM Response

The requested diagram is included as Figure 2. The containment spray system automatic start logic at PINGP is one out of two taken three times and is “energize to actuate”. This differs from the other engineered safeguard features installed in the plant in that on a loss of power to the instrument buses, a start signal will not be propagated to the containment spray system. In the event that Panel 117 is providing power to Instrument Bus 112 , the logic for Channels I, II, and III are all ultimately powered from MCC 1AC1. If a loss of MCC 1AC1 were to occur, only the Channel IV initiation logic would remain energized. Channel IV does not provide an input to three logic gates in either train of the containment spray actuation logic. Therefore, there are not enough energized Reactor Protection Instrument AC Panels to initiate an automatic containment spray system actuation.

For the case where one Train B instrument bus is being powered from Panel 117 (217) instead of its associated inverter, independence/redundancy is not preserved. This alignment and resulting lack of independence/redundancy would result in, as proposed in Reference 1, NSPM declaring LCO 3.8.7 not met and taking the necessary actions to restore the inverter to operable status within 24 hours or shut the plant down in the following 36 hours.

NSPM is further revising the TS Bases of TS 3.8.7 and TS 3.8.9, “Distribution Systems – Operating” to further clarify that Panels 117 and 217 cannot be used to meet LCOs 3.8.7 or 3.8.9. The revised TS Bases pages are provided for information only and are included as

Figure 2, Unit 1 Containment Spray Automatic Initiation Logic



Attachment 1 to this Enclosure. Attachment 1 to this Enclosure supersedes Attachment 3 to the Enclosure of Reference 1 in its entirety.

Question 2.b

Clarify whether the Reactor Protection Instrument AC panels are powered from Panel 117 (Unit 1) or Panel 217 (Unit 2) during normal, abnormal, and accident conditions other than during TS LCO conditions and maintenance activities.

NSPM Response

The instrument buses are only powered from Panel 117 (217) during TS LCO conditions and maintenance activities. During normal, abnormal, and accident conditions the instrument buses are fed from their associated inverters as described in NSPM's response to Question 1.a.

Question 2.c

PINGP USAR Figure 8.5-1A, "125 VDC & 120 VAC Instrument Supply Unit Train A," and Figure 8.5-2A, "125 VDC & 120 VAC Instrument Supply Unit 2 Train A," show that Panel 117 in Unit 1 and Panel 217 in Unit 2 also power other panels (EM 1-5, 1EMA, 2EMA, EM2-4, 1EMB, 2EMB).

Clarify whether panels EM1-5, 1EMA, 2EMA, EM2-4, 1EMB, 2EMB are safety-related or non-safety-related panels and explain how the safeguards Reactor Protection Instrument AC panels are protected from faults that impact these above-mentioned panels.

NSPM Response

Fault propagation to the instrument buses from Panels 117 and 217 is addressed by NSPM's response to Question 1.b and through entry into TS Required Actions as described in NSPM's response to Question 2.a. Fault propagation from the event monitoring and emergency lighting panels to Panels 117 and 217 is discussed below.

Panels 1EMA, 2EMA, 1EMB, and 2EMB are the safety-related event monitoring panels. Similar to the instrument buses, panels 1EMA, 2EMA, 1EMB, and 2EMB are powered from safeguards 480 V MCCs via safety-related inverters 17, 27, 18 and 28, respectively, during normal, abnormal, and accident conditions. These inverters are similar in design and function to the Reactor Protection Instrument AC inverters as described in NSPM's response to Question 1.a. The output breakers from Panels 117 and 217 to panels 1EMA, 2EMA, 1EMB, and 2EMB are kept open during normal operations and require manual action to close. These breakers' positions are verified weekly to ensure the safety-related inverters are always aligned to the safety-related event monitoring panels. Therefore, a fault on one of the event monitoring panels cannot directly affect one of the instrument buses during normal operations.

Panels EM1-5 and EM2-4 are non safety-related emergency lighting panels. These panels are always aligned to Panel 117 and 217, respectively. However, as described in NSPM's response to 1.b, a fault on Panel 117 or 217, or downstream thereof, cannot directly affect an instrument bus, nor can it affect the safeguards MCC. Therefore, a fault on non safety-related Panels EM1-5 and EM2-4 cannot directly affect the instrument buses during normal operations.

References

1. Letter from NSPM to NRC, “License Amendment Request to Revise Technical Specification 3.8.7 to Remove Non-Conservative Required Action,” dated August 31, 2016, (Agencywide Document Access and Management System (ADAMS) Accession No. ML16244A493).

2. NUREG-1431, “Standard Technical Specifications: Westinghouse Plants” Revision 4.0, Volumes 1 and 2, dated April 2012, (ADAMS Accession Nos. ML12100A222 and ML12100A228).

3. Email from NRC to NSPM, “Request for Additional Information: Prairie Island License Amendment Request to Revise Technical Specification 3.8.7 to Remove Non-Conservative Required Action (CAC Nos. MF83219 and MF8320),” dated January 18, 2017, (ADAMS Accession No. ML17018A427).

ENCLOSURE, ATTACHMENT 1

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2

Response to Request for Additional Information Regarding License Amendment Request to Revise Technical Specification 3.8.7 to Remove Non-Conservative Required Action

TECHNICAL SPECIFICATION BASES PAGES (Marked-Up)
(Provided for Information Only)

(8 pages follow)

BASES (continued)

ACTIONS

A.1 and A.2

With one required Reactor Protection Instrument AC inverter inoperable, its associated Reactor Protection Instrument AC panel becomes inoperable until it is re-energized from an operable inverter or the inverter internal bypass source.

For this reason a Note has been included in Condition A requiring entry into the Conditions and Required Actions of LCO 3.8.9, "Distribution Systems – Operating." This ensures that the Reactor Protection Instrument AC panel is re-energized within 2 hours.

Required Action A.1 allows 24 hours to restore the inoperable Reactor Protection Instrument AC inverter to OPERABLE status. The 24 hour limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the Reactor Protection Instrument AC panel is powered from its alternate source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the Reactor Protection Instrument AC panel is the preferred source for powering instrumentation trip setpoint devices.
With one Reactor Protection Instrument AC inverter inoperable, Required Action A.1 and A.2 require verification, within 2 hours, the Reactor Protection Instrument AC panel with an inoperable inverter is powered from Panel 117 (Unit 2 - 217) or verify that the Reactor Protection Instrument AC panel with an inoperable inverter is powered from its inverter bypass source.

Plant design provides acceptable alternate methods of powering a Reactor Protection Instrument AC panel with an inoperable inverter. Panel 117 (Unit 2 - Panel 217), by plant design, can provide reliable power to a Reactor Protection Instrument AC panel. Alternatively, a Reactor Protection Instrument AC panel may be powered by an inverter internal bypass. In the event an inverter becomes

BASES (continued)

~~inoperable, the inverter static transfer bypass switch will automatically bypass, thus providing power to the associated Reactor Protection Instrument AC panel and maintain OPERABILITY. Required Actions A.1 and A.2 require verification that only one Reactor Protection Instrument AC panel is powered from Panel 117 (Unit 2 - Panel 217) or an inverter bypass source. This verification must be completed within 2 hours.~~

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

~~With two Reactor Protection Instrument AC inverters inoperable, the associated Reactor Protection Instrument AC panels are considered to be inoperable unless they are energized from Panel 117 (Unit 2 - Panel 217) or they are automatically re-energized by their inverter static transfer switch.~~

~~For this reason a Note has been included in Condition B requiring the entry into the Conditions and Required Actions of LCO 3.8.9,~~

BASES

ACTIONS

B.1, B.2, and B.3 (continued)

"Distribution Systems — Operating." This ensures that the Reactor Protection Instrument AC panel is re-energized within 2 hours. Plant design provides acceptable alternate methods of powering Reactor Protection Instrument AC panels with an inoperable inverter. Panel 117 (Unit 2 - Panel 217), by plant design, can provide reliable power to a Reactor Protection Instrument AC panel. Alternatively, a Reactor Protection Instrument AC panel may be powered by an inverter internal bypass. In the event an inverter becomes inoperable, the inverter static transfer bypass switch will automatically bypass, thus providing power to the associated Reactor Protection Instrument AC panel and maintain OPERABILITY. Therefore, based on plant design, Required Actions B.1 and B.2 require verification that no more than one Reactor Protection Instrument AC inverter will be powered from Panel 117 (Unit 2 - Panel 217) and one or both Reactor Protection Instrument AC panel(s) are powered from an inverter bypass source. This verification must be completed within 2 hours.

Required Action B.3 allows 8 hours to fix the inoperable inverter and return it to service. The 8 hour limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the Reactor Protection Instrument AC panel is powered from its alternate source, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the Reactor Protection Instrument AC panel is the preferred source for powering instrumentation trip setpoint devices.

BASES

ACTIONS (continued)

CB.1 and CB.2

If the inoperable devices or components cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

This Surveillance verifies that the inverters are functioning properly with all required circuit breakers closed and Reactor Protection Instrument AC panels energized from the inverter. The verification of proper voltage output ensures that the required power is readily available for the instrumentation of the RPS and ESFAS connected to the Reactor Protection Instrument AC panels. The 7 day Frequency takes into account the redundant capability of the inverters and other indications available in the control room that alert the operator to inverter malfunctions.

REFERENCES

1. USAR, Section 8.
2. USAR, Section 14.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.9 Distribution Systems-Operating

BASES

BACKGROUND

The onsite safeguards AC and DC electrical power distribution systems are divided by train into two redundant and independent electrical power distribution subsystems. The onsite Reactor Protection Instrument AC Distribution System is divided by channels into four separate subsystems (Ref. 1).

Each AC electrical power subsystem consists of a safeguards 4 kV bus and two 480 V buses. These in turn supply power to distribution panels and motor control centers (MCCs). Each safeguards 4 kV bus has two offsite sources of power as well as a dedicated onsite diesel generator (DG) source. Each safeguards 4 kV bus is normally connected to an offsite source. After a loss of this offsite power source, a transfer to the alternate offsite source is accomplished by a load sequencer, initiated by bus undervoltage relays. If all offsite sources are unavailable, the onsite emergency DG supplies power to the safeguards 4 kV bus. Control power for the 4 kV and 480 V bus breakers is supplied from the safeguards DC distribution system. Additional description of the safeguards AC system may be found in the Bases for LCO 3.3.4, "4 kV Safeguards Bus Voltage Instrumentation," and the Bases for LCO 3.8.1, "AC Sources-Operating."

The AC electrical power distribution system for each train includes the safety related buses and MCCs shown in Table B 3.8.9-1.

The 120 V Reactor Protection Instrument AC panels are arranged in four load groups and are normally powered from inverters. An alternate power supply for the instrument panels is the inverter bypass transformer powered from the same MCC as the associated inverter. ~~Another alternate power supply is from the unit 208/120~~

BASES

BACKGROUND (continued)

VAC interruptable panel. Use of these supplies is governed by LCO 3.8.7, "Inverters-Operating."

There are two independent 125 VDC electrical power distribution subsystems (one for each train). The 125 VDC safeguards electrical power system consists of two independent and redundant safety related DC safeguards electrical power subsystems (Train A and Train B). The sources for each train are a 125 VDC battery, a battery charger, and all the associated control equipment and interconnecting cabling.

The list of the required Reactor Protection Instrument AC and safeguards DC distribution panels is presented in Table B 3.8.9-1.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the USAR (Ref. 2) assume ESF systems are OPERABLE. The safeguards AC, DC, and Reactor Protection Instrument AC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the safeguards AC, DC, and Reactor Protection Instrument AC electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining power distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power; and

b. A worst case single failure.

BASES

APPLICABLE SAFETY ANALYSES (continued)	The distribution systems satisfy Criterion 3 of 10 CRF 50.36(c)(2)(ii).

LCO

The required power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of safeguards AC, DC, and Reactor Protection Instrument AC electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. The safeguards AC, DC, and Reactor Protection Instrument AC electrical power distribution subsystems are required to be OPERABLE.

Maintaining the Train A and Train B safeguards AC and DC, and Reactor Protection Instrument AC electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor. This does not preclude redundant safeguards 4 kV buses from being powered from the same offsite path.

OPERABLE AC electrical power distribution subsystems require the associated buses and MCCs to be energized to their proper voltages. OPERABLE DC electrical power distribution subsystems require the associated panels to be energized to their proper voltage from either the associated battery or charger. OPERABLE Reactor Protection Instrument AC electrical power distribution subsystems require the associated panels to be energized to their proper voltage from the associated inverter or inverter bypass transformer.

BASES

ACTIONS

B.1 (continued)

c. The potential for an event in conjunction with a single failure of a redundant component.

The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

With one Reactor Protection Instrument AC panel inoperable, the remaining OPERABLE Reactor Protection Instrument AC panels are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum ESF functions not being supported. Therefore, the required Reactor Protection Instrument AC panel must be restored to OPERABLE status within 2 hours by powering the panel from the associated inverter ~~,~~ or inverter bypass transformer~~, or interruptible panel~~.