Dominion Energy Nuclear Connecticut, Inc.
Rt 156, Rope Ferry Road, Waterford, CT 06385
DominionEnergy.com

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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

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Docket No.	50-423
License No.	NPF-49

DOMINION NUCLEAR CONNECTICUT, INC.
MILLSTONE POWER STATION UNIT 3
PROPOSED ALTERNATIVE REQUEST P-06 FOR 'C' CHARGING PUMP TEST FREQUENCY

Pursuant to 10 CFR 50.55a(z)(2), Dominion Energy Nuclear Connecticut, Inc. (DENC) requests an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) 2012 Edition, ISTB-3400, "Frequency of Inservice Tests," for Millstone Power Station Unit 3 (MPS3) for the 'C' charging pump, 3CHS*P3C.

In accordance with OM Code Table ISTB-3400-1, Group A pumps, which include the charging pumps, are required to be tested on a quarterly frequency. Due to the electrical configuration of 3CHS*P3C, performing the quarterly inservice test on this pump results in unavailability for the high pressure safety injection system each quarter. DENC concludes that the requirement of ISTB-3400 and Table ISTB-3400-1 to perform a quarterly test on charging pump 3CHS*P3C presents a hardship without a compensating increase in the level of quality and safety. DENC proposes to perform quarterly testing of 3CHS*P3C during the time periods when the pump is required to be OPERABLE. DENC will continue to comply with all other aspects of the OM Code.

The justification for the proposed alternative and the supporting information is provided in Attachment 1. The 3CHS*P3C Preventative Maintenance Strategy is provided in Attachment 2. The mark up of changes to the Final Safety Analysis Report is provided in Attachment 3 for information only.

DENC requests expedited review of this proposed alternative request. Realignment of the charging pumps to support required quarterly testing results in pressure, temperature and flow transients on the reactor coolant pump (RCP) seals, which have been identified as contributors to RCP seal degradation. DENC recently identified a shift in the RCP seal differential temperature trend, which is a precursor to seal degradation. The RCP seals remain capable of performing their safety function. RCP seal replacement is planned at the next refueling outage. However, to minimize challenges to the RCP seals and to support continued plant operation, DENC requests expedited review of this proposed alternative by October 18, 2018. Quarterly tests for the 'C' charging pump are scheduled for July 17, 2018 and October 19, 2018.

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The duration of this proposed alternative is for the remainder of the third 10-year inservice test interval and for the fourth 10-year inservice test interval that is scheduled to begin on December 2, 2018 and end on December 1, 2028.

This alternative request has been approved by the Facility Safety Review Committee.

If you have any questions regarding this submittal, please contact Wanda Craft at (804) 273-4687.

Sincerely,

Gerald T. Bischof
Senior Vice President – Nuclear Operations& Fleet Performance

Attachments:

1. Proposed Alternative Request P-06 for 'C' Charging Pump Test Frequency.
2. 3CHS*P3C Preventative Maintenance Strategy
3. FSAR Changes (For Information Only)

Commitments made in this letter: None

cc: U.S. Nuclear Regulatory Commission
Region I
2100 Renaissance Blvd
Suite 100
King of Prussia, PA 19406-2713

Richard V. Guzman
Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North, Mail Stop 08 C 2
11555 Rockville Pike
Rockville, MD 20852-2738

NRC Senior Resident Inspector
Millstone Power Station

ATTACHMENT 1

PROPOSED ALTERNATIVE REQUEST P-06 FOR 'C' CHARGING PUMP TEST FREQUENCY

MILLSTONE POWER STATION UNIT 3
DOMINION ENERGY NUCLEAR CONNECTICUT, INC.

Pump Alternative Request Number P-06
Millstone Power Station Unit 3

'C' Charging System Pump Test Frequency

Proposed Alternative Request
In accordance with 10 CFR 50.55a(z)(2)

Hardship or Unusual Difficulty without a Compensating Increase in Quality or Safety

1) ASME Code Component(s) Affected

Pump: 3CHS*P3C
System: Chemical Volume Control Charging
Group: A
Class: 2

2) Applicable Code Edition

ASME OM Code 2001 Edition through 2003 Addenda (Third Interval)
ASME OM Code 2012 Edition (Fourth Interval)

3) Applicable Code Requirement(s)

ISTB-3400, "Frequency of Inservice Tests," requires that a Group A test be performed quarterly for 3CHS*P3C per Table ISTB-3400-1.

4) Reason for Request

The Millstone Power Station Unit 3 (MPS3) charging pumps (3CHS*P3A/B/C) are classified as Group A pumps per ASME OM 2012 (the Code), Subsection ISTB paragraph 2000, Supplemental Definitions. Subsection ISTB, paragraph 3400, "Frequency of Inservice Tests" requires that a Group A test be performed quarterly for these pumps per Table ISTB-3400-1. Charging pump 3CHS*P3C serves as an installed spare pump that is not normally connected to any power source. Quarterly testing of 3CHS*P3C requires that one train of High Pressure Safety Injection (HPSI) be disabled to support electrically connecting 3CHS*P3C to a safety-related electrical bus for testing purposes. Unavailability is accrued for the HPSI safety function for the time the emergency core cooling system (ECCS) train is disabled. Approximately 20% of total HPSI unavailability is due to quarterly testing of 3CHS*P3C. Additionally, aligning 3CHS*P3C for testing is a complex evolution that involves entry into a 72-hour shutdown Technical Specifications (TS) action statement and close coordination between the control room and field personnel to execute the required breaker manipulations and realignment of cooling water to the charging pump oil cooler.

Pursuant to 10CFR50.55a(z)(2), Dominion Energy Nuclear Connecticut (DENC) is requesting NRC approval of a proposed alternative to the quarterly testing requirement of Table ISTB-3400-1 on the basis that the requirement to perform quarterly testing of 3CHS*P3C represents a hardship without a compensating increase in quality or safety.

5) Proposed Alternative and Basis for Use

Proposed Alternative

DENC proposes to perform the quarterly Group A test on 3CHS*P3C for the time periods when the pump is required to be OPERABLE to support continued plant operation. If it becomes necessary to use 3CHS*P3C, a quarterly Group A test will be performed prior to declaring the pump OPERABLE. Testing on a quarterly frequency would be performed until 3CHS*P3C is returned to its normal (spare) alignment. A pump comprehensive test will continue to be performed on a refueling outage frequency. Charging pump 3CHS*P3C is considered available provided a current satisfactory comprehensive test is documented. Existing preventive maintenance activities are shown in Attachment 2.

Basis for Use

The MPS3 charging system design includes three hydraulically similar pumps. MPS3 TS require two independent emergency core cooling system (ECCS) trains. Charging pumps 3CHS*P3A and 3CHS*P3B are normally aligned and credited for maintaining the two independent trains. Pumps 3CHS*P3A and 3CHS*P3B are each electrically connected to an independent safety-related electrical bus backed by an emergency power source. Charging pump 3CHS*P3C serves as an installed spare pump that is not normally connected to any power source. There is a dedicated breaker cubicle on each of the safety-related electrical buses that can be used to connect 3CHS*P3C to the associated bus. To connect 3CHS*P3C, either 3CHS*P3A or 3CHS*P3B must be electrically disconnected by racking out the appropriate breaker and physically removing, relocating and reinstalling the affected breaker in the 3CHS*P3C pump breaker cubicle. Kirk key interlocks are provided to prevent having two charging pumps capable of starting on the same electrical bus. Additionally, cooling water must be aligned to the 'C' charging pump oil cooler to support pump operation. The process is then reversed to restore the system to its normal operational alignment. The time required to complete this evolution is approximately 5 hours.

Aligning 3CHS*P3C for operation is not credited as the primary mitigation strategy for any Final Safety Analysis Report (FSAR) Chapter 15 accident analysis as the time required to place 3CHS*P3C in service exceeds the response time assumptions for functions credited for Chapter 15 accident mitigation. In its normal (spare) alignment, 3CHS*P3C is considered available for use but does not meet MPS3 TS requirements to be considered OPERABLE. Should 3CHS*P3C be placed into service during normal plant operations, (3CHS*P3A or B inoperable) it would become the credited component for FSAR Chapter 15 event mitigation and would be subject to all performance testing requirements specified in the MPS3 TS.

Alignment of 3CHS*P3C is listed as a contingency action in station Abnormal and Emergency Operating Procedures. A decision to use 3CHS*P3C while operating within the Abnormal and Emergency Operating Procedure network would be based on specific plant conditions and circumstances that exist at the time. Should plant operators elect to align 3CHS*P3C during an abnormal or emergency event, performance of a quarterly test may be deferred until after plant conditions are stabilized.

Additionally, MPS3 TS Bases for entry into the 14-day allowed outage time (TS 3.8.1.1.b ACTION) for an emergency power source out of service require 3CHS*P3C be available to replace an inservice charging pump, if necessary. The proposed alternate testing plan does not affect the availability of the spare pump to fulfill these functions. Charging pump 3CHS*P3C would be considered available provided a current satisfactory comprehensive test is documented.

Extending the interval between tests will not degrade the performance of 3CHS*P3C. The charging pumps (3CHS*P3A/B/C) are located in the controlled environment of the MPS3 auxiliary building. The charging pumps are constructed of materials specifically selected to be compatible with the chemistry of the pumped fluid (borated water). The charging system fluid chemistry is monitored and maintained to meet reactor coolant system water quality requirements and therefore is not expected to cause any degradation of the pump internals over time. When idle, the pump bearings will not be subjected to wear and therefore would not be expected to degrade. As shown in Attachment 2, preventative maintenance tasks have been established to monitor for degradation of the lubricating oil through routine sampling and analysis for indicators of breakdown of the lubricant properties as well as the presence of wear products. Pump vibration data is also collected and analyzed for indications of bearing wear or pump alignment problems whenever a pump is put in service and periodically while it remains in service.

In 2016, Dominion submitted a formal Code Inquiry to ASME to clarify the intent of the 2001 Edition through 2003 Addenda of the OM Code in regards to testing of 3CHS*P3C. The response to the Code Inquiry was issued on March 26, 2017 as OM Code Interpretation Number OM-17-01. While this relief request references the 2012 Edition of the OM Code, the relevant Code requirements have not changed. Review by the Code Committee determined that it was not the intent of the Code to require testing of components, 1) not connected to an emergency power source, and 2) not required to be OPERABLE.

DENC concludes that the requirement of ISTB-3400 and Table ISTB-3400-1 to perform a quarterly test on charging pump 3CHS*P3C, which results in increased unavailability of the HPSI system, presents a hardship without a compensating increase in the level of quality and safety. DENC will continue to comply with all other aspects of the OM Code, such as comprehensive pump tests and post maintenance tests. The proposed alternative to perform the quarterly test prior to placing charging pump 3CHS*P3C into normal service with the existing preventive maintenance activities shown in Attachment 2 provide continued assurance of pump performance and an acceptable level of quality and safety without increased HPSI system unavailability.

6) <u>Duration of Proposed Alternative</u>

This proposed alternative is requested for the remainder of the third 10-yar inservice test interval and for the MPS3 fourth 10-year IST interval that is scheduled to begin on December 2, 2018 and end on December 1, 2028.

ATTACHMENT 2

3CHS*P3C PREVENTATIVE MAINTENANCE STRATEGY

MILLSTONE POWER STATION UNIT 3
DOMINION ENERGY NUCLEAR CONNECTICUT, INC.

3CHS*P3C PREVENTATIVE MAINTENANCE STRATEGY

PM	Description	Location	Cycle	Status
RE94626	EEQ, 60A Pump Motor And Motor Main Lead Replacement	M33CHS*P3C		ACTIVE
RE618954	PM, 1R – PDMA (energized), health and condition monitoring of motor	M33CHS*P3C	3R20	ACTIVE
RE618902	PM, 2R – PDMA (de-energized), health and condition monitoring of motor	M33CHS*P3C	3R22	ACTIVE
RE618669	PM, 8R – Charging Pump Motor Overhaul	M33CHS*P3C	3R29	ACTIVE
RE614565	EEQ, 39A(J) - 5KV PWR Cable & Raychem Kit Replacement	M33CHS*P3C		ACTIVE
RE613970	PM, 4R – Grease & Inspect Couplings - (Gear / Pump & Motor / Gear)	M33CHS*P3C	3R24	ACTIVE
RE610041	SI, 2R -- 3CHS*P3C (VT-2) Exam, VT-2 Exam of 3CHS*P3C & associated components.	M33CHS*P3C	3R20	ACTIVE
RE609575	PM, 15R – Replace O-Rings on Gear / Pmp Coupling, - Inspect O-Rings on Motor / Gear Coupling	M33CHS*P3C	3R36	ACTIVE
RE609004	PM, 1R – Motor Oil Change	M33CHS*P3C	3R20	ACTIVE
RE608085	RT, 6 Month – Seal Reservoir/Drain Line Cleaning	M33CHS*P3C		ACTIVE
RE607891	PM, 1R – Gear Box & Reservoir Oil Sample	M33CHS*P3C	3R19	ACTIVE
RE607058	PM, 4.5A - 3CHS*P3C (34C22) Relay & Meter Calibrations	M33CHS*P3C		ACTIVE

ATTACHMENT 3

FSAR CHANGES

(FOR INFORMATION ONLY)

MILLSTONE POWER STATION UNIT 3
DOMINION ENERGY NUCLEAR CONNECTICUT, INC.

MPS3 FSAR

TABLE 1.7-1 ELEMENTARY DIAGRAMS (CONTINUED)

(Refer to Plant Document Control for latest Document Rev. and Date)

NUSCO Drawing Number 25212-32001	SWEC Drawing Number 12179-ESK-	Diagram Title
Sh. 5BY	5BY	US Fdr Bkr [3ENS*ACB-BC], 34D4-2
Sh. 5CJ	5CJ	Service Wtr Pump [3SWP*P1A]
Sh. 5CK	5CK	Service Wtr Pump [3SWP*P1B]
Sh. 5CL	5CL	Service Wtr Pump [3SWP*P1C]
Sh. 5CM	5CM	Service Wtr Pump
Sh. 5CN	5CN	Cntmt Recirc Pump [3RSS*P1A]
Sh. 5CP	5CP	Cntmt Recirc Pump [3RSS*P1B]
Sh. 5CQ	5CQ	Cntmt Recirc Pump [3RSS*P1C]
Sh. 5CR	5CR	Cntmt Recirc Pump [3RSS*P1D]
Sh. 5CS	5CS	Charging Pump P3A [3CHS*P3A]
Sh. 5CT	5CT	Charging Pump P3B [3CHS*P3B]
Sh. 5CU	5CU	Charging Pump P3C (~~Swing~~ spare) [3CHS*P3C]
Sh. 5CV	5CV	Charging Pump P3C (~~Swing~~ spare) [3CHS*P3C]
Sh. 5DA	5DA	Reactor Plant Comp Cooling Wtr Pp [3CCP*P1A]
Sh. 5DB	5DB	Reactor Plant Comp Cooling Wtr Pp [3CCP*P1B]
Sh. 5DC	5DC	Reactor Plant Comp Cooling Wtr Swing Pp [3CCP*P1C]
Sh. 5DD	5DD	Reactor Plant Comp Cooling Wtr Swing Pp [3CCP*P1C]
Sh. 5DE	5DE	Residual Heat Removal Pump P1A [3RHS*P1A]
Sh. 5DF	5DF	Residual Heat Removal Pump P1B [3RHS*P1B]
Sh. 5DG	5DG	Quench Spray Pump P3A (3QSS*P3A)
Sh. 5DH	5DH	Quench Spray Pump P3B (3QSS*P3B)
Sh. 5DJ	5DJ	Safety Injection Pump P1A [3SIH*P1A]
Sh. 5DK	5DK	Safety Injection Pump P1B [3SIH*P1B]
Sh. 5DR	5DR	Emer Diesel Gen Bkr [3ENS*ACB-G-A] 15G-14U-2
Sh. 5DS	5DS	Emer Diesel Gen Bkr [3ENS*ACB-G-B] 15G-15U-2
Sh. 5DX	5DX	Stm Gen Aux Fdwtr Pp Mot Driven P1A [3FWA*P1A]

Uncertainties such as NPSH variation between similar pumps and test inaccuracies were considered but not included in the calculation due to the adequate margin between available and required NPSH and the conservatism in calculated pipe loss.

Potential pumps runout due to suction pressure boost during recirculation mode is precluded by the throttling of the ECCS branch line throttling valves.

Residual Heat Removal Pumps

The (RHS) pumps are started automatically on receipt of an SIS signal. The pumps deliver water to the RCS from the RWST during the injection phase. Each pump is a single stage vertical position centrifugal pump.

A minimum flow bypass line is provided down stream of the RHS heat exchangers for the pumps to recirculate and return the pump discharge fluid to the pump suction should these pumps be started with their normal flow paths blocked. Once flow greater than approximately 1,542 gpm is established to the RCS, the bypass line is automatically closed. This line prevents dead heading of the pumps and permits pump testing during normal operation.

The RHS pumps are discussed further in Section 5.4.7. A pump performance curve is given on Figure 6.3–3. This pump performance curve is the one used in the Safety Analysis, therefore, the pump heads analyzed will differ from the actual design values given in Table 5.4–8.

The pumps have a self-contained mechanical seal which is normally cooled by the component cooling water system. However, after a LOCA, cooling water is not supplied or required, because the pumps are pumping water having a maximum temperature of 75°F. The RHS pumps are not utilized in the recirculation phase.

Centrifugal Charging Pumps

In the event of an accident, ~~the~~ two charging pumps are started automatically on receipt of an SIS and are automatically aligned to take suction from the RWST during injection. However, the charging pumps will not automatically inject into the reactor coolant cold legs unless there is also a cold leg injection permissive [(P-19) - pressurizer pressure low] signal present to open the charging pumps to RCS cold leg injection headers parallel isolation valves. During recirculation, suction is provided from the containment recirculation pump discharge.

The charging pumps deliver flow to the RCS at the prevailing RCS pressure. Each centrifugal charging pump is a multistage centrifugal diffuser design (barrel type casing) with vertical suction and discharge nozzles. The pumps lubricating oil coolers are cooled by the charging pumps seal cooling subsystem (Section 2.2.4).

A minimum flow bypass line is provided on each pump discharge to recirculate flow to the pump suction after cooling via the seal water heat exchanger during normal plant operation. The minimum flow bypass line contains two valves in series which close on receipt of the SIS. Two alternate miniflow paths are provided for the two operable charging pumps when the normal

TABLE 6.3–10 FAILURE MODE AND EFFECTS ANALYSIS - EMERGENCY CORE COOLING SYSTEM - ACTIVE COMPONENTS

COMPONENT	FAILURE MODE	ECCS OPERATION PHASE	EFFECT ON SYSTEM OPERATION *	FAILURE DETECTION METHOD	REMARKS
1. Motor operated gate valve LCV-112B (LCV-112C analogous)	Fails to close on demand	Injection-cold legs of RC loops	Failure reduces redundancy of providing VCT discharge isolation. No effect on safety for system operation; isolation valve (LCV-112C) and check valve 8440 provides backup tank discharge isolation.	Valve position indication (open to closed position change) at CB. Valve close position monitor light and alarm for group monitoring of components at CB.	Valve is electrically interlocked with isolation valve LCV-112D. Valve closes on actuation by a SIS signal provided isolation valve LCV-112D is at a full open position. (Analogous train LCV-112C is electrically interlocked with LCV-112E.)
2. Motor operated gate valve LCV-112D (LCV-112E analogous)	Fails to open on demand	Injection-cold legs of RC loops	Failure reduces redundancy of providing fluid flow from RWST to suction of HHSI/CH pumps. No safety effect on system operation. Alternate isolation valve (LCV-112E) opens to provide backup flow path to suction of HHSI/CH pumps.	Valve position indication (closed to open position change) at CB. Valve open position monitor light and alarm for group monitoring of components at CB.	Valve is electrically interlocked with the instrumentation that monitors fluid level of the VCT. Valve opens upon actuation by a SIS signal or upon actuation by a "Low-Low-Level" VCT signal.
3. Centrifugal charging pump ~~3CHS*P3A (3CHS*P3B and 3CHS*P3C analogous)~~ [Two charging pumps are required to automatically start. 3CHS*P3A and 3CHS*P3B are normally aligned electrically. 3CHS*P3C, considered an installed spare, is not normally electrically connected.]	Fails to deliver working fluid	Injection and recirculation cold legs of RC loops	Failure reduces redundancy of providing emergency coolant to the RCS at prevailing incident RCS pressure. Fluid flow from HHSI/CH Pump ~~P3A~~ will be lost. Minimum flow requirements at prevailing high RCS pressures will be met by [the redundant] HHSI/CH Pump ~~P3B or Pump P3C~~ delivery.	HHSI/CH pump discharge header flow (FI-917) at CB. Open pump switchgear circuit breaker close position monitor light for group monitoring of components at CB. Common breaker trip alarm at CB.	One HHSI/CH pump is used for normal charging of RCS during plant operation. Pump circuit breaker aligned to close on actuation by SIS signal.
4. Motor operated globe valve 8110 (8111A, B, C analogous)	Fails to close on demand	Injection-cold legs of RC loops	Failure reduces redundancy of providing isolation of HHSI/CH pump miniflow line. No effect on safety for system operation. Alternate isolation valve (8111 A,B&C) in miniflow line provides backup isolation.	Same method of detection as that stated for Item 2.	Valves are normally open and closed upon actuation by a SIS.

d. IEEE Standard 279-1971, Paragraph 4.17:

The safety injection pumps have manual controls on the main control board and at the switchgear. A REMOTE/LOCAL control transfer switch at the switchgear is alarmed in the control room when LOCAL is selected.

e. IEEE Standard 279-1971, Paragraphs 4.9 and 4.10:

One train at a time is taken out of service and periodically tested in accordance with the Technical Specifications.

This testing will consist of manually starting the pump during normal surveillance of the system or the breaker for the pump will be in the test position. Once the pump is running or the breaker is in the test position, the AUTO start and tripping is verified using the emergency generator load sequencer with safety signals generated internally or externally to the sequencer.

3. Charging Pumps

an installed spare

Normally, one charging pump is running. During a loss-of-coolant accident (LOCA), two charging pumps operate as part of the safety injection system. The third pump is ~~a swing~~ pump with a breaker cubicle on each emergency bus that is normally empty. The ~~swing~~ pump uses the breaker of the pump which is not in service. Mechanical and keylock switches prevent the pump from being placed on Train A and Train B emergency buses at the same time.

installed spare

On a loss-of-power (LOP) signal the charging pump that is running is not stripped from the emergency bus; therefore, the pump starts immediately when power is restored. The pumps are started automatically on receipt of a sequenced safeguard signal.

Manual controls are provided on the main control board and at the switchgear for the charging pumps. An annunciator is alarmed on the main control board when local control is selected. ESF status lights indicate when a charging pump is running.

Ammeter and indicator lights are located at the switchgear and on the main control board.

Bypass and inoperable alarms are provided in accordance with Regulatory Guide 1.47.

Each charging pump has an auxiliary lube oil pump with a local STOP-AUTO control switch. The auxiliary lube oil pumps start automatically when AUTO is selected on low lube oil pressure, or when the associated charging pump is stopped. The auxiliary lube-oil pump stops automatically when AUTO is selected and lube oil pressure is above a predetermined pressure and the associated charging pump is started.

<u>Analysis</u>

a. IEEE Standard 279-1971, Paragraph 4.2:

There are three charging pumps, 3CHS*P3A, B, and C. The C pump is ~~a swing~~ an installed spare pump. Normally, two charging pumps (3CHS*P3A and B) have their breakers racked in and one of the two is running. In the event that the A or B pump fails, its breaker is racked out and racked into the C pump cubicle (Train A or B). Mechanical and electrical interlocks prevent the C pump from being connected to two buses at the same time.

Power is supplied to the charging pumps from two separate emergency buses. No single failure at the system level will prevent charging pump safety injection.

b. IEEE Standard 279-1971, Paragraph 4.4:

Equipment qualifications are discussed in Sections 3.10 and 3.11.

c. IEEE Standard 279-1971, Paragraph 4.13:

A bypass and inoperable annunciator in the control room is alarmed when any of the following conditions exists for Train A or B:

- Charging pump A, B, or C control switch in pull to lock or loss of control power or breaker racked out.
- Charging pump cubicle ventilation system bypassed.

  (Auxiliary circuits associated with the inlet and outlet ventilation dampers for the charging pump cubicles do not provide input to bypass annunciator.)
- Bypass push button depressed for charging pumps safety injection.
- Charging pump header isolation valve not full open.
- RWST to charging pump valve circuit breaker open.
- VCT to charging pump valve circuit breaker open.
- Charging pumps to reactor cold legs isolation valve circuit breaker open.

MPS3 FSAR

TABLE 7.4-1 INSTRUMENTS AND CONTROLS OUTSIDE CONTROL ROOM FOR COLD SHUTDOWN (CONTINUED)

Description		Mark No.
Main Stm Pressure Relieving Valve		3MSS*PV20D
Miscellaneous Controls ASP Section 2/Non-Train		
White Indicator Light (Steam Line Safety Injection Blocked, Train A)		
White Indicator Light (Steam Line Safety Injection Blocked, Train B)		
White Indicator Light (Pressurizer Safety Injection Blocked, Train A)		
White Indicator Light (Pressurizer Safety Injection Blocked, Train B)		
Safety-Related Controls on 4160V Emergency Switchgear		
Motor-Driven Aux Fdwtr Pumps		3FWA*P1A, Train A
		3FWA*P1B, Train B
Charging Pumps		3CHS*P3A, Train A
		3CHS*P3B, Train B
		3CHS*P3C, ~~Swing~~ Spare Pump
Service Water Pumps		3SWP*P1A, Train A
		3SWP*P1C, Train A
		3SWP*P1B, Train B
		3SWP*P1D, Train B
Reactor Plant Component Cooling Pumps		3CCP*P1A, Train A
		3CCP*P1B, Train B
		3CCP*P1C, Swing Pump
Control Building Chilled Water Pumps		3HVK*P1A, Train A
		3HVK*P1B, Train B
RHR Pumps		3RHS*P1A, Train A
		3RHS*P1B, Train B
Local, Manual Valve Control		
Adjustable travel limiters (to be used during safety grade cold shutdown with single failure loss of one train of RHS and loss of all instrument air.)		3RHS*FCV618, Train A 3RHS*FCV619, Train B

Each emergency generator is capable of being manually paralleled with the unit station service system under nonaccident conditions. The emergency generators are capable of being manually paralleled with the off site AC power source under post-accident conditions. Provisions are made in the emergency AC power system design to prevent the inadvertent electrical interconnection of the emergency generators by providing key interlocks for breakers for the ~~swing~~ spare charging and swing Reactor Plant Component Cooling pumps and the SBO Diesel Generator.

Each emergency generator diesel engine is provided with cooling by means of a shell and tube heat exchanger cooled by water from the service water system. The emergency generators are self-cooled, forced air ventilated. A complete description of the cooling water system is given in Section 9.5.5.

Each diesel engine is provided with a dedicated air starting system consisting of two separate air starting subsystems. Engine cranking is accomplished by two stored air supplies with sufficient capacity to start the engine without using an air compressor. Fast starting and load pickup are facilitated by electric heaters which keep the engines warm when they are not running. A complete description of the air starting system is given in Section 9.5.6.

The fuel oil system for the emergency generators' diesel engines have a storage capacity suitable for operating one emergency generator at post-accident load for approximately six days. Two fuel oil storage tanks, which contain fuel for the emergency generators, are buried underground. Each diesel engine is equipped with an independent fuel day tank with a capacity of approximately 493 gallons at the shutoff level for the two fuel oil transfer pumps. This corresponds to approximately 60 minutes of engine operation at the 2,000 hr. rating of 5335 kW. At the lowest level with auto makeup capability, there is approximately 278 gallons of fuel in the tank which is sufficient for 27 minutes of engine operation at the 2,000 hr. rating. In the standby condition, a minimum of 493 gallons of fuel is maintained. This independent fuel day tank is filled by transferring fuel from a fuel oil storage tank. Two motor-driven fuel oil transfer pumps powered from their associated emergency generator, ensures that an operating emergency generator has a continuous supply of fuel. These two full capacity transfer pumps are operated automatically at preset level points in the corresponding day tank.

Complete information on the fuel oil system is given in Section 9.5.4.

The emergency generators are located in separate rooms in the emergency generator enclosure (Figure 8.3–1). Within these rooms, the emergency generators, including associated starting equipment and other auxiliaries, are completely isolated from one another by means of a 2-foot concrete wall designed to prevent any event occurring at one emergency generator from affecting the other. There are no openings or common passageways between the rooms.

The emergency generator enclosure is a Seismic Category I structure and is capable of withstanding tornado generated missiles. Additional details on the building structure are given in Section 3.8.

Each of the rooms has a separate drainage system to prevent liquids from flowing from one room to the other. The separate drainage system for each diesel is sized to accommodate any release of