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

Serial No. 14-123
LIC/NW/R0
Docket No.: 50-305
License No.: DPR-43

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
TECHNICAL SPECIFICATIONS BASES CHANGES AND TECHNICAL REQUIREMENTS MANUAL CHANGES

Pursuant to Kewaunee Power Station (KPS) Technical Specification 5.5.12, "Technical Specifications (TS) Bases Control Program," Dominion Energy Kewaunee, Inc. (DEK) changes to the TS Bases implemented without prior NRC approval shall be provided to the Nuclear Regulatory Commission (NRC) on a frequency consistent with 10 CFR 50.71(e). There have not been any changes to the TS Bases since our April 5, 2013 submittal (reference 1).

Also, DEK submits changes to the KPS Technical Requirements Manual (TRM). 10 CFR 50.71(e)(4) states the requirements for submittal of the KPS Updated Safety Analysis Report (USAR). As the KPS TRM is considered a part of the USAR by reference, it is required to be submitted to the NRC.

The attachments provide copies of the TRM pages and TRM current page list reflecting the changes implemented since April 2013.

The changes to the TRM were made in accordance with the provisions of 10 CFR 50.59 and approved by the KPS Facility Safety Review Committee.

If you have questions or require additional information, please feel free to contact Mr. Richard Repshas at 920-388-8217.

Very truly yours,

Jeffrey T. Stafford
Director Safety and Licensing
Kewaunee Power Station

A001
NRR

Reference:

1. Letter from Jeffrey T. Stafford (DEK) to NRC Document Control Desk, "Technical Specifications Bases Changes and Technical Requirements Manual Changes," dated April 5, 2013 (ADAMS Accession No. ML13108A183).

Attachments:
1. Kewaunee Power Station Technical Requirements Manual Changes
2. Kewaunee Power Station Technical Requirements Manual Current Page List

Commitments made by this letter: NONE

cc: Regional Administrator, Region III
U. S. Nuclear Regulatory Commission
2443 Warrenville Road
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Lisle, IL 60532-4352

ATTACHMENT 1

TECHNICAL SPECIFICATIONS BASES CHANGES AND TECHNICAL REQUIREMENTS MANUAL CHANGES

KEWAUNEE POWER STATION TECHNICAL REQUIREMENTS MANUAL CHANGES

TRM PAGES:

TRM 8.1.1-1 through 8.1.1-3 Rev 0	Deleted 5/28/13
TRM 8.3.1-1 through 8.3.1-6 Rev 0	Deleted 5/28/13
TRM 8.3.3-1 through 8.3.3-5 Rev 1	Deleted 5/28/13
TRM 8.3.5-1 through 8.3.5-6 Rev 1	Deleted 5/28/13
TRM 8.3.8-1 through 8.3.8-7 Rev 0	Deleted 5/28/13
TRM 8.3.9-1 through 8.3.9-8 Rev 1	Deleted 5/28/13
TRM 8.4.1-1 through 8.4.1-6 Rev 0	Deleted 5/28/13
TRM 8.4.3-1 through 8.4.3-4 Rev 0	Deleted 5/28/13
TRM 8.5.1-1 through 8.5.1-3 Rev 1	Deleted 5/28/13
TRM 8.5.2-1 through 8.5.2-6 Rev 1	Deleted 5/28/13
TRM 8.6.1-1 through 8.6.1-3 Rev 0	Deleted 5/28/13
TRM 8.7.4-1 through 8.7.4-6 Rev 0	Deleted 5/28/13
TRM 8.7.6-1 through 8.7.6-2 Rev 0	Deleted 5/28/13
TRM 8.8.4-1 through 8.8.4-11 Rev 0	Deleted 5/28/13
TRM 8.9.3-1 through 8.9.3-2 Rev 1	Deleted 5/28/13
TRM 10.1-1 Rev 0	Deleted 5/28/13
TRM 8.3.4-1 through 8.3.4-2 Rev 0	Deleted 7/1/13
TRM 8.4.2-1 through 8.4.2-3 Rev 0	Deleted 7/1/13
TRM 8.7.1-1 through 8.7.1-2 Rev 0	Deleted 7/1/13
TRM 8.8.2-1 through 8.8.2-6 Rev 3	Issued 7/1/13
TRM 8.8.5-1 through 8.8.5-3 Rev 0	Issued 71/13
TRM 8.8.1-1 through 8.8.1-7 Rev 2	Issued 9/16/13
TRM 7.0-1 through 7.0-5 Rev 1	Issued 10/15/13
TRM 8.7.8-1 through 8.7.8-4 Rev 0	Issued 10/15/13
TRM 8.9.1-1 through 8.9.1-4 Rev 1	Issued 10/15/13
TRM 8.9.2-1 through 8.9.2-2 Rev 1	Issued 10/15/13
TRM 8.9.4-1 through 8.9.4-2 Rev 2	Issued 10/15/13
TRM 8.9.6-1 through 8.9.6-7 Rev 0	Deleted 10/15/13
TRM 8.3.7-1 through 8.3.7-5 Rev 1	Deleted 1/28/14
TRM 8.7.5-1 through 8.7.5-29 Rev 1	Deleted 1/28/14
TRM 8.7.7-1 through 8.7.7-4 Rev 0	Deleted 1/28/14
TRM 8.8.3-1 through 8.8.3-10 Rev 2	Issued 1/28/14
TRM 8.3.6-1 through 8.3.6-6 Rev 1	Deleted 2/24/14

KEWAUNEE POWER STATION
DOMINION ENERGY KEWAUNEE, INC.

DELETED May 28, 2013

8.1 REACTIVITY CONTROL SYSTEMS

8.1.1 Chemical and Volume Control System

TNC 8.1.1 The Chemical and Volume Control System shall be FUNCTIONAL consisting of EITHER:

a. A flow path from the RWST or BAST via a FUNCTIONAL Charging pump to the Reactor Coolant System (RCS);

OR

b. A flow path from the RWST or BAST via a FUNCTIONAL Safety Injection pump to the Reactor Coolant System (RCS).

NOTE

Boric Acid Storage Tanks (BAST) are an acceptable source only in MODES 5 and 6.

APPLICABILITY: All MODES.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. Required flow path is NonFUNCTIONAL.	A.1 Initiate action to restore flow path to FUNCTIONAL status.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.1.1.1	Verify each valve (manual, power operated or automatic) in the required boron injection flow path that is not locked, sealed or otherwise secured in position, is in its correct position.	31 days

BASES

BACKGROUND

The Chemical and Volume Control System provides control of the Reactor Coolant System boron inventory. This is normally accomplished by using any one of the three charging pumps. Also, the Safety Injection pumps can take a suction from the Refueling Water Storage Tank and provide borated water to the Reactor Coolant System.

The quantity of boric acid stored in the Refueling Water Storage Tank is sufficient to achieve COLD SHUTDOWN at any time during core life.

8.3 INSTRUMENTATION

8.3.1 Movable Incore Detectors

TNC 8.3.1 The Movable Incore Detection System shall be FUNCTIONAL.

---NOTES---

1. Power operation may be continued until the next refueling period provided best efforts are utilized to restore the FUNCTIONALITY of the system or systems.
2. At least 75% thimble FUNCTIONALITY is required at the startup of each cycle.

APPLICABILITY: MODES 1 and 2.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. Thimble FUNCTIONALITY < 75% and ≥ 50%.	A.1 If thimble FUNCTIONALITY is > 50% then apply total measurement uncertainties linearly using Basis Equations 8.3.1-1 and 8.3.1 2.	Prior to mapping with < 75% FUNCTIONAL thimbles
	<u>AND</u>	
	A.2 If thimble FUNCTIONALITY is 50% then apply a total measurement uncertainty of 5% and 6% to FΔH and FQ respectively.	Prior to mapping with 50% FUNCTIONAL thimbles

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
B. Thimble FUNCTIONALITY < 75% and ≥ 50% AND < 3 FUNCTIONAL thimbles per quadrant	B.1 Suspend use of the Movable Incore Detection System for monitoring and calibration of the excore axial offset detection system.	Immediately
C. Thimble FUNCTIONALITY < 50%.	C.1 Suspend use of the Movable Incore Detection System for monitoring and calibration of the excore axial offset detection system.	Immediately
	AND	
	C.2 Initiate action to restore Moveable Incore Detection System to ≥ 50% FUNCTIONAL status.	Immediately
D. > 50% Incore instrumentation is NonFUNCTIONAL greater than 7 days.	D.1 Submit report to Commission.	30 days
	AND	
	D.2 Submit additional reports of status until nonconformance is corrected.	Every 30 days

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
E. < 2 movable detector thimbles per quadrant FUNCTIONAL.	E.1 Suspend use of the Movable Incore Detection System for monitoring and calibration of the excore axial offset detection system.	Immediately
	AND	
	E.2 Initiate action to restore Moveable Incore Detection System to FUNCTIONAL status.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION	FREQUENCY
TVR 8.3.1.1 Confirm ≥ 75% thimbles FUNCTIONAL	Prior to entering MODE 2 from MODE 3 after each refueling outage.
TVR 8.3.1.2 Confirm power distribution	Prior to exceeding 75% power following each refueling outage.

BASES

BACKGROUND

The moveable detector system is used to measure the core fission power density distribution. A power map made with this system following each fuel loading will confirm the proper fuel arrangement within the core. The moveable detector system is designed with substantial redundancy so that part of the system could be out of service without reducing the value of a power map.

The moveable detector system is not an integral part of the Reactor Protection System, this system is rather a surveillance system which may be required in the event of an abnormal occurrence such as a power tilt or a control rod misalignment. Since such occurrences cannot be predicted a priori, it is prudent to have the surveillance systems in an operable state.

TNC and APPLICABILITY

The movable incore detection system is considered fully FUNCTIONAL when sufficient detectors, drives, and readout equipment is available. An individual thimble is considered FUNCTIONAL when sufficient detectors, drives, and readout equipment is available to read the flux through the active length of the thimble.

The percentage of thimbles available is meant in terms of the total number of thimbles originally available in the movable detector system. Thus 100% thimble availability and 50% availability correspond to 36 and 18 available thimbles, respectively.

Two notes modify the TNC. The first note states that there is no minimum number of thimbles required to continue power operation. The second note attempts to prevent the system from reaching a condition where not enough thimbles are available.

The movable detector system is required to be FUNCTIONAL following the initial fuel loading and each subsequent reloading. To confirm power distribution sufficient neutron flux must be available to ensure the incore detection system is indicating the neutron flux produced from power operation. Thus the MODES of applicability are MODES 1 and 2.

CONTINGENCY MEASURES

A.1 and A.2

If the system is severely degraded, large measurement uncertainty factors must be applied. The uncertainty factors would necessarily depend on the operable configuration. Between 75% and 50% availability, the total measurement uncertainties are applied linearly using Equations 8.3.1-1 and 8.3.1-2 shown below.

$F_{\Delta H}$ measurement uncertainty (%) = 7 – (T / 9) (Eq. 8.3.1-1)
FQ measurement uncertainty (%) = 8 – (T / 9) (Eq. 8.3.1-2)

where T = number of thimbles used for flux traces

When operating between 75% and 50% thimble availability, each of the core quadrants, as defined by both the major and minor axes (the minor axes are at 45° to the major axes), must contain at le ast 3 available thimbles (all thimbles, even those on the quadrant axes, are to be counted as whole values).

The purpose of the measurement uncertainty factor is to provide a means to account for statistical variation in the flux measurement process. A standard percentage value was used in the equations used in the COLR. The Technical Requirements Manual is not prescriptive as to the required actions when using less than 75% of the thimbles. Based on the uncertainty analysis performed by Westinghouse (reference NF-WP-05-19, "Kewaunee Thimble Deletion Analysis," dated October 31, 2005), the additional uncertainty factor provides conservatism to the calculated values when operating with less than 75% and greater than 50% of the thimbles available.

The uncertainties in Equations 8.3.1-1 and 8.3.1-2 were determined from Kewaunee Power Station Cycle 26 and 27 data. Given that the different fuel types in Cycles 26 and 27 are distributed in distinct patterns (for example, in Cycle 27, fuel type 1 is loaded in peripheral core locations), the use of the maximum sensitivity over all these fuel types ensures the peaking factor penalties are conservative. Further, these penalties discussed in this section can be applied to future cycles (of similar general fuel management strategy to Cycles 26 and 27) without regard for how the fuel types are distributed in the core. These penalties will bound future cycles where fewer fuel types are present. The basis for the uncertainty analysis is in WCAP-7308-L-P-A.

CONTINGENCY MEASURES (continued)

B.1

The study performed by Westinghouse shows that the probability of having less than 3 thimbles per quadrant, as a result of random thimble deletion, is about 11%. This suggests that if less than three thimbles remain in each quadrant when only 50% of thimbles are available, it is likely that these deletions were made systematically rather than randomly. Systematic thimble deletion which results in large un-instrumented regions of the core may result in larger penalties than described herein.

C.1 and C.2

TNC 8.3.1(C) is necessary to avoid issues regarding the ability of the core monitoring system to detect a fuel misload event. In addition, this requirement helps to prevent long-term deterioration of the flux mapping system.

D.1 and D.2

If greater than 50% of the incore instrumentation is NonFUNCTIONAL for greater than 7 days the NRC requires to be informed of the situation and the efforts in progress to restore the thimbles to service.

E.1 and E.2

Two detector thimbles per quadrant, and sufficient detectors, drives, and readout equipment to map these thimbles, are sufficient to provide data for the normalization of the excore detector system's axial power offset feature.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.3.1.1

This verification requirement confirms the number of FUNCTIONAL incore moveable detectors prior to startup from a refueling outage.

TVR 8.3.1.2

This verification requirement confirms power distribution is within limits prior to exceeding 75% rated power.

8.3 INSTRUMENTATION

8.3.3 Auxiliary Feedwater (AFW) Pump Low Suction Pressure Trip Channels

TNC 8.3.3 One low suction pressure trip channel shall be FUNCTIONAL for each AFW pump.

APPLICABILITY: Whenever the associated AFW pump is required to be OPERABLE.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. AFW pump low suction pressure trip channel on one or more AFW pumps NonFUNCTIONAL.	A.1 Declare associated AFW train(s) INOPERABLE and apply requirements of Technical Specification (TS) 3.7.5.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
	---NOTE--- Verification of relay setpoints is not required. ---	
TVR 8.3.3.1	Perform CHANNEL FUNCTIONAL TEST on each AFW pump low suction pressure trip channel.	92 days
TVR 8.3.3.2	Deleted	
TVR 8.3.3.3	Perform CHANNEL CALIBRATION on each AFW pump low suction pressure trip channel.	18 months
TVR 8.3.3.4	Deleted	

BACKGROUND

AFW pump low suction pressure trip protects pump internals from damage that could result from loss of the required net positive suction head (NPSH), which could be caused by loss of the normal water supply from the condensate storage tanks (CSTs) following a tornado or seismic event.

Three pressure switches (one per pump) are located on the AFW pump suction line from the CST. The set point of each pressure switch is designed to preclude pump operation with sub-atmospheric pressure at the AFW pump suction. A low-pressure signal sensed by any one of the switches will cause the associated AFW pump to trip. Operator action is required to bypass the trip circuit or align to the service water source and restart the associated AFW pump. Service water alignment and restart of the AFW pumps ensures an adequate supply of water to maintain at least one of the steam generators (SGs) as the heat sink for reactor decay heat and sensible heat removal.

A cavitating venturi is installed in the discharge of each AFW pump. At high SG pressures, the venturi operates in resistance mode as a flow control element in conjunction with the AFW pump discharge throttle valves. For low SG pressures (associated with accidents or transients) flow through the venturis cavitates and limits flow through the AFW pumps precluding pump runout. At the maximum possible flow rate thru the venturi, the pump's required NPSH is maintained less than atmospheric pressure. Since the AFW pump low suction pressure trips are set to stop pump operation prior to suction pressure dropping below atmospheric, margin to required NPSH continues to be maintained.

The requirement for AFW pump low suction pressure trip was relocated from the previous Custom TS during the conversion to Improved TS. In License Amendment 183 (Reference 1), the NRC approved a four hour allowance to defer applying the AFW TS requirements for the condition of one low suction pressure trip channel inoperable. This amendment stipulated that when only a single trip channel was inoperable, the AFW pump associated with that trip channel was allowed to be considered OPERABLE for up to four hours, provided the AFW train was otherwise OPERABLE. In License Amendment 207 (Reference 2), the NRC approved relocating this 4 hour allowance to the TRM. However, since this trip function is required for AFW pump OPERABILITY, TS LCO 3.7.5 is not met with an AFW pump low suction pressure trip channel NonFUNCTIONAL. Therefore, this relocated allowance is not applicable.

BASES

TNC and APPLICABILITY

AFW pump low suction pressure trip channels (one per pump) support OPERABILITY of the AFW system (Reference 3) by providing automatic protection for the pumps. The low pressure trip is necessary in order to prevent damage to the AFW pumps if the normal water supply (from the CSTs) is lost following a tornado or seismic event. Therefore each channel must be FUNCTIONAL whenever its associated (supported) AFW train is required to be OPERABLE.

One low suction pressure trip channel must be FUNCTIONAL for each AFW pump whenever its supported AFW pump is required to be OPERABLE per TS 3.7.5 (Reference 3).

CONTINGENCY MEASURES

A.1

Loss of a pressure trip channel unacceptably degrades AFW pump protection capability. If one or more AFW pump low suction pressure trip channels are NonFUNCTIONAL, the associated AFW train(s) shall immediately be declared INOPERABLE and the applicable requirements of TS 3.7.5 applied. Contingency Measure A.1 thereby limits the time that a channel may be removed from service.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.3.3.1

A CHANNEL FUNCTIONAL TEST is required to be performed on each AFW pump's low suction pressure trip channel every 92 days. Verification of relay setpoints is not required to be performed during the conduct of this test.

TVR 8.3.3.3

A CHANNEL CALIBRATION is required to be performed on each AFW pump's low suction pressure trip channel every 18 months.

REFERENCES

1. License Amendment 183, "Kewaunee Nuclear Power Plant – Issuance of Amendment Re: Auxiliary Feedwater System (TAC No. MC6916", dated June 20, 2005.
2. License Amendment 207, "Kewaunee Power Station (KPS) – Issuance of Amendment for the Conversion to the Improved Technical Specifications with Beyond Scope Issues (TAC Nos. ME2139, ME2419, ME2420, ME2421, ME3122, ME3460, and ME3544)", dated February 2, 2011.
3. TS 3.7.5, AFW System.

8.3 INSTRUMENTATION

8.3.5 Post Accident Monitoring (PAM) Instrumentation

TNC 8.3.5 The PAM instrumentation for each Function in Table 8.3.5-1 shall be FUNCTIONAL.

APPLICABILITY: MODES 1 and 2.

CONTINGENCY MEASURES

--------------------NOTE--------------------

Separate Condition entry is allowed for each Function.

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. One or more Functions with one required channel NonFUNCTIONAL.	A.1 Restore required channel to FUNCTIONAL status.	14 days
B. One or more Functions with two required channels NonFUNCTIONAL.	B.1 Restore required channels to FUNCTIONAL status.	72 hours
C. Required CONTINGENCY MEASURES and associated Restoration Time of Nonconformance A or B not met.	C.1 Enter TNC 7.5.3.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

-----NOTE-----

These TVRs apply to each PAM instrumentation Function in Table 8.3.5-1.

	VERIFICATION	FREQUENCY
TVR 8.3.5.1	-----NOTE----- Verification of auxiliary feedwater (AFW) flow rate indicator is only required during unit startup and shutdown. ---------- Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
TVR 8.3.5.2	Perform CHANNEL CALIBRATION.	18 months

Table 8.3.5-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS
1. AFW Flow Rate indication	1 per SG
2. Pressurizer Power Operated Relief Valve Position (One Common Channel Temperature, One Channel Limit Switch per Valve)	2 per valve
3. Pressurizer Power Operated Relief Block Valve Position (One Common Channel Temperature, One Channel Limit Switch per Valve)	2 per valve
4. Pressurizer Safety Valve Position (One Channel Temperature, and One Acoustic Sensor)	2 per valve

BASES

BACKGROUND

The primary purpose of the PAM instrumentation is to display unit variables that provide information required by the control room operators during accident situations. Post Accident Monitoring Instruments are divided into one or more of five (5) types of variables (A, B, C, D, & E). Type A variables are those variables to be monitored that provide the primary information required to permit the control room operators to take the specified manually controlled actions for which no automatic control is provided and that are required for safety systems to accomplish their safety function for design basis accident events. Types B, C, D, and E are variables for following the course of an accident and are to be used (1) to determine if the plant is responding to the safety measures in operation and (2) to inform the operator of the necessity for unplanned actions to mitigate the consequences of an accident. Further definition of Type B, C, D, and E variables can be found in the KPS RG 1.97 Accident Monitoring Instrumentation Plan (Reference 1).

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

Only those instruments monitoring Type A and Category 1 variables are required to be included in Technical Specifications (TS). The instruments in this Technical Requirement do not meet the criteria for inclusion into TS. The requirements for PAM instrumentation that did not meet Type A or Category 1 variables were relocated from the previous Custom TS Table 3.5-6, "Accident Monitoring Instrumentation Operating Conditions for Indication," during the conversion to Improved TS in License Amendment 207 (Reference 2). That conversion also deleted the previous requirement for the unit to be shutdown if a required channel was nonfunctional and not restored within the allowed restoration time.

TNC and APPLICABILITY

The PAM instrumentation TNC is applicable in MODES 1 and 2.

The PAM instrumentation TNC provides FUNCTIONALITY requirements for the monitors listed in Table 8.3.5-1 (Regulatory Guide 1.97 monitors other than Type A or Category 1), which provide information required by the control room operators to perform certain manual actions specified in the unit Emergency Operating Procedures.

The FUNCTIONALITY of the PAM instrumentation ensures there is sufficient information available on selected unit parameters to monitor and assess unit status following an accident.

CONTINGENCY MEASURES

A Note has been added in the CONTINGENCY MEASURES to clarify the application of Restoration Time rules. The conditions of this requirement may be entered independently for each Function listed on Table 8.3.5-1. The Restoration Time(s) of the inoperable channel(s) of a Function will be tracked separately for each Function starting from the time the condition was entered for that Function. When the Required Channels in Table 8.3.5-1 are specified (e.g., on a per steam generator, per valve, etc., basis), then the condition may be entered separately for each steam generator, valve, etc., as appropriate.

<u>A.1</u>

Nonconformance A applies when one or more Functions have one required channel that is NonFUNCTIONAL. CONTINGENCY MEASURE A.1 requires restoring the NonFUNCTIONAL channel to FUNCTIONAL status within 14 days.

<u>B.1</u>

Nonconformance B applies when one or more Functions have two NonFUNCTIONAL required channels (i.e., two channels NonFUNCTIONAL in the same Function). CONTINGENCY MEASURE B.1 requires restoring all but one required channel in the Function(s) to FUNCTIONAL status within 72 hours.

<u>C.1</u>

Nonconformance C applies when the CONTINGENCY MEASURE and associated completion time of Nonconformance A or B is not met. CONTINGENCY MEASURE C.1 requires initiating the action specified in TNC 7.5.3 immediately. Each time a nonfunctional channel has not met the CONTINGENCY MEASURE of either Nonconformance A or B, and the associated completion time has expired, Condition C is entered for that channel and provides for transition to TNC 7.5.3.

TECHNICAL VERIFICATION REQUIREMENTS

<u>TVR 8.3.5.1</u>

This verification is modified by a Note that alters the frequency requirement for checking the AFW flow rate indicator. Rather than at the normally specified 31 day interval, AFW flow rate indication is required to be checked during each startup and shutdown of the unit (unless it was performed in the previous 31 days).

BASES

TECHNICAL VERIFICATION REQUIREMENTS (continued)

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure has not occurred.

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

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

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

<u>TVR 8.3.5.2</u>

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

REFERENCES

1. KW-PLAN-000-RG 1.97, “Regulatory Guide 1.97 Accident Monitoring Instrumentation Plan”.
2. Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 207 to Facility Operating License No. DPR-43, Dominion Energy Kewaunee, Inc., Kewaunee Power Station, Docket No. 50-305, dated February 2, 2011.

DELETED
MAY 8, 2013

8.3 INSTRUMENTATION

8.3.8 Reactor Protection System (RPS)

TNC 8.3.8 Reactor Trip Breakers and Logic Cabinets shall be OPERABLE.

APPLICABILITY: Whenever the associated Reactor Trip Breakers and Logic Cabinets are required to be OPERABLE by Technical Specifications (TS).

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. One reactor trip breaker inoperable.	---------------NOTE--------------- One AFW Pump may be placed in pullout intermittently for maintenance, provided the DSS is FUNCTIONAL ------------------------------------	
	A.1 Suspend activities that could degrade the availability of the auxiliary feedwater (AFW) system, reactor coolant system pressure relief (pressurizer power operated relief valves (PORVs) and safety valves), Anticipated Transient Without Scram (ATWS) Mitigating System Actuation Circuitry (AMSAC), turbine trip, or Diverse Scram System (DSS). AND	Immediately

DELETED
May 8, 2013

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. (continued)	A.2 Suspend activities on electrical systems that support the systems or functions listed in A.1.	Immediately
	<u>AND</u>	
	A.3 Verify suspended activities can be safely performed.	Prior to continuing with suspended activities.
B. One logic cabinet inoperable.	B.1 Suspend activities that could degrade other components of the RPS, including master relays or slave relays should not be scheduled when a logic cabinet is unavailable.	Immediately
	<u>AND</u>	
	B.2 Suspend activities that cause analog channels to be unavailable.	Immediately
	<u>AND</u>	
	B.3 Verify suspended activities can be safely performed.	Prior to continuing with suspended activities
C. Required Action and associated Completion Time of Condition A or Condition B not met.	C.1 Enter TNC 7.5.3.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION	FREQUENCY
None	N/A

BASES

BACKGROUND

In its approval of the policy statement on the use of probabilistic risk analysis (PRA) methods in nuclear regulatory activities, the Commission stated an expectation that "the use of PRA technology should be increased in all regulatory matters. . . in a manner that complements the NRC's deterministic approach and supports the NRC's traditional defense-in-depth philosophy". The NRC staff has defined an acceptable approach to analyzing and evaluating proposed TS changes (reference 1).

The NRC staff has identified a three-tiered approach for licensees to evaluate the risk associated with proposed TS allowed outage time (AOT) changes (reference 1). Tier 1 is an evaluation of the impact on plant risk of the proposed TS change as expressed by the change in core damage frequency (ΔCDF), the incremental conditional core damage probability (ICCDP), and, when appropriate, the change in large early release frequency (ΔLERF) and the incremental conditional large early release probability (ICLERP). Tier 2 is an identification of potentially high-risk configurations that could exist if equipment in addition to that associated with the change were to be taken out of service simultaneously, or other risk significant operational factors such as concurrent system or equipment testing were also involved. The objective of this part of the evaluation is to ensure that appropriate restrictions on dominant risk-significant configurations associated with the change are in place. Tier 3 is the establishment of an overall configuration risk management program to ensure that other potentially lower probability, but nonetheless risk-significant, configurations resulting from maintenance and other operational activities are identified and compensated for.

WCAP-15376 identified restrictions on concurrent removal of certain equipment when an RTB is out of service. These recommended Tier 2 restrictions are provided in Section 8.5 of WCAP-15376 (reference 2).

BASES

BACKGROUND (continued)

Additionally, 10CFR50.62 provides requirements for reduction of risk from anticipated transients without scram (ATWS) events for light-water-cooled nuclear power plants. This rule states that each pressurized water reactor must have equipment from sensor output to final actuation device, that is diverse from the reactor trip system, to automatically initiate the auxiliary (or emergency) feedwater system and initiate a turbine trip under conditions indicative of an ATWS. For PWR designs other than Westinghouse designs (i.e., CE and B&W) the rule requires that they must have a diverse scram system from the sensor output to interruption of power to the control rods. Although not required by the rule, in 1998 Kewaunee received NRC approval for installation of a Diverse Scram System (DSS) (reference 4).

During an engineering review of the AFW system, Kewaunee staff determined that the AFW pumps may trip on low suction pressure during a postulated ATWS event initiated by a Loss of Normal Feedwater transient (LONF). With prompt operator action to restore AFW pump operation, reactor conditions would remain within acceptance criteria, but with less primary coolant system peak pressure margin than originally calculated. To resolve this concern, Kewaunee staff determined that the addition of a Diverse Scram System (DSS) will restore the original safety margin.

The DSS change modified the exciter field circuits of the motor/generator (M/G) sets which powers trains A and B control rod cabinets. Contacts from the existing AMSAC relay are installed in series with auxiliary relays contacts, such that upon opening, it will de-energize the M/G exciter field after a 2-second delay. The de-energization of the exciter field results in a loss of generator output voltage, causing the stationary gripper coils to de-energize, causing the control rods to drop into the reactor core, shutting down the reactor.

As a part of the 7.4% stretch power uprate License Amendment (LA) 172, the ATWS event had to be reanalyzed. A conservative approach was taken supporting LA 172 showed that the analytical basis for the final ATWS rule continues to be met, wherein no credit was taken for the DSS. An ATWS analysis was also performed to address the steam generator pressure criterion. Since the DSS was installed at KPS to address NPSH concerns, the DSS in conjunction with the AMSAC system was credited for event mitigation. The results of the analysis crediting the DSS in conjunction with the AMSAC system show that the steam generator pressure is greater than 640 psig subsequent to AFW pump initiation and prior to the time of reactor trip (reference 5).

BASES

TNC and APPLICABILITY

The Reactor Trip Breakers and Logic Cabinets shall be OPERABLE when required by Technical Specifications (TS) to be OPERABLE.

CONTINGENCY MEASURES

A1, A.2, and A.3

This contingency implements tier two of the three tiered approach to evaluate risk-informed AOT changes in Regulatory Guide 1.177 (reference 1). The objective of the second tier is to provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when equipment is out of service. If risk-significant configurations do occur, then enhancements to Technical Specifications or procedures, such as limiting unavailability of backup systems, increased surveillance frequencies, or upgrading procedures or training, can be made that avoid, limit, or lessen the importance of these configurations. Placing these restrictions on plant operation avoids risk-significant plant configurations

A Note is added to allow one AFW pump to be placed in pullout intermittently for maintenance. At Kewaunee the ATWS/LONF accident was analyzed for five cases (reference 6) Each of the cases changed the input assumption for AFW flow assuming 800 gpm, 400 gpm, 3 AFW pumps flow, 2 AFW pumps flow, and 1 AFW pumps flow. All five cases demonstrated acceptable results. Additionally, the diverse scram system at Kewaunee provides additional risk benefit for an ATWS event in that the probability of an ATWS requiring immediate AFW is reduced. The risk analysis performed by Westinghouse in WCAP-15376-P-A, which recommended not degrading AFW when a reactor trip breaker was inoperable, did not assume a diverse scram system was available. The risk benefit of the diverse scram system will result is a risk neutral condition for one AFW pump in pullout during maintenance when compared to the risk analysis assumed by the Tier 2 restrictions from WCAP 15376-P-A. Therefore, Kewaunee meets the intent of WCAP 15376-P-A Tier 2 Restrictions with one AFW pump in pullout for maintenance.

BASES

CONTINGENCY MEASURES (continued)

B1, B.2, and B.3

The objective of the second tier is to provide reasonable assurance that risk-significant plant equipment outage configurations will not occur when equipment is out of service. If risk-significant configurations do occur, then enhancements to Technical Specifications or procedures, such as limiting unavailability of backup systems, increased surveillance frequencies, or upgrading procedures or training, can be made that avoid, limit, or lessen the importance of these configurations. Placing these restrictions on plant operation avoids risk-significant plant configurations

C.1

When it is discovered that a TNC has not been met and the associated CONTINGENCY MEASURES are not satisfied (or an associated CONTINGENCY MEASURE is not provided), the equipment subject to the TNC is in a nonconforming condition. In this situation, appropriate actions shall be taken as necessary to provide assurance of continued safe plant operations. TNC 7.5.3 provides direction for these appropriate actions.

TECHNICAL VERIFICATION REQUIREMENTS

Verification activities are performed in accordance with Technical Specifications. There are no additional TVRs specified in this TRM section

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REFERENCES

1. Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications" August 1998.
2. WCAP-15376-P-A, Revision 1, "Risk-Informed Assessment of the RTS and ESFAS Surveillance Test Intervals and Reactor Trip Breaker Test and Completion Times" March 2003.
3. Kewaunee Power Station License Amendment Request 249, "Conversion to Improved Standard Technical Specifications."
4. Letter from William O. Long (NRC) to M.L. Marchi (WPSC), "Kewaunee Safety Evaluation – AMSAC Modification," dated July 29, 1998.
5. Calculation - CN-TA-02-110, Revision 1, ATWS Evaluation for Kewaunee Uprate Program, dated November 6, 2003.
6. Calculation - CN-TA-02-110, Revision 0, ATWS Evaluation for Kewaunee Uprate Program, dated November 6, 2003.

8.3 INSTRUMENTATION

8.3.9 Reactor Thermal Output Monitoring

TNC 8.3.9 The Plant Process Computer System (PPCS) Reactor Thermal Output (RTO) monitoring program shall be FUNCTIONAL with the following provisions:

a. Steam generator conductivity shall be ≤ 20 µmhos;

b. Ultrasonic Flow Measurement Device (UFMD) feedwater flow correction factors shall be in service;

c. UFMD feedwater temperature correction factors shall be in service.

APPLICABILITY: THERMAL POWER > 1749 MWth.

CONTINGENCY MEASURES

---NOTE---

Multiple Nonconformance entries are allowed.

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. Steam generator conductivity > 20 µmhos.	A.1	Initiate action to insert temperature correction factors.	Immediately
	<u>AND</u>		
	A.2	Initiate action to reduce UFMD Operating Limit to ≤ 1769 MWth.	Immediately
	<u>AND</u>		
	A.3	Reduce THERMAL POWER to ≤ 1769 MWth (15 minute average) and to ≤ 1768.7 MWth (8 hour average).	24 hours after the last performance of a secondary calorimetric calculation

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
B. Feedwater flow correction factor not in service. <u>OR</u> Feedwater flow correction factor has inserted value. <u>OR</u> Feedwater flow correction factor questionable.	B.1 Initiate action to reduce UFMD Operating Limit to ≤ 1749 MWth.	Immediately
	<u>AND</u>	
	B.2 Reduce THERMAL POWER to ≤ 1749 MWth (15 minute average) and to ≤ 1748.7 MWth (8 hour average).	24 hours after the last performance of a secondary calorimetric calculation
C. Feedwater temperature correction factor not in service. <u>OR</u> Feedwater temperature correction factor has inserted value. <u>OR</u> Feedwater temperature correction factor questionable.	C.1 Initiate action to reduce UFMD Operating Limit to ≤ 1769 MWth.	Immediately
	<u>AND</u>	
	C.2 Reduce THERMAL POWER to ≤ 1769 MWth (15 minute average) and to ≤ 1768.7 MWth (8 hour average).	24 hours after the last performance of a secondary calorimetric calculation

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
D. RTO monitoring program NonFUNCTIONAL.	D.1 Reduce THERMAL POWER to ≤ 1749 MWth.	24 hours after the last performance of a secondary calorimetric calculation

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.3.9.1	Perform signal conditioning/processing unit self test.	6 months AND After calibration
TVR 8.3.9.2	Reboot the UFM and UTM.	6 months
TVR 8.3.9.3	Perform reflected signal strength indication scan.	12 months
TVR 8.3.9.4	Recalibrate the signal conditioning/processing unit.	18 months

BASES

BACKGROUND

Feedwater flow is measured using the venturi flow meters on each of the feedwater line headers. The venturi feedwater flow is corrected using the Crossflow ultrasonic flow measurement devices (UFMDs) that are located on the A and B feedwater lines. Feedwater flow provides input into the secondary calorimetric calculation. In the event that the feedwater flow correction factors from the UFMD system become questionable, reactor thermal power output must be reduced in a specified time period to a power output consistent with secondary calorimetric power measurement uncertainty of 2.0 percent. If power level has been reduced due to questionable feedwater flow correction factors from the UFMD system, the feedwater flow venturis may be corrected for fouling using the full flow feedwater bypass line (FBL). The total FBL flow section feedwater flow measurement uncertainty is 0.45 percent; however, reactor thermal power output is limited to a power output consistent with a 2.0 percent secondary calorimetric power measurement uncertainty (reference 1).

Correcting venturi feedwater flow with the Crossflow System is the basis for the measurement uncertainty recapture (MUR) power uprate, which increased licensed rated reactor thermal power output.

Calorimetric power measurement uncertainty is used in the determination of reactor thermal power output. Secondary calorimetric power measurement is obtained from measurement of feedwater flow, feedwater inlet temperature to the steam generator and steam pressure. This power measurement is performed periodically to ensure that reactor thermal power output does not exceed licensed limits. It is also used to calibrate/adjust the nuclear instrumentation on a periodic basis to ensure that the nuclear instrumentation is indicating reactor power consistent with the secondary calorimetric power measurement.

The MUR power uprate was achieved by installation of AMAG Crossflow Ultrasonic Flow Measurement Devices (UFMDs) on the A and B Feedwater Loops, which allow reactor thermal power output to be measured more accurately. Each UFMD consists of an ultrasonic flow meter (UFM) and ultrasonic temperature monitor (UTM). The Crossflow UFMDs derive feedwater flow and feedwater temperature correction factors that are input into the Plant Process Computer System (PPCS). Use of the UFMD correction factors along with the relaxation of the 10 CFR 50, Appendix K rule regarding power measurement uncertainty, allows for operation at a power level consistent with the actual power measurement uncertainty (reference 2).

BASES

BACKGROUND (continued)

When the UFM and UTM are providing reliable correction factors, total secondary calorimetric power measurement uncertainty is 0.6%. If a UTM correction factor becomes questionable, the total secondary calorimetric power measurement uncertainty is 0.8%. If a UFM correction factor becomes questionable, the total secondary calorimetric power measurement uncertainty is 2.0% (reference 2). Reactor thermal power output must be reduced in a specified time period to a power output consistent with the appropriate secondary calorimetric power measurement uncertainty if the correction factors from the UFMD system specified above become questionable.

Additional information on ensuring adherence to the maximum THERMAL POWER limit is provided via a safety evaluation discussed in NRC Regulatory Issue Summary (RIS) 2007-21, Revision 1 (reference 3).

TNC and APPLICABILITY

The Plant Process Computer System (PPCS) Reactor Thermal Output (RTO) monitoring program is required to be FUNCTIONAL whenever reactor thermal power is > 1749 MWth (98.7%; as indicated by the 15 minute average).

Operation up to the maximum licensed reactor power level (1772 MWth) requires the UFMD feedwater flow and temperature correction factors to be in service. Therefore, the following provisions must be met whenever the PPCS RTO monitoring program is required to be FUNCTIONAL: a) Steam generator conductivity shall be ≤ 20 μmhos; b) the UFMD feedwater flow correction factors shall be in service; and, c) the UFMD feedwater temperature correction factors shall be in service.

A questionable feedwater flow or temperature correction factor is the last good correction factor received from the UFMD system prior to a condition that causes the system to stop providing automatic updates. Since the questionable correction factor is good, the PPCS RTO monitoring program remains FUNCTIONAL when using a questionable correction factor. However, since questionable correction factors are not updated, operation with their use is limited to the time stated in the ACTIONS section for the respective questionable correction factor.

BASES

CONTINGENCY MEASURES

The CONTINGENCY MEASURES are modified by a Note allowing for multiple Condition entries to be entered concurrently.

The various CONTINGENCY MEASURES direct reducing reactor power and the Ultrasonic Flow Measurement Device (UFMD) Operating Limit to specified values within 24 hours of the last performance of a secondary calorimetric calculation (i.e., the last calorimetric using a valid UFMD correction factor that was performed before the associated Nonconformance occurred) (reference 4). Secondary calorimetric calculations are performed in accordance with plant procedures (reference 5).

The 24 hour allowance is based on the daily nuclear power range surveillance (SR 3.3.1.2) (reference 4). It is also based on unit operating experience, considering instrument reliability and operating history data for instrument drift. Together, these factors demonstrate that a difference between the calorimetric heat balance calculation and the power range channel output of more than + 2% reactor thermal power is not expected in any 24 hour period.

A.1

Uncertainty of the ultrasonic temperature monitors (UTM) is impacted if feedwater total dissolved solids (TDS) are greater than 20 ppm (steam generator conductivity > 20 μmhos). The UTMs are NonFUNCTIONAL when TDS is greater than 20 ppm. In this condition, the associated Actions require immediate initiation of action to insert current temperature correction factors and to reduce the UFMD Operating Limit to ≤ 1769 MWth. Although the UFMD Operating Limit is automatically set to 1769 MWth if any temperature correction factor is questionable, the system does not automatically detect high steam generator conductivity; therefore, the last good correction factors must be inserted manually.

Additionally, the associated CONTINGENCY MEASURES require reducing reactor power to ≤ 1769 MWth (as indicated by the 15 minute average) and to ≤ 1768.7 MWth (as indicated by the 8 hour average) within 24 hours of the last performance of a secondary calorimetric calculation (that was performed before this Nonconformance was entered).

Since the UTMs are rendered NonFUNCTIONAL when feedwater TDS > 20 ppm, this condition needs to be evaluated for simultaneous entry into Nonconformance C.

CONTINGENCY MEASURES (continued)

B.1

If any feedwater flow correction factor is either not in service, has an inserted value, or is questionable, the power measurement uncertainty may be higher than the ideal value. In this condition, the associated Actions require immediate initiation of action to reduce the UFMD Operating Limit to ≤ 1749 MWth. This action is performed on the plant process computer system (PPCS). Note that the UFMD Operating Limit is automatically set to 1749 MWth if any flow correction factor is questionable.

Additionally, the associated CONTINGENCY MEASURES require reducing reactor power to ≤ 1749 MWth (as indicated by the 15 minute average) and to ≤ 1748.7 MWth (as indicated by the 8 hour average) within 24 hours of the last performance of a secondary calorimetric calculation (that was performed before this Nonconformance was entered).

C.1

If any feedwater temperature correction factor is either not in service, has an inserted value, or is questionable, the power measurement uncertainty may be higher than the ideal value. In this condition, the associated Actions require immediate initiation of action to reduce the UFMD Operating Limit to ≤ 1769 MWth. This action is performed on the PPCS. Note that the UFMD Operating Limit is automatically set to 1769 MWth if any temperature correction factor is questionable.

Additionally, the associated CONTINGENCY MEASURES require reducing reactor power to ≤ 1769 MWth (as indicated by the 15 minute average) and to ≤ 1768.7 MWth (as indicated by the 8 hour average) within 24 hours of the last performance of a secondary calorimetric calculation (that was performed before this Nonconformance was entered).

D.1

If the RTO monitoring program is NonFUNCTIONAL, the primary method for accurately monitoring RTO is unavailable. In this condition, the associated CONTINGENCY MEASURES require reducing reactor power to ≤ 1749 MWth (as indicated by calorimetric (reference 4)) within 24 hours of the last performance of a secondary calorimetric calculation (that was performed before this Nonconformance was entered).

BASES

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.3.9.1

A self test of the signal conditioning/processing unit is required to be performed every 6 months. This test is performed automatically by installed software (reference 4). A self test must also be performed following calibration of the unit prior to returning it to service.

TVR 8.3.9.2

The UFM and UTM signal conditioning/processing unit is required to be rebooted every 6 months (reference 4).

TVR 8.3.9.3

A reflected signal strength indication scan is required to be performed annually (reference 4).

TVR 8.3.9.4

The signal conditioning/processing unit is required to be recalibrated every 18 months. This recalibration is typically performed every refueling outage by returning the unit to the vendor (reference 4).

REFERENCES

1. USAR Section 10.2.2.7, Main Feedwater System.
2. USAR Section 14.0.4.1, Calorimetric Error Instrumentation Accuracy.
3. NRC Regulatory Issue Summary (RIS) 2007-21, Rev. 1, "Adherence to Licensed Power Limits," February 9, 2009.
4. KPS License Amendment 168 and associated NRC safety evaluation, dated July 8, 2003.
5. Procedure SP-87-125, "Shift Instrument Channel Checks – Operating."

8.4 REACTOR COOLANT SYSTEM (RCS)

8.4.1 Chemistry

TNC 8.4.1 Reactor Coolant System chemistry shall be maintained within the limits specified in Table 8.4.1-1 and Table 8.4.1-2.

APPLICABILITY: All MODES.

CONTINGENCY MEASURES

-----NOTE-----

If a reactor shutdown is required as a result of exceeding Table 8.4.1-1 Transient Limits, then reactor restart and continued reactor operation may be permitted upon safety review by Facility Safety Review Committee.

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. One or more chemistry parameter in excess of its Normal Steady State Limit but within its Transient Limit of Table 8.4.1-1.	A.1	Initiate action to restore the parameter to within its Normal Steady State Limit.	Immediately
	<u>AND</u>		
	A.2	Restore the parameter to within its Normal Steady State Limit.	24 hours
B. CONTINGENCY MEASURE and associated Restoration Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	<u>AND</u>		
	B.2	Be in MODE 5.	36 hours
<u>OR</u>	<u>AND</u>		
One or more chemistry parameters in excess of its Transient Limit of Table 8.4.1-1.	B.3	Facility Safety Review Committee conduct safety review.	Prior to Startup

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
C. Chemistry parameter not within normal concentration limits of Table 8.4.1-2.	C.1 Restore concentration limits established in Table 8.4.1-2.	48 hours
D. CONTINGENCY MEASURE and associated Restoration Time of Condition C not met. OR Chemistry parameter not within transient limits of Table 8.4.1-2.	D.1 Be in MODE 5.	36 hours

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.4.1.1	------------------------------NOTE------------------------------ Only required when reactor coolant temperature > 250°F. -- Determine by analysis, the parameters listed in TRM Table 8.4.1-1 are within their specified limits.	----------NOTE------------- Maximum time between tests is 4 days ------------------------------ 3 times per week
TVR 8.4.1.2	------------------------------NOTE------------------------------ Only required when reactor coolant temperature ≤ 250°F. -- Determine by analysis, the parameters listed in TRM Table 8.4.1-2 are within their specified limits.	-----------NOTE------------ Maximum time between tests is 4 days ------------------------------ 3 times per week

Table 8.4.1-1 (page 1 of 1)
Concentration of Contaminants Reactor Coolant Temperature > 250° F

CONTAMINANT	NORMAL STEADY STATE OPERATION	TRANSIENT LIMITS
Oxygen	≤ 0.10 ppm	≤ 1.00 ppm
Chloride	≤ 0.15 ppm	≤ 1.50 ppm
Fluoride	≤ 0.15 ppm	≤ 1.50 ppm

---NOTE---

To meet the above limits, reactor coolant pump operation shall be permitted for short periods, provided the coolant temperature does not exceed 250° F.

TABLE 8.4.1-2 (Page 1 of 1)
Concentration of Contaminants Reactor Coolant Temperature ≤ 250° F

CONTAMINANT	NORMAL CONCENTRATION	TRANSIENT LIMITS
Oxygen	Saturated	Saturated
Chloride	≤ 0.15 ppm	≤ 1.50 ppm
Fluoride	≤ 0.15 ppm	≤ 1.50 ppm

-----NOTE-----

To meet the above limits, reactor coolant pump operation shall be permitted for short periods, provided the coolant temperature does not exceed 250° F.

BASES

BACKGROUND

By maintaining the oxygen, chloride and fluoride concentrations in the reactor coolant below the limits as specified in TRM 8.4.1, the integrity of the Reactor Coolant System is ensured under all OPERATING conditions (reference 1).

If these limits are exceeded, measures can be taken to correct the condition, e.g., replacement of ion exchange resin or adjustment of the hydrogen concentration in the volume control tank (reference 2). Because of the time-dependent nature of any adverse effects arising from oxygen, chloride, and fluoride concentration in excess of the limits, it is unnecessary to shut down immediately since the condition can be corrected. Thus, the time periods for corrective action to restore concentrations within the limits have been established. If the corrective action has not been effective at the end of the time period, reactor cooldown will be initiated and corrective action will continue.

The effects of contaminants in the reactor coolant are temperature dependent. The reactor may be restarted and operation resumed if the maximum concentration of any of the contaminants did not exceed the permitted transient values; otherwise a safety review by the Facility Safety Review Committee is required before startup.

REFERENCES

1. USAR Section 4.2
2. USAR Section 9.2
3. EPRI Report 1014986, Pressurized Water Reactor Primary Water Chemistry Guidelines

8.4 REACTOR COOLANT SYSTEM (RCS)

8.4.3 Reactor Coolant Vent System

TNC 8.4.3 The following reactor coolant system vent paths shall be FUNCTIONAL and closed:

a. Reactor vessel head vent path.

b. Pressurizer steam space vent path.

APPLICABILITY: MODES 1, 2, 3, and 4.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. One Vent Path NonFUNCTIONAL.	A.1 Restore the NonFUNCTIONAL vent path to FUNCTIONAL status.	30 days
B. Two Vent Paths NonFUNCTIONAL.	B.1 Restore at least one NonFUNCTIONAL vent path to FUNCTIONAL status.	72 hours
C. Required CONTINGENCY MEASURE and associated Restoration Time of Nonconformance A or B not met.	C.1 Enter TNC 7.5.3.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.4.3.1	Cycle each solenoid operated valve in each vent path through at least one complete cycle of full travel.	Once per operating cycle or once every 18 months, whichever occurs first
TVR 8.4.3.2	Verify unobstructed flow exists through the reactor coolant system vent paths during normal filling and venting operations following refueling.	Once per operating cycle or once every 18 months, whichever occurs first

BASES

BACKGROUND

The function of the High Point Vent System is to vent noncondensible gases from the high points of the RCS to ensure that core cooling during natural circulation will not be inhibited. The FUNCTIONALITY of at least one vent path from both the reactor vessel head and pressurizer steam space ensures the capability exists to perform this function.

The vent path from the reactor vessel head and the vent path from the pressurizer each contain two independently emergency powered, energize to open, valves in parallel, and connect to a common header that discharges either to the containment atmosphere or to the pressurizer relief tank. The lines to the containment atmosphere and pressurizer relief tank each contain an independently emergency powered, energize to open, isolation valve. This redundancy provides protection from the failure of a single vent path valve rendering an entire vent path NonFUNCTIONAL.

TNC and APPLICABILITY

A FUNCTIONAL vent path consists of the piping and valves necessary to relieve noncondensible gases from the reactor head or the pressurizer to the pressurizer relief tank or the containment atmosphere. Therefore, for a FUNCTIONAL reactor vessel head vent path, either valve RC-45A or RC-45B must be FUNCTIONAL and either valve RC-46 or RC-49 must be FUNCTIONAL. Accordingly, for a FUNCTIONAL pressurizer vent path, either PR-33A or PR-33B must be FUNCTIONAL and either RC-46 or RC-49 must be FUNCTIONAL.

A flow restriction orifice in each vent path limits the flow from an inadvertent actuation of the vent system to less than the flow capacity of one charging pump.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.4.3.1

The cycling of each solenoid operated valve once each refueling ensures that the valves are capable of opening, if required to vent the reactor coolant system. More frequent cycling of these valves is not practical since it would provide unnecessary challenges to the reactor coolant pressure boundary during plant operation.

TVR 8.4.3.2

Flow verification is performed to assure that there are no blockages in the reactor coolant system vent piping that would prevent venting of noncondensible gases from the reactor coolant system. Flow verification is performed following each refueling by qualitatively assuring flow exist through the system during the post-refueling filling and venting of the RCS.

DELETED
May 28, 2013

8.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

8.5.1 Accumulators

TNC 8.5.1 Accumulator check valves and block valves shall be FUNCTIONAL.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. TNC 8.5.1 not met.	A.1 Evaluate OPERABILITY of Accumulators per Technical Specification 3.5.1.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.5.1.1	Verify accumulator check valves are FUNCTIONAL.	18 months
TVR 8.5.1.2	Verify accumulator block valves are checked for “valve open” requirements.	18 months

BASES

BACKGROUND

The requirement for accumulator check valves and block valves was relocated from the previous Custom Technical Specifications (TS) during the conversion to Improved TS in License Amendment 207 (Reference 1),

The accumulator discharge check valves (SI-21A(B) and SI-22A(B)) have both an open and closed function. They are considered FUNCTIONAL when they have the ability to pass flow from the accumulator to the RCS. Additionally, the accumulator discharge check valves are considered FUNCTIONAL, during normal plant operation with the safety injection (SI) system in standby, when the check valves are closed and isolating the reactor coolant system from the SI accumulators.

The "valve open" requirement for the accumulator block valves (SI-20A(B)) is met when the accumulator block valve open indication in the control room is verified to accurately indicate that the block valve is open by the passing of water from the accumulator to the reactor coolant system (RCS) when the control room indicator indicates the valve is open.

TNC and APPLICABILITY

Accumulator check valves and block valves shall be FUNCTIONAL whenever the SI accumulators are required to be OPERABLE in accordance with TS 3.5.1 (i.e., in MODES 1 and 2, and in MODE 3 with RCS pressure > 1000 psig) (Reference 2).

CONTINGENCY MEASURES

A.1

If any accumulator check valve or block valve is not FUNCTIONAL, OPERABILITY of the associated accumulator(s) must be evaluated per TS 3.5.1.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.5.1.1

A verification that each accumulator check valve is FUNCTIONAL is required to be performed every 18 months.

TVR 8.5.1.2

A verification that each accumulator block valve is checked for "valve open" requirements is required to be performed every 18 months.

BASES

REFERENCES

1. License Amendment 207, "Kewaunee Power Station (KPS) – Issuance of Amendment for the Conversion to the Improved Technical Specifications with Beyond Scope Issues (TAC Nos. ME2139, ME2419, ME2420, ME2421, ME3122, ME3460, and ME3544)", dated February 2, 2011.
2. Technical Specification 3.5.1, Accumulators.

DELETED
May 28, 2013

8.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

8.5.2 Emergency Core Cooling System (ECCS), Residual Heat Removal System, and Internal Containment Spray System Gas Accumulation

TNC 8.5.2 All required Safety Injection (SI), Residual Heat Removal (RHR) and Internal Containment Spray (ICS) trains shall be sufficiently full of water.

APPLICABILITY: Whenever the associated SI, RHR and ICS trains are required to be OPERABLE by Technical Specifications (TS).

CONTINGENCY MEASURES

------------------------------------NOTE------------------------------------

Separate Nonconformance entry is allowed for each ECCS train, RHR train, and ICS train.

NONCONFORMANCE	CONTINGENCY MEASURE	RESTORATION TIME
A. One or more required ECCS trains not sufficiently full of water.	A.1 Evaluate OPERABILITY of ECCS train(s) per Technical Specification 3.5.2.	Immediately
	AND	
	A.2 Evaluate OPERABILITY of ECCS train(s) per Technical Specification 3.5.3.	Immediately
B. One or more required RHR trains not sufficiently full of water.	B.1 Evaluate OPERABILITY of RHR train(s) per Technical Specification 3.4.6.	Immediately
	AND	
	B.2 Evaluate OPERABILITY of RHR train(s) per Technical Specification 3.4.7.	Immediately
	AND	
	B.3 Evaluate OPERABILITY of RHR train(s) per Technical Specification 3.4.8.	Immediately

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURE	RESTORATION TIME
C. One or more ICS train(s) not sufficiently full of water.	C.1 Evaluate OPERABILITY of ICS train(s) per Technical Specification 3.6.6.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.5.2.1	Verify SI, RHR and ICS piping is sufficiently full of water.	92 days

BASES

BACKGROUND

The U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2008-01 (reference 3) to address the issue of gas accumulation in the emergency core cooling, decay heat removal (DHR), and containment spray systems. At Kewaunee the DHR function is performed by the RHR system. Because the RHR system serves two functions, ECCS and DHR, it is listed separately, covering each function, as appropriate.

The ECCS and ICS System pumps are normally in a standby non-operating mode. As such, some flow path piping has the potential to develop pockets of entrained gases. Plant operating experience and analysis has shown that after proper system filling (following maintenance or refueling outages), some entrained non-condensable gases remain. These gases will form small voids, which remain stable in the system in both normal and transient operation. Mechanisms postulated to increase the void size are gradual in nature, and the system is operated in accordance with procedures to preclude growth in these voids. In addition, other mechanisms, such as valve seat leakage into the stagnant systems from other gas-laden sources, system fluid velocities and physical geometries can cause a gradual increase in the size of gas voids.

The system is sufficiently full of water when the voids and pockets of entrained gases in the ECCS, RHR, and ICS piping are small enough in size and number to not interfere with the proper operation of the ECCS, RHR, or ICS systems. Verification that the ECCS, RHR, and ICS piping is sufficiently full of water can be performed by venting the necessary accessible high point ECCS, RHR, and ICS vents, using NDE, or using other engineering-justified means.

Maintaining the piping and components from the ECCS pump suction sources to the final isolation valve before connection to the RCS sufficiently full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent pump cavitation and air binding, water hammer, and pumping of excess non-condensable gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SI signal or during shutdown cooling.

Exceptions to the ECCS system being sufficiently full of water are discussed in USAR Section 6.2.2.3 (Reference 1). These exceptions are designed such that they can accommodate a void without affecting the operability of the associated systems.

BASES

BACKGROUND (continued)

Maintaining the piping and components from the ICS pump suction sources to the discharge to containment sufficiently full of water ensures that the system will perform properly, injecting its full capacity into containment upon demand.

TNC and APPLICABILITY

All required SI, RHR and ICS trains shall be sufficiently full of water to be FUNCTIONAL whenever the associated SI, RHR and ICS trains are required to be OPERABLE by Technical Specifications (TS).

CONTINGENCY MEASURES

The Actions are modified by a Note. The Note provides clarification that each train allows separate entry into a Condition. This is allowed based upon the FUNCTIONAL independence of each train. The SI and RHR systems together comprise the ECCS system. These systems work in tandem to provide core cooling and negative reactivity to ensure that the reactor core is protected. Thus, the SI/RHR system consists of two trains and the ICS system consists of two trains.

<u>A.1 and A.2</u>

With one or more ECCS train not sufficiently full of water, it is not capable of delivering design flow to the RCS. When a train is not sufficiently full of water, the appropriate TS ACTION(S) must be entered immediately. Individual components are NonFUNCTIONAL if they are not capable of performing their design function or supporting systems are not available.

<u>B.1, B.2, and B.3</u>

Condition B is applicable when one or more trains of RHR are not sufficiently full of water. In this condition, the RHR system needs to be considered for decay heat removal requirements. When a train is not sufficiently full of water, the appropriate TS ACTION(S) must be entered immediately.

BASES

CONTINGENCY MEASURES (continued)

C.1

Condition C is applicable when one or more trains of ICS are not sufficiently full of water and not capable of delivering design flow to containment. When a train is not sufficiently full of water, it is considered NonFUNCTIONAL and the appropriate TS ACTION must be entered immediately.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.5.2.1

The ECCS and ICS System pumps are normally in a standby non-operating mode. As such, some flow path piping has the potential to develop pockets of entrained gases. Plant operating experience and analysis has shown that after proper system filling (following maintenance or refueling outages), some entrained non-condensable gases remain. These gases will form small voids, which remain stable in the system in both normal and transient operation. Mechanisms postulated to increase the void size are gradual in nature, and the system is operated in accordance with procedures to preclude growth in these voids. In addition, other mechanisms, such as valve seat leakage into the stagnant systems from other gas-laden sources, system fluid velocities and physical geometries can cause a gradual increase in the size of gas voids.

To provide additional assurances that the system will function, verification is performed every 92 days that the system is sufficiently full of water. The system is sufficiently full of water when the voids and pockets of entrained gases in the ECCS, RHR, and ICS piping are small enough in size and number to not interfere with the proper operation of the ECCS, RHR, or ICS systems. Verification that the ECCS, RHR, and ICS piping is sufficiently full of water can be performed by venting the necessary accessible high point ECCS, RHR, and ICS vents, using NDE, or using other Engineering-justified means.

Maintaining the piping and components from the ECCS pump suction sources to the final isolation valve before connection to the RCS sufficiently full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent pump cavitation and air binding, water hammer, and pumping of excess non-condensable gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SI signal or during shutdown cooling. The 92-day frequency takes into consideration the gradual nature of the postulated gas accumulation mechanisms.

BASES

TECHNICAL VERIFICATION REQUIREMENTS (continued)

Maintaining the piping and components from the ECCS pump suction sources to the final isolation valve before connection to the RCS sufficiently full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent pump cavitation and air binding, water hammer, and pumping of excess non-condensable gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SI signal or during shutdown cooling. The 92-day frequency takes into consideration the gradual nature of the postulated gas accumulation mechanisms.

Exceptions to the ECCS system being sufficiently full of water are discussed in USAR Section 6.2.2.3 (Reference 1). These exceptions are designed such that they can accommodate a void without affecting the operability of the associated systems.

Maintaining the piping and components from the ICS pump suction sources to the discharge to containment sufficiently full of water ensures that the system will perform properly, injecting its full capacity into containment upon demand. The 92-day frequency takes into consideration the gradual nature of the postulated gas accumulation mechanisms.

REFERENCES

1. USAR 6.2, "Safety Injection System."
2. USAR 6.4, "Internal Containment Spray System."
3. NRC Generic Letter 2008-01, Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems.

8.6 CONTAINMENT SYSTEMS

8.6.1 Containment Hydrogen Monitoring System

TNC 8.6.1 Containment Hydrogen Monitoring System, consisting of two trains and associated containment dome fans, shall be FUNCTIONAL.

------------------------------NOTE------------------------------
A change in operational MODES or conditions is acceptable with one or both trains of the Containment Hydrogen Monitoring System and its associated Containment Dome Vent Fan NonFUNCTIONAL.

APPLICABILITY: MODE 1 and 2.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. One train of Containment Hydrogen Monitoring System NonFUNCTIONAL.	A.1	Restore Containment Hydrogen Monitoring System train to FUNCTIONAL status.	30 days
B. Two trains of Containment Hydrogen Monitoring System NonFUNCTIONAL.	B.1	Restore one Containment Hydrogen Monitoring System train to FUNCTIONAL status.	72 hours
C. CONTINGENCY MEASURE and associated Restoration Time of Nonconformance A or B not met.	C.1	Enter condition into the corrective action process to address why the hydrogen monitors were not restored to FUNCTIONAL status within the allotted time.	Immediately

DELETED
May 28, 2013

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.6.1.1	Perform CHANNEL CHECK.	24 hours
TVR 8.6.1.2	Perform CHANNEL FUNCTIONAL TEST.	31 days
TVR 8.6.1.3	Perform CHANNEL CALIBRATION.	18 months

BASES

BACKGROUND

The TS requirements for a Containment Hydrogen Monitoring System have been removed from TS as listed in the Federal Register on September 25, 2003. Guidance for the Consolidated Line Item Improvement Process (CLIIP) has been incorporated in the Technical Specification Task Force (TSTF) Change Traveler 447, Rev.1. Part of the requirements for removing Containment Hydrogen Monitoring System from TS was to place any remaining requirements in a Licensee controlled document (Technical Requirements Manual) with the requirements that a hydrogen monitoring system be available for beyond design-basis accident monitoring of containment hydrogen levels.

Even though the requirements for Hydrogen Monitors were taken out of TS, the system still needs to be available for beyond design-basis accident monitoring of containment hydrogen levels. In the event CONTINGENCY MEASURES A or B are not met, the condition will be entered into the corrective action program immediately to address why the hydrogen monitors were not restored to FUNCTIONAL status within the allotted time. Actions shall be implemented in a timely manner to place the unit in a safe condition as determined by plant management. The intent of using the corrective action program is to assure prompt attention and adequate management oversight to minimize the additional time the hydrogen monitors are NonFUNCTIONAL.

The USAR credits the operation of the Containment Dome Vent Fans in section 5.8.2.17. The sample ports are located near the discharge of the Containment Dome Fans, which permit rapid detection of hydrogen escaping from the reactor. The fans draw suction from the upper areas of containment, which prevents the formation of a stratified atmosphere. KPS takes credit for the containment dome vent fans as a support system for the hydrogen monitors.

REFERENCES

1. PORC meeting 97-097
2. KAP 01-527
3. Commitment 97-115
4. Inspection Report 97-10 IFI 305/97010-01

8.7 PLANT SYSTEMS

8.7.4 Main Turbine Overspeed Protection

TNC 8.7.4 Main Turbine Overspeed Protection shall be FUNCTIONAL with at least two of the following turbine overspeed protection systems:

a. Mechanical overspeed trip mechanism,

b. Electro-hydraulic control,

c. Redundant overspeed trip (ROST) protection.

APPLICABILITY: MODE 1.

CONTINGENCY MEASURES

---NOTE---

When one turbine overspeed protection system is NonFUNCTIONAL, a second turbine overspeed protection system may be blocked for up to 4 hours to allow for testing without requiring entry into Nonconformance A, provided at least one system remains FUNCTIONAL.

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. One required turbine overspeed protection systems NonFUNCTIONAL.	A.1 Reduce power to less than 50% rated power.	6 hours
B. Two required turbine overspeed protection systems NonFUNCTIONAL.	B.1 Isolate the turbine from the steam supply.	6 hours

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.7.4.1	Perform turbine redundant overspeed trip test.	31 days
TVR 8.7.4.2	Perform turbine trip mechanism test.	92 days
TVR 8.7.4.3	Perform turbine mechanical overspeed trip calibration check.	18 months
TVR 8.7.4.4	Perform turbine electro-hydraulic overspeed trip test.	18 months
TVR 8.7.4.5	Perform turbine electro-hydraulic overspeed trip calibration.	18 months
TVR 8.7.4.6	Perform redundant overspeed turbine trip system calibration.	18 months

BASES

BACKGROUND

The main function of the Main Turbine Overspeed Protection System is to prevent the generation of potentially damaging missiles from the turbine due to turbine overspeed. The potential effects of missile ejection from the turbine are explained in USAR Section, Appendix B.9, "Turbine Missile Effects" (reference 1).

Turbine overspeed, upon loss of electrical load, is prevented by the rapid cutoff of steam admission to the turbine. Turbine main steam and reheat steam admission are both controlled by series alignments of main turbine stop, control, reheat, and intercept valves which are held open against strong spring pressure by high-pressure hydraulic fluid. Overspeed control and protection is by release of hydraulic fluid pressure to the steam admission valves. Three independent overspeed protection systems and redundant hydraulic fluid pressure release valves assure a highly reliable prevention of turbine overspeed.

The E/H Control System incorporates an Overspeed Protection Controller to limit the overspeed of the turbine during a loss of electrical load. A turbine shaft speed transducer provides a signal to the E/H Control System and at 103 percent of rated shaft speed, this system releases the actuating hydraulic fluid pressure to close the control and intercept valves (reference 2). Once speed is reduced, the main turbine control and intercept valves reopen allowing the E/H Control System to return the turbine generator to 1800 rpm.

The main overspeed protection system is the mechanical overspeed trip mechanism which is backed up by two separate overspeed protection systems. However, actuation of any of the three systems dumps the E/H fluid and therefore initiates closure of all fourteen steam inlet valves. In addition to closing the steam inlet valves, dumping E/H fluid also closes the air pilot valve to the extraction line non-return valves to Feedwater Heaters No. 14 and 15, thereby closing the nonreturn valves. Baffles in Feedwater Heaters No. 11, 12, and 13 minimize flashback of water in these heaters. Even though the 14 steam inlet valves and the extraction line non-return valves are relied upon for overspeed protection, a Westinghouse analysis (WCAP-11525, "Probabilistic Evaluation of Reduction in Turbine Valve Test Frequency" and WCAP-16054-P, "Probabilistic Analysis of Reduction in Turbine Valve Test Frequency for Nuclear Plants with Siemens-Westinghouse BB-95/96 Turbines," determined certain valve failures would not result in a design overspeed situation.

The main overspeed protection system consists of an overspeed oil trip valve and a mechanical overspeed mechanism which consists of a spring-loaded eccentric weight mounted in the end of the turbine shaft.

BACKGROUND (continued)

At a maximum of 109.28 percent of rated shaft speed, centrifugal force moves the weight outward to mechanically actuate the overspeed trip valve which dumps auto stop oil pressure and in turn releases the actuating hydraulic fluid pressure to close the main turbine stop, control, reheat stop, and intercept valves. The supply steam pressure acts to hold the main turbine stop valves closed.

One of the backup overspeed protection systems is provided by the E/H Control System if turbine speed reaches 109.5 percent of rated speed. At this point, the solenoid trip is energized to dump the auto stop oil which releases actuating hydraulic fluid pressure to ensure closing of the main turbine stop, control, reheat stop, and intercept valves.

Another backup overspeed protection system is the Redundant Channel Overspeed Trip System (ROST). This system provides a completely independent and physically separate redundant sensing and tripping circuit to trip closed all steam supply valves at 109.5 percent of rated speed. Speed signals originate from three turbine speed-sensing magnetic pickups located in the exciter enclosure. The three pickups provide a signal to three speed switches each containing frequency converters, comparators, and trip relays. The unit works by comparing the signals from the frequency converters to the overspeed trip setpoint. An overspeed trip signal is generated by 2 out of 3 (2/3) relay trip logic which energizes redundant auto stop oil trip solenoids. When energized, the redundant auto stop oil trip devices release auto stop oil pressure which releases E/H fluid system pressure on the valve actuators of the main turbine stop, control, reheat stop, and intercept valves, allowing the heavy spring pressure to slam the valves closed. Power for the magnetic speed pickups, frequency converters and comparators is provided by the exciter's permanent magnet generator. Power for the trip relays is provided by 125 VDC battery BRC-101 and power for the redundant auto stop oil solenoids is provided by 125VDC battery BRA-101. Individual channels can be checked on line without loss of the emergency protective function.

BASES

TNC and APPLICABILITY

During power operation, Turbine Overspeed Protection is required to be FUNCTIONAL, including at least two of the following turbine overspeed protection systems: mechanical overspeed trip mechanism; electrohydraulic control; and, redundant overspeed trip (ROST) protection.

Reactor power shall not exceed 50 percent of rated power unless two of the three turbine overspeed protection systems are FUNCTIONAL.

CONTINGENCY MEASURES

The CONTINGENCY MEASURES are modified by a Note that allows blocking an individual overspeed protection system for up to 4 hours to allow for testing (reference 3). The provisions of this Note are applicable when only one of the turbine overspeed protection systems is NonFUNCTIONAL. One of the remaining two FUNCTIONAL systems may be blocked for up to 4 hours to allow for testing without requiring entry into Nonconformance A.

A.1

If two of the three turbine overspeed protection systems are NonFUNCTIONAL, power must be reduced below 50 percent of rated power within 6 hours.

B.1

If all three turbine overspeed protection systems are NonFUNCTIONAL, the turbine overspeed protection systems cannot automatically effect a turbine isolation. This Nonconformance requires that the turbine be isolated from its steam supply within 6 hours.

BASES

TECHNICAL VERIFICATION REQUIREMENTS

Testing of the turbine overspeed protection system is discussed in reference 3.

TVR 8.7.4.1

TVR 8.7.4.1 requires the performance of a turbine redundant overspeed trip test every 31 days.

TVR 8.7.4.2

TVR 8.7.4.2 requires the performance of a turbine trip mechanism test every 92 days.

TVR 8.7.4.3

TVR 8.7.4.3 requires the performance of a turbine mechanical overspeed trip calibration check 18 months.

TVR 8.7.4.4

TVR 8.7.4.4 requires the performance of a turbine electro-hydraulic overspeed trip test every 18 months.

TVR 8.7.4.5

TVR 8.7.4.5 requires the performance of a turbine electro-hydraulic overspeed trip calibration every 18 months.

TVR 8.7.4.6

TVR 8.7.4.6 requires the performance of a redundant overspeed turbine trip system calibration every 18 months.

REFERENCES

1. USAR Section B.9, Turbine Missile Effects.
2. USAR Section 10.2.2.10, Turbine Overspeed Control.
3. USAR Section 10.4.

8.7 PLANT SYSTEMS

8.7.6 Guard Pipes

TNC 8.7.6 Guard pipes shall be FUNCTIONAL.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is relied upon for heat removal.

CONTINGENCY MEASURES

---NOTE---

Separate entry is allowed for each guard pipe.

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. Guard pipe NonFUNCTIONAL	A.1	Initiate action to restore Guard pipe to FUNCTIONAL status.	Immediately
	<u>AND</u>		
	A.2	Enter TNC 7.5.3.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.7.6.1	Perform visual inspection of Guard Pipes.	After maintenance on equipment that could affect the operation of the guard pipe <u>AND</u> 18 months

BASES

BACKGROUND

The purpose of guard pipes is to prevent jet impingement from directly impacting vulnerable needed equipment. A guard pipe is used to totally enclose either the main steam line or feedwater line to prevent steam or water from damaging equipment.

Visual inspections will be made of the accessible portions of the hot process pipeline guard pipes once during each operating cycle or once every 18 months, whichever occurs first.

8.8 ELECTRICAL SYSTEMS

8.8.4 Reserve Auxiliary Transformer (RAT) / Reserve Supply Transformer (RST) and Tertiary Auxiliary Transformer (TAT) / Tertiary Supply Transformer (TST)

TNC 8.8.4 The following AC electrical sources shall be FUNCTIONAL:

a. RAT / RST;

AND

b. TAT / TST

APPLICABILITY: Whenever the main generator is in operation

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. Main feedwater pump (FWP) trip on fast bus transfer circuit unavailable when both FWPs are operating.	A.1	IF RST load tap changer (LTC) is in manual operation, then declare the offsite circuit associated with the RAT inoperable per Technical Specification (TS) 3.8.1. OR	Immediately
	A.2	IF RST LTC is in automatic operation with Delta-V (%) above 0.45%, then declare the offsite circuit associated with the RAT inoperable per TS 3.8.1.	Immediately

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
B. Automatic RST LTC operation with Delta-V (%) monitoring capability unavailable.	B.1	Operate RST LTC in manual.	Immediately
	AND		
	B.2	Evaluate OPERABILITY of the offsite circuit associated with the RAT per TS 3.8.1.	Immediately
C. Automatic TST LTC operation with Delta-V (%) monitoring capability unavailable.	C.1	Operate TST LTC in manual.	Immediately
	AND		
	C.2	Evaluate OPERABILITY of the offsite circuit associated with the TAT per TS 3.8.1.	Immediately
D. Automatic RST LTC operation with Delta-V (%) above 1.2%, while Buses 1-3 AND 1-4 are aligned to the main auxiliary transformer.	D.1	Declare the offsite circuit associated with the RAT inoperable per TS 3.8.1.	Immediately
E. Automatic RST LTC operation with Delta-V (%) above 2.7%, while Bus 1-3 OR Bus 1-4 is aligned to the RAT.	E.1	Declare the offsite circuit associated with the RAT inoperable per TS 3.8.1.	Immediately
F. Automatic RST LTC operation with Delta-V (%) above 4.5%, while Buses 1-3 AND 1-4 are aligned to the RAT.	F.1	Declare the offsite circuit associated with the RAT inoperable per TS 3.8.1.	Immediately
G. Automatic TST LTC operation with Delta-V (%) above 5.0%.	G.1	Declare the offsite circuit associated with the TAT inoperable per TS 3.8.1.	Immediately

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
H. Manual RST LTC operation with calculated post trip voltage below minimum required post trip voltage for existing tap position.	H.1	Declare the offsite circuit associated with the RAT inoperable per TS 3.8.1.	Immediately
I. Manual TST LTC operation (with RST LTC in automatic) with Delta-V (%) above 1.2%.	I.1	Evaluate OPERABILITY of the offsite circuit associated with the TAT per TS 3.8.1.	Immediately
J. Manual TST LTC operation (with RST LTC in manual) with calculated post trip voltage below minimum required post trip voltage for existing tap position.	J.1	Declare the offsite circuit associated with the TAT inoperable per TS 3.8.1.	Immediately
K. Manual RST LTC operation with calculated post trip voltage monitoring capability unavailable.	K.1	Evaluate OPERABILITY of the offsite circuit associated with the RAT per TS 3.8.1.	Immediately
L. Manual TST LTC operation with calculated post trip voltage monitoring capability unavailable.	L.1	Evaluate OPERABILITY of the offsite circuit associated with the TAT per TS 3.8.1.	Immediately
M. RST unavailable.	M.1	Declare the offsite circuit associated with the RAT inoperable per TS 3.8.1.	Immediately
N. TST unavailable.	N.1	Declare the offsite circuit associated with the TAT inoperable per TS 3.8.1.	Immediately

DELETED May 28, 2013

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.8.4.1	Verify status light 'FWP TRIP ON FAST BUS XFER' located on mechanical vertical panel 'A' is ON when both FWPs are operating.	7 days
TVR 8.8.4.2	Verify generator lockout auxiliary relays associated with main FWP trip on fast bus transfer are FUNCTIONAL.	36 months
TVR 8.8.4.3	Perform a FUNCTIONAL test of the RST LTC and TST LTC to verify stepping capability (only required if no stepping occurred in prior period).	7 days
TVR 8.8.4.4	Perform a FUNCTIONAL test of the RST LTC and TST LTC in manual to verify stepping capability (only required if no manual stepping occurred within the period).	3 months
TVR 8.8.4.5	Perform a FUNCTIONAL test of the RST LTC and TST LTC in automatic to verify stepping capability and automatic response of the LTC voltage regulators (only required if no automatic high speed return stepping occurred within the period).	3 months
TVR 8.8.4.6	Perform a diagnostic maintenance calibration and test to verify settings and functionally check the LTC voltage regulators of the RST LTC and TST LTC.	18 months
TVR 8.8.4.7	Perform the recommended maintenance-free interval complementing checks of the RST and TST on-line tap changers (OLTCs) and the LTC control cabinets.	18 months
TVR 8.8.4.8	Perform a maintenance test to check the internals of the RST and TST OLTCs.	36 months

DELETED
May 28, 2013

BACKGROUND

When a fast bus transfer occurs as a result of energizing relays 86/T1A and 86/T1B (instantaneous generator lockout) or 86/T1C and 86/T1D (time delay turbine trip), a large amount of electrical load is rapidly applied to the reserve auxiliary transformer (RAT). Upgrades to the RAT / reserve supply transformer (RST) system increase the system voltage drop and make it more difficult for the RAT / RST to support the added load during a fast bus transfer.

The RST and tertiary supply transformer (TST) are each equipped with an on-line tap changer (OLTC). The load tap changer (LTC) allows plant operators the capability of correcting bus / line voltage. The maximum and minimum range of the LTC is +/- 10% of the secondary voltage of the RST or TST and includes 33 taps (nominal, 16 taps to lower voltage and 16 taps to raise voltage) to adjust the voltage. The LTC can operate in either automatic or manual modes.

American Transmission Company (ATC) and Midwest Independent System Operator (MISO) have the ability to monitor Delta-V (%), used with automatic LTC operation, and post trip voltage, used with manual LTC operation. ATC has the capability to monitor if either LTC is in automatic or manual operating mode and to monitor both LTC tap positions.

Operation of a transformer LTC in automatic is predicated on having the ability to monitor Delta-V (%) (138kV bus voltage % change) for any auto LTC tap position. This voltage change (%) is the predicted voltage change, after any post trip voltage drop, with any transmission system configuration.

Operation of a transformer LTC in manual is predicated on having the ability to monitor post trip voltage (138kV bus voltage) for the fixed tap position of the LTC. This voltage is the predicted voltage, after any post trip voltage drop, with any transmission system configuration.

TNC and APPLICABILITY

The RAT / RST shall be FUNCTIONAL.

With both feedwater pumps (FWPs) operating, when the RST LTC is operated in manual, control room operators are required to select a single FWP ('A' or 'B') to trip in the event a fast bus transfer occurs.

With both FWPs operating, when the RST LTC is operated in automatic and Delta-V (%) is above 0.45% (Reference 2), control room operators are required to select a single FWP ('A' or 'B') to trip in the event a fast bus transfer occurs.

Tripping a selected FWP during initiation of a fast bus transfer of non-safety related buses to the RAT ensures that during a loss of power from the main auxiliary transformer (MAT) adequate voltage will remain at the RAT during a transfer.

TNC and APPLICABILITY (continued)

For automatic RST LTC operation, ATC has established a Delta-V (%) alarm of 1.2% to alert Kewaunee Power Station (KPS) of an abnormal distribution system condition associated with the RAT / RST that could lead to an extended degraded voltage condition on the connected safeguard bus, if KPS was to experience a unit trip. Above a Delta-V of 1.2%, concurrent with unit trip, a degraded voltage actuation could exist that would disconnect the safeguard bus from the preferred offsite circuit and start and load the emergency diesel generator to repower the safeguard bus.

For manual RST LTC operation, ATC has established post trip voltage alarms for each RST LTC tap position, to alert KPS of an abnormal distribution system condition associated with the RAT / RST that could lead to an extended degraded voltage condition on the connected safeguard bus, if KPS was to experience a unit trip. With an analyzed post trip voltage below the required post trip voltage for the selected tap position, concurrent with unit trip, a degraded voltage actuation could exist that would disconnect the safeguard bus from the preferred offsite circuit and start and load the emergency diesel generator to repower the safeguard bus.

The tertiary auxiliary transformer (TAT) / TST shall be FUNCTIONAL.

For automatic TST LTC operation, KPS has established a Delta-V (%) requirement of 5.0% to take action to prevent an abnormal distribution system condition associated with the TAT / TST that could lead to an extended degraded voltage condition on the connected safeguard bus, if KPS was to experience a unit trip. Above a Delta-V of 5.0%, concurrent with unit trip, a degraded voltage actuation could exist that would disconnect the safeguard bus from the preferred offsite circuit and start and load the emergency diesel generator to repower the safeguard bus.

For manual TST LTC operation, KPS has established a requirement to maintain the TST LTC tap position at or above five (5) taps below the RST LTC tap position. This will ensure that the ATC alarm set for automatic RST LTC operation associated with Delta-V, and the ATC alarms set for manual RST LTC tap positions based on minimum required post trip voltages will be conservative for the manual TST LTC tap positions. With the alarm associated with Delta-V, and the alarms associated with the RST LTC tap positions (concurrent with the analysis between the minimum required post trip voltages for the TST LTC and RST LTC tap positions), ATC would be able to alert KPS of an abnormal distribution system condition associated with the TAT / TST that could lead to an extended degraded voltage condition on the connected safeguard bus, if KPS was to experience a unit trip. With an analyzed post trip voltage below the required post trip voltage for the

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TNC and APPLICABILITY (continued)

selected tap position, concurrent with unit trip, a degraded voltage actuation could exist that would disconnect the safeguard bus from the preferred offsite circuit and start and load the emergency diesel generator to repower the safeguard bus.

CONTINGENCY MEASURES

A.1

With both FWPs operating, if the main FWP trip on fast bus transfer circuit is unavailable while the RST LTC is in manual, the ability to obtain a fast bus transfer from the MAT to the RAT without actuating safeguard degraded voltage relaying would not be guaranteed. The KPS GDC 39 (meeting the intent of GDC 17) described in the Updated Safety Analysis Report (USAR) (Reference 3) may not be met. Because the offsite power source could potentially not be relied upon under this condition, CONTINGENCY MEASURE A.1 requires immediate action.

A.2

With both FWPs operating, if the main FWP trip on fast bus transfer circuit is unavailable while the RST LTC is in automatic with Delta-V greater than 0.45%, the ability to obtain a fast bus transfer from the MAT to the RAT without actuating safeguard degraded voltage relaying would not be guaranteed. The KPS GDC 39 (meeting the intent of GDC 17) described in the USAR (Reference 3) may not be met. Because the offsite power source could potentially not be relied upon under this condition, CONTINGENCY MEASURE A.2 requires immediate action.

B.1 and B.2, C.1 and C.2

If the Delta-V monitoring capability is unavailable from both ATC and MISO, automatic RST LTC and TST LTC operation would be considered Non-FUNCTIONAL and CONTINGENCY MEASURES B.1 and C.1 would be required. Because the offsite power source could potentially not be relied upon under this condition, CONTINGENCY MEASURES B.2 and C.2 require immediate action.

CONTINGENCY MEASURES (continued)

D.1

If the Delta-V (%) is greater 1.2% while Buses 1-3 and 1-4 are aligned to the MAT, Automatic RST LTC operation may not meet the analytical requirements to maintain the RAT / RST offsite circuit operable and CONTINGENCY MEASURE D.1 would be immediately required.

E.1

If the Delta-V (%) is greater 2.7% while Bus 1-3 or Bus 1-4 is aligned to the RAT, automatic RST LTC operation may not meet the analytical requirements to maintain the RAT / RST offsite circuit operable and CONTINGENCY MEASURE E.1 would be immediately required.

F.1

If the Delta-V (%) is greater 4.5% while Buses 1-3 and 1-4 are aligned to the RAT, automatic RST LTC operation may not meet the analytical requirements to maintain the RAT / RST offsite circuit operable and CONTINGENCY MEASURE F.1 would be immediately required.

G.1

If the Delta-V (%) is greater 5.0%, automatic TST LTC operation may not meet the analytical requirements to maintain the TAT / TST offsite circuit operable and CONTINGENCY MEASURE G.1 would be immediately required.

H.1

If the calculated post trip voltage is below the minimum required post trip voltage for the operating tap position, manual RST LTC operation may not meet the analytical requirements to maintain the RAT / RST offsite circuit operable and CONTINGENCY MEASURE H.1 would be immediately required.

CONTINGENCY MEASURES (continued)

I.1

If the Delta-V (%) is greater than 1.2% (conservative to the analysis specified in Reference 7), manual TST LTC operation (with the RST LTC in automatic) may not meet the analytical requirements to maintain the TAT / TST offsite circuit operable and CONTINGENCY MEASURE I.1 would be immediately required.

J.1

If the calculated post trip voltage is below the minimum required post trip voltage for the operating tap position, manual TST LTC operation (with the RST LTC in manual) may not meet the analytical requirements to maintain the TAT / TST offsite circuit operable and CONTINGENCY MEASURE J.1 would be immediately required.

K.1, and L.1

If the calculated post trip voltage monitoring capability is unavailable from both ATC and MISO, manual RST LTC or TST LTC operation may not meet the analytical requirements to maintain the RAT / RST or TAT/ TST offsite circuits operable and CONTINGENCY MEASURES K.1 and L.1 would be immediately required.

M.1, and N.1

If the RST or TST is unavailable, the RAT / RST or TAT / TST offsite circuit would be considered inoperable and CONTINGENCY MEASURE M.1 or N.1 would be immediately required.

TECHNICAL VERIFICATION REQUIREMENTS

All TECHNICAL VERIFICATION REQUIREMENTS tests, calibrations and checks associated with the LTCs are per the correspondence found in References 4 and 5.

TVR 8.8.4.1

The status light 'FWP TRIP ON FAST BUS XFER' should be illuminated when the FWP trip on fast bus transfer selector switch is selected to trip FWP 'A' or 'B'.

TVR 8.8.4.2

Generator lockout relays and generator auxiliary relays are functionally tested every 36 months in accordance with the plant's maintenance testing procedure for FUNCTIONAL tripping of generator zone lockout relay outputs.

TVR 8.8.4.3

A FUNCTIONAL test should be performed weekly in manual to verify lower and raise stepping capability of the LTC (only required if no stepping occurred in prior week). Auto stepping of the LTC within the prior week also satisfies this requirement.

TVR 8.8.4.4

A FUNCTIONAL test should be performed quarterly in manual to verify stepping capability of the LTC. Manual stepping of the LTC within the prior quarter also satisfies this requirement.

TVR 8.8.4.5

A FUNCTIONAL test should be performed quarterly in automatic to verify stepping capability of the LTC and automatic response of the LTC voltage regulators. Auto stepping of the LTC, along with high speed return stepping, within the prior quarter also satisfies this requirement.

TVR 8.8.4.6

A diagnostic maintenance calibration and test should be performed every refueling outage to verify settings and functionally check the LTC voltage regulators. This includes verification of the OLTC motor drive operation for both normal expected operation (voltage in and outside the normal control bandwidth) and abnormal operation (voltage outside the voltage limit band).

TECHNICAL VERIFICATION REQUIREMENTS (continued)

TVR 8.8.4.7

The vendor recommended maintenance-free interval complementing checks of oil sampling, vacuum interrupter system test, motor drive condition checks, dehydrating breather checks, and checks for oil leaks should be performed every refueling outage. Additionally, LTC cabinets are to be visually inspected to check for loose connections, damage, overheating, deterioration, and relay degradation.

TVR 8.8.4.8

A maintenance test should be performed every other refueling outage to check the internals of the OLTC cabinet, including vacuum interrupter, associated motor drive circuitry and equipment, and monitoring system. The maintenance test should be performed per the vendor manual for LTC Type RMV-II, which includes a vacuum interrupter examination for mechanical test, contact erosion indicator check, and Hi-Pot (if required); bypass switch check; and preparation of the LTC for service checks. Additionally, perform checks for loose connections, damage and contact wear.

REFERENCES

1. TS 3.8.1
2. Calculation C11450 Rev. 2, Addendum D, Attachments 3 & 5
3. USAR Section 8.1.1.2
4. License Amendment Request 236, and Supplement dated 1/18/11 (KW-CORR-LAR-NRC-11-003)
5. License Amendment No. 209 dated 7/29/11 (KW-CORR-SER-K-11-101)
6. Calculation C11450 Rev. 2, Attachment 51
7. Calculation C11450 Rev. 2, Addendum I

8.9 REFUELING OPERATIONS

8.9.3 Decay Time

TNC 8.9.3 The reactor shall be subcritical for ≥ 100 hours.

APPLICABILITY: During movement of irradiated fuel assemblies within the reactor vessel.

CONTINGENCY MEASURES

NONCONFORMANCES	CONTINGENCY MEASURES	RESTORATION TIME
A. Reactor subcritical for < 100 hours	A.1 ------------NOTE------------ Fuel assemblies may be placed in a safe condition. ------------------------------------	
	Suspend movement of irradiated fuel assemblies in the reactor.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.9.3.1	Verify the reactor is subcritical for ≥ 100 hours.	Prior to initial movement of irradiated fuel assemblies within the reactor vessel.

BASES

BACKGROUND

The 100 hour decay time following plant shutdown bounds the assumption used in the dose calculation for the fuel handling accident in USAR Section 14.2.1.

A cycle-specific cooling analysis will be performed to verify that the spent fuel pool cooling system can maintain the pool temperature within allowable limits based on the 100 hour decay time. In the unlikely event that the analysis determines this time is not sufficient to maintain acceptable pool temperature, the analysis will determine the additional in core hold time required.

Each refueling outage, this analysis is reviewed and/or modified, as needed, for the current offload heat input and heat exchanger conditions.

REFERENCE

1. COMTRAK 2005-176/COM 26442, Perform a cycle-specific heat load calculation prior to each refueling outage.

10.0 ADMINISTRATIVE CONTROLS

10.1 Miscellaneous Closure Times

When tested in accordance with the applicable technical specification, the closure times for the components listed in Table 10.1-1 shall be met.

Table 10.1-1
Miscellaneous Closure Times

COMPONENT	REQUIREMENT
Containment Purge and Vent Isolation valves (36 inch)	Valve closure ≤ 5 seconds
Main Steam Isolation Valve	Valve closure ≤ 5 seconds
High Steam Flow in a Steam Line Coincident with a Safety Injection and "Lo-Lo" T_{avg}	Main Steam line isolation valve closure ≤ 5 seconds
High-High Steam Flow in a Steam Line Coincident with a Safety Injection	Main Steam line isolation valve closure ≤ 5 seconds

8.3 INSTRUMENTATION

8.3.4 Residual Heat Removal (RHR) Pump Flow Instrumentation

TNC 8.3.4 RHR Pump Flow Channel F626 shall be FUNCTIONAL.

APPLICABILITY: When RHR Pump is in operation for decay heat removal.

DELETED JUN 1, 2013

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. RHR pump flow channel F626 NonFUNCTIONAL.	A.1 Initiate action to restore instrument channel to FUNCTIONAL status.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
	------------------------------NOTE------------------------ Verification only required when Residual Heat Removal Pump is in operation for decay heat removal. --	
TVR 8.3.4.1	Perform CHANNEL CHECK on Residual Heat Removal Pump flow instrument.	12 hours
TVR 8.3.4.2	Perform CHANNEL CALIBRATION on Residual Heat Removal Pump flow instrument.	18 months

BASES

BACKGROUND	RHR pumps flow outlet loop provides indication, controls and alarms of RHR flow to the RCS during the decay heat removal phase of plant cooldown.
APPLICABILITY	When an RHR pump is in operation in the decay heat removal lineup, RHR pump flow channel F626 is required to be FUNCTIONAL to measure RHR flow.

DELETED
July 1, 2013

8.4 REACTOR COOLANT SYSTEM (RCS)

8.4.2 Pressurizer

TNC 8.4.2 The pressurizer shall be limited to:

a. A maximum heatup of 100°F in any one hour period;

b. A maximum cooldown of 200°F in any one hour period;

c. A maximum pressurizer to spray water temperature differential of 320°F.

APPLICABILITY: At all times.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. Pressurizer temperature values in excess of any of the above limits.	A.1	Initiate action to restore pressurizer temperature to within limits.	Immediately
	<u>AND</u>		
	A.2	Initiate action to determine by engineering evaluation the effects of exceeding the pressurizer temperature limits or the structural integrity of the pressurizer.	Immediately
	<u>AND</u>		
	A.3	Evaluate OPERABILITY of Pressurizer per Technical Specification 3.4.9.	Immediately
B. Engineering evaluation of the Pressurizer structural integrity is unacceptable.	B.1	Evaluate OPERABILITY of Pressurizer per Technical Specification 3.4.9.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.4.2.1	-------------------------------NOTE--------------------------- Only required during heatup or cooldown operation. --- Determine pressurizer temperature within limits.	30 minutes
TVR 8.4.2.2	Verify differential temperature between spray water temperature and pressurizer water temperature is < 320°F.	12 hours

BASES

BACKGROUND

Although the pressurizer operates at temperature ranges above those for which there is reason for concern about brittle fracture, operating limits are provided to ensure compatibility of operation with the fatigue analysis performed in accordance with Code requirements. In-plant testing and calculations have shown that a pressurizer heatup rate of 100°F/hr cannot be achieved with the installed equipment.

8.7 PLANT SYSTEMS

8.7.1 Steam Generator Pressure / Temperature Limitation

TNC 8.7.1 Temperature of the secondary coolant in the steam generator shall be ≥ 70°F when the pressure of the secondary coolant in the steam generator is > 200 psig.

APPLICABILITY: At all times.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. Temperature of the secondary coolant in the steam generator is < 70°F when the pressure of the secondary coolant in the steam generator is > 200 psig.	A.1	Initiate action to reduce the steam generator secondary side pressure to ≤ 200 psig.	Immediately
	<u>AND</u>		
	A.2	Determine by engineering evaluation the effects of the overpressurization on the structural integrity of the steam generator and that the steam generator remains acceptable for continued operation.	Prior to increasing steam generator pressure > 200 psig

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.7.1.1	Verify steam generator secondary coolant is ≥ 70° F prior to increasing steam generator pressure > 200 psig.	Prior to increase steam generator pressure > 200 psig

BASES

BACKGROUND

To provide the necessary high degree of integrity for the components in the reactor coolant system, transient conditions are selected for fatigue evaluation based on a conservative estimate of the magnitude and frequency of the temperature and pressure transients resulting from normal operation, normal and abnormal load transients and accident conditions. To a large extent, the specific transient operating conditions to be considered for equipment fatigue analyses are based upon engineering judgment and experience. Those transients are chosen which are representative of transients to be expected during plant operation and which are sufficiently severe or frequent to be of possible significance to component cyclic behavior.

The secondary side of the steam generator is pressurized to 1356 psig with a minimum water temperature of 70°F coincident w ith the primary side at 0 psig. The steam generator is analyzed for 5 cycles of this test (reference 1).

The 70°F limitation on pressurization of the SG ensures operation within the analyzed number of cycles.

REFERENCE

1. USAR Section 4.1.5

8.8 ELECTRICAL SYSTEMS

8.8.2 AC Sources

TNC 8.8.2

a. One circuit between the offsite transmission network and the onsite AC electrical power distribution subsystem(s) required by TRM 8.8.5. Distribution Systems shall be FUNCTIONAL.

b. Specified Emergency Diesel Generator (EDG) support activities shall be met.

APPLICABILITY: Whenever any irradiated fuel assembly is stored in the spent fuel pool and during movement of irradiated fuel assemblies (TNC 8.8.2.a); Whenever the associated EDG is required to be OPERABLE (TNC 8.8.2.b)

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. TNC 8.8.2.a not met.	A.1 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.2 Initiate action to restore required offsite power circuit to FUNCTIONAL status.	Immediately
B. TNC 8.8.2.b not met.	B.1 Enter TNC 7.5.3.	Immediately
	AND	
	B.2 Evaluate OPERABILITY of EDG(s) per Technical Specifications 3.8.2.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.8.2.1	Verify correct breaker alignment and indicated power availability for the offsite circuit	7 days
TVR 8.8.2.2	For each EDG, verify fuel oil properties for water, sediment, and particulates in the EDG day tank are tested and maintained within limits.	92 days
TVR 8.8.2.3	Perform NACE surveys of the cathodic protection system associated with the fuel oil storage tanks and protected portions of the fuel oil lines.	12 months
TVR 8.8.2.4	For each EDG, perform inspection in accordance with procedures prepared in conjunction with its manufacture's recommendations.	24 months

BASES

BACKGROUND

Onsite electrical power is normally supplied from the offsite transmission network by one of two separate sources. The preferred source is the Tertiary Auxiliary Transformer. The Reserve Auxiliary Transformer is also available if necessary. Either of these sources is sufficient to supply the necessary electrical load from one of four available transmission lines.

Because of the continued need for electric power to supply equipment needed for cooling of irradiated fuel stored in the spent fuel pool and as defense in depth for ensuring normal electrical power availability during a response to a Fuel Handling Accident (FHA), the pertinent requirements of TS 3.8.2 "AC Sources Shutdown" for a single FUNCTIONAL AC circuit were relocated to the TRM. The requirements for performance of EDG inspections were relocated from the previous Custom Technical Specification TS 4.6.1.3, during the conversion to Improved TS in License Amendment 207 (Reference 3).

TNC and APPLICABILITY

Offsite power is supplied to the unit substation from the transmission network by four transmission lines. These four transmission lines support FUNCTIONALITY of the required qualified circuit between the offsite transmission network and the onsite electrical power system.

To be FUNCTIONAL, the AC circuit must be must be properly aligned (i.e. required breakers closed) such that off-site transmission grid is connected to and able to supply Bus 5 or Bus 6 as required.

The requirement for an AC circuit was relocated from the previous TS 3.8.2. It is required to be FUNCTIONAL whenever irradiated fuel is stored in the spent fuel pool and also during the movement of irradiated fuel assemblies.

To ensure EDG reliability, activities specified by Technical Verification Requirements TVR 8.8.2.2, TVR 8.8.2.3, and TVR 8.8.2.4 must be met whenever the associated EDG is required to be OPERABLE.

BASES

CONTINGENCY MEASURES

A.1 and A.2

If neither of the circuits are FUNCTIONAL (i.e., TNC 8.8.2.a is not met), reliability of the normal power supply to equipment needed for cooling of irradiated fuel stored in the spent fuel pool and defense in depth for mitigation of a fuel handling accident is degraded. Therefore, CONTINGENCY MEASURE A.1 requires immediate action to suspend the movement of irradiated fuel in the spent fuel pool and CONTINGENCY MEASURE A.2 requires initiating action to restore an offsite power supply to FUNCTIONAL.

B.1 and B.2

If the Emergency Diesel Generator (EDG) support activities required by TNC 8.8.2.b are not met, the reliability of the associated EDG may be adversely affected. In response, CONTINGENCY MEASURE B.1 requires initiating the action specified in TNC 7.5.3 immediately. This action provides for transition to TNC 7.5.3 to address the condition.

Failure to meet a specified EDG support activity does not necessarily render the associated EDG inoperable. However, because such a failure has the potential to adversely affect EDG performance, CONTINGENCY MEASURE B.2 requires that an evaluation be immediately initiated to determine whether this condition has impacted EDG operability.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.8.2.1

This TVR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred power source. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

TVR 8.8.2.2

License Renewal Commitment 30 (Reference 5) requires that quarterly laboratory testing of fuel oil samples for water, sediment, and particulates will be performed on the emergency diesel generator

TECHNICAL VERIFICATION REQUIREMENTS (continued)

(EDG) day tanks and on the technical support center diesel generator (TSC DG) day tank. TVR 8.8.2.2 addresses the EDG portion of this commitment. The testing acceptance criteria will be consistent with the requirements specified in American Society for Testing and Materials (ASTM) D975-06b for water and sediment and ASTM D6217 for particulates.

Fuel oil in the EDG day tanks shall be sampled for water and sediment on a quarterly (92-day) basis in accordance with ASTM D975-06b.

Particulate concentrations shall be determined on a quarterly (92-day) basis in accordance with ASTM D6217. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a maximum limit of 10 mg/l. ASTM D6217 provides the sample analysis methodology and states that the corresponding particulate limits are as specified in several military fuel specifications (which provide a maximum limit for particulate content of 10 mg/l). The particulate limit of 10 mg/l is consistent with the sampling requirements in ASTM D6217. NRC Information Notice (IN) 91-46, "Degradation of Emergency Diesel Generator Fuel Oil Delivery Systems," had identified that certain earlier testing methods were inappropriate. IN 91-46 stated that the particulate contamination test of ASTM-D2276 was an appropriate test for particulate contamination of stored fuel oil and discussed a limit of 10 mg/l. ASTM-D2276 was supplemented by ASTM-D6217 (Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration) because it is more appropriate for Number 2 diesel fuel. This method is also consistent with EPRI NP-6317.

TVR 8.8.2.3

License Renewal Commitment 48 (Reference 5) states that the cathodic protection system associated with the diesel generator fuel oil storage tanks and protected portions of the fuel oil lines will each be maintained available a minimum of 90% of the time during the period of extended operation (starting December 22, 2013). In addition, National Association of Corrosion Engineers (NACE) cathodic protection system surveys will be performed at least annually during the period of extended operation.

This verification addresses the cathodic protection survey requirements associated with the EDG aspect of this commitment.

BASES

TECHNICAL VERIFICATION REQUIREMENTS (continued)

TVR 8.8.2.4

EDG inspections are performed at 24 month intervals in order to maintain the diesel generators in accordance with the manufacturers' recommendations. The inspection procedure is periodically updated to reflect experience gained from past inspections and new information as it is available from the manufacturer.

REFERENCES

1. USAR 8.1.1.2.1.
2. USAR Figure 8.2-1 and 8.2-2.
3. Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 207 to Facility Operating License No. DPR-43, Dominion Energy Kewaunee, Inc., Kewaunee Power Station, Docket No. 50-305, dated February 2, 2011.
4. NRC Safety Evaluation Related to License Amendment 67, dated July 3, 1986.
5. KPS Renewed Facility Operating License, § 2.C(15)(b), NUREG-1958, "Safety Evaluation Report Related to the Kewaunee Power Station," Appendix A, dated January 2011, License Renewal Commitments 30 and 48.
6. License Amendment Request 256, Permanently Defueled License and Technical Specifications.

8.8 ELECTRICAL SYSTEMS

8.8.5 Distribution Systems

TNC 8.8.5 The necessary portion of AC, DC and AC Instrument bus electrical power distribution subsystems shall be FUNCTIONAL to support equipment required to be FUNCTIONAL for management of irradiated fuel.

APPLICABILITY: Whenever any irradiated fuel assembly is stored in the spent fuel pool,
During movement of irradiated fuel assemblies

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. Required AC, DC or AC Instrument bus electrical power distribution subsystems NONFUNCTIONAL.	A.1 Initiate actions to restore required AC, DC or AC Instrument electrical power distribution subsystems to FUNCTIONAL status. AND A.2 Suspend movement of irradiated fuel assemblies.	Immediately Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION	FREQUENCY
TVR 8.8.5.1 Verify correct breaker alignments and voltage to required AC, DC and AC Instrument electrical power distribution subsystems. .	7 days

BACKGROUND

The onsite AC, DC and AC Instrument bus electrical power distribution system is divided into electrical power distribution subsystems.

The AC electrical power subsystems consists of 4.16 kV buses and secondary 480 V buses, distribution panels, motor control centers and load centers. Each required 4.16 kV bus has at least one offsite source of power. Additional description of AC distribution system may be found in the Bases for TNC 8.8.2, "AC Sources."

The 4.16 kV portion of the AC electrical power distribution system powers service water pumps while the 480 V portion of the system powers the spent fuel pool pumps and component cooling pumps.

The DC electrical power subsystem provides the control power for 4.16 kV switchgear, and 480 V load centers. The DC electrical power subsystem also provides DC electrical power to the inverters, which in turn power the AC instrument buses.

The requirements for onsite AC, DC and AC Instrument electrical power distribution were previously contained in Technical Specification (TS) 3.8.10 "Distribution Systems – Shutdown." Because of the continued need for electric power to supply equipment needed for cooling of irradiated fuel stored in the spent fuel pool, the pertinent requirements of TS 3.8.10 are being relocated to the TRM during the conversion to Permanently Defueled TS (Reference 1).

TNC and APPLICABILITY

The AC, DC and AC Instrument electrical power distribution systems are designed to provide sufficient electrical power to support Functionality of equipment needed for safe management (e.g., storage and movement) of irradiated fuel that is stored in the spent fuel pool and for pool inventory makeup. This TNC requires that those portions of the electrical power distribution system, which are necessary to support forced cooling, a source of coolant inventory makeup, and temperature and level monitoring , be FUNCTIONAL. Depending on specific plant conditions, various combinations of systems, equipment, and components may be used to satisfy this TNC.

A FUNCTIONAL electrical power distribution system is also required during movement of irradiated fuel assemblies. Although the permanently defueled fuel handling accident (FHA) analysis shows that the dose consequences are acceptable without relying on any systems, structures, or components to remain functional during and following the event (following 90 days of irradiated fuel decay time after reactor shutdown and compliance with the spent fuel pool water level requirements of TS 3.7.13), the requirement for a FUNCTIONAL

TNC and APPLICABILITY (continued)

electrical power distribution system is maintained to provide defense in depth by providing electrical power to equipment that may be employed to mitigate the consequences of a FHA.

To be FUNCTIONAL, the AC circuit must be capable of maintaining nominal voltage (±10%), and accepting required loads.

CONTINGENCY MEASURES

A.1 and A.2

With a required AC, DC or AC Instrument electrical subsystem NONFUNCTIONAL, action to restore the system to FUNCTIONAL status shall be initiated immediately. This action shall continue until restoration is accomplished in order to energize the necessary bus(es) such that power is available to equipment needed to provide forced cooling, coolant inventory makeup, and temperature and level monitoring of irradiated fuel. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the facility is without forced cooling of irradiated fuel.

If movement of irradiated fuel assemblies is in progress with TNC 8.8.5 not met, action must immediately be initiated to suspend movement of irradiated fuel assemblies. With no movement of fuel assemblies in progress, a fuel handling accident is not possible. Suspension of fuel handling activities does not preclude completion of actions to establish a safe conservative condition, such as movement of fuel to a safe position.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.8.5.1

This TVR verifies that the required AC, DC and AC Instrument bus electrical power distribution systems are functioning properly, with the required buses energized. The verification of nominal voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for system loads connected to these buses. The 7 day Frequency takes into account other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. License Amendment Request 256, Permanently Defueled License and Technical Specifications.

8.8 ELECTRICAL SYSTEMS

8.8.1 Technical Support Center (TSC) Diesel Generator (DG)

TNC 8.8.1 TSC DG shall be FUNCTIONAL with:

a. Usable fuel oil supply ≥ 200 gallons;
b. Lube oil supply within limits; and,
c. Starting battery FUNCTIONAL.

APPLICABILITY: At all times.

CONTINGENCY MEASURES

-----NOTE-----
Changes may be made in plant conditions with the TSC DG NonFUNCTIONAL.

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. TSC DG NonFUNCTIONAL.	A.1	Initiate action to restore to FUNCTIONAL status.	Immediately
	<u>AND</u>		
	A.2	Protect Bus 1-46.	Immediately
	<u>AND</u>		
	A.3	Ensure dose assessment can be performed from the control room.	Immediately
	<u>AND</u>		
	A.4	Notify Security that backup power to protected area lighting is unavailable.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.8.1.1	Verify TSC DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 500 kW.	92 days
TVR 8.8.1.2	Verify TSC DG fuel oil storage tank contains ≥ 200 gallons of usable fuel.	31 days
TVR 8.8.1.3	Verify TSC DG lube oil level is ≥ 1 inch below "F" mark on engine oil dipstick when engine has been shutdown > 20 minutes.	31 days
TVR 8.8.1.4	Verify fuel oil properties for water, sediment, and particulates in the TSC DG day tank are tested and maintained within limits.	92 days
TVR 8.8.1.5	Verify TSC DG starts from standby condition in ≤ 40 seconds and achieves required voltage and frequency.	18 months
TVR 8.8.1.6	Verify TSC DG auto start and load circuitry is FUNCTIONAL.	18 months
TVR 8.8.1.7	---------------------------NOTE------------------------------- Replacing the battery meets this TVR. --- Verify required starting battery capacity.	36 months

BASES

BACKGROUND

The TSC DG is an independent, non-class 1E, 600 kW (1000 hr/year standby rating) power source that provides AC power to 480V Bus 1-46 through breaker 14604.

The TSC DG starts automatically on loss of voltage to Bus 1-46 and automatically connects to the bus after attaining voltage and frequency provided that Source Breaker 14601 has tripped.

The TSC DG provides power to the TSC Building, security lighting system, and other non-ESF plant systems which are required to operate upon loss of off-site electrical sources. Auxiliaries for fuel supply, engine radiator heat rejection, and ventilation are energized from bus 1-46.

TNC and APPLICABILITY

The TSC DG is required to be FUNCTIONAL at all times, to provide backup AC power to TSC equipment for Emergency Preparedness (EP) response.

The TSC DG is FUNCTIONAL when it is capable of meeting its TSC supply requirements. It must be capable of automatically starting and available to power required loads within 30 minutes after loss of power to Bus 1-46 to meet EP activation requirements.

The 10,000 gallon capacity fuel oil storage tank for the TSC DG is maintained with sufficient fuel oil to allow operation for an extended period, within which normal power can reasonably be expected to be restored. A minimum indicated level of 2000 gallons is procedurally required to maintain defense in depth beyond the minimum needed for extended operation and thereby assures that the required 200 gallons of usable fuel is available. The 200 gallon requirement originated when the TSC Diesel Generator was previously credited as the Station Blackout Alternate AC Source

To be FUNCTIONAL, the lube oil supply must be within established quality and quantity limits. Required oil quantity is determined using the engine oil dipstick, which can only be used when the engine is shutdown. Oil level must be ≥ 1 inch below "F" mark on dipstick (i.e., 1 inch below "F" mark is the lowest allowable oil level) when engine has been shutdown > 20 minutes. When the engine is running, proper oil levels are monitored on the oil level sight glass. Oil quality is maintained via normal station processes for lube oil procurement.

BASES

TNC and APPLICABILITY (continued)	The starting battery must be maintained in a high state of readiness to ensure it remains capable of starting the TSC SBO DG in ≤ 40 seconds of a start signal. The battery is connected to a battery charger that maintains it continuously charged.

CONTINGENCY MEASURES

A.1

If the TSC DG is NonFUNCTIONAL, action must immediately be initiated to restore it to FUNCTIONAL status. While it is being restored, the following additional compensatory actions (A.2 thru A.4) are needed to ensure availability of electrical power and the capability to respond to a loss of power event.

A.2

With the TSC DG NonFUNCTIONAL, the backup power supply to Bus 1-46 is degraded. Except for emergent circumstances, work and testing relative to Bus 46 should not be undertaken.

A.3

From an EP perspective, with the TSC DG out of service, the intent of the compensatory and mitigation measures is to:

- Have adequate measures in place to minimize the probability of creation of a loss-of-power event.
- Have adequate measures in place to deal with an event requiring activation and manning of the TSC, preceded by or followed by a loss of offsite power, rendering the TSC NonFUNCTIONAL.

During the time the TSC diesel is NonFUNCTIONAL, if the emergency response organization is activated and there is a loss of offsite power to the TSC, it may be necessary to relocate the TSC due to loss of the TSC ventilation and loss of the ability to acquire data. If it becomes necessary to relocate the TSC, the following functions/activities are covered by the Emergency Plan Implementing Procedures:

- Communications/notifications will be performed from the Control Room until the emergency operations facility (EOF) is activated.
- Classification will be maintained in the Control Room.

CONTINGENCY MEASURES (continued)

- Protective Action Recommendations will be maintained in the Control Room until the EOF is activated.
- Dose assessment will be performed from the Control Room until the EOF is activated.

A.4

With the TSC DG NonFUNCTIONAL, the backup power supply to Protected Area Lighting is unavailable.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.8.1.1

Verifying that the TSC DG is synchronized with its bus, loaded, and operates for ≥ 60 minutes at a load ≥ 500 kW ensures the availability of the TSC DG as a backup power source for the TSC. The 92 day frequency is consistent with NUMARC 87-00 guidance.

TVR 8.8.1.2

Required usable fuel oil quantity is verified by checking indicated level on the TSC DG fuel oil storage tank. The 200 gallon limit was based on the fuel needed for operation at the SBO load output for the 4 hour coping duration. However, a minimum indicated level of 2000 gallons is procedurally required to maintain defense in depth and assures that the required 200 gallons of usable fuel is available. This TVR is satisfied if indicated level is ≥ 2000 gallons or if 200 usable gallons is otherwise determined. The 31 day frequency is adequate to ensure that a sufficient supply of usable fuel oil is available, since unit operators would be aware of any large uses of fuel oil during this period.

TVR 8.8.1.3

Required lube oil quantity is verified by checking that level does not decrease lower than 1 inch below "F" mark on engine oil dipstick when engine has been shutdown > 20 minutes. This verification is typically performed in conjunction with DG load testing. The 31 day frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run times are closely monitored by unit staff.

TECHNICAL VERIFICATION REQUIREMENTS (continued)

TVR 8.8.1.4

License Renewal Commitment 30 (Reference 2) requires that quarterly laboratory testing of fuel oil samples for water, sediment, and particulates will be performed on the emergency diesel generator (EDG) day tanks and on the technical support center diesel generator (TSC DG) day tank. TVR 8.8.1.4 addresses the TSC DG portion of this commitment. The testing acceptance criteria will be consistent with the requirements specified in American Society for Testing and Materials (ASTM) D975-06b for water and sediment and ASTM D6217 (D6217-98) for particulates.

Fuel oil in the TSC DG day tank shall be sampled for water and sediment on a quarterly (92-day) basis in accordance with ASTM D975-06b.

Particulate concentrations shall be determined on a quarterly (92-day) basis in accordance with ASTM D6217. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a maximum limit of 10 mg/l. ASTM D6217 provides the sample analysis methodology and states that the corresponding particulate limits are as specified in several military fuel specifications (which provide a maximum limit for particulate content of 10 mg/l). The particulate limit of 10 mg/l is consistent with the sampling requirements in ASTM D6217. NRC Information Notice (IN) 91-46, “Degradation of Emergency Diesel Generator Fuel Oil Delivery Systems,” had identified that certain earlier testing methods were inappropriate. IN 91-46 stated that the particulate contamination test of ASTM-D2276 was an appropriate test for particulate contamination of stored fuel oil and discussed a limit of 10 mg/l. ASTM-D2276 was supplemented by ASTM-D6217 (Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration) because it is more appropriate for Number 2 diesel fuel. This method is also consistent with EPRI NP-6317.

TVR 8.8.1.5

Diesel Generator Start Timing was required by NUMARC 87-00 (Paragraph B.10) when the TSC Diesel Generator was previously credited as the Station Blackout Alternate AC Source. Verifying the TSC SBO DG starts from standby condition in ≤ 40 seconds and achieves required voltage and frequency is being maintained as a good practice. Although normally performed with each start, the 18 month frequency is consistent with the periodicity specified in NUMARC 87-00.

BASES

TECHNICAL VERIFICATION REQUIREMENTS (continued)

TVR 8.8.1.6

This TVR ensures that the auto start and load circuitry is capable of supporting the TSC DG function to provide automatic emergency power to TSC equipment for EP response. This verification is only performed on the associated circuitry components (auto loading of the DG onto the bus is not required to be performed as part of the test).

TVR 8.8.1.7

Every 36 months, the starting battery must be either replaced with a new battery or tested to verify that it maintains required capacity needed to start the TSC DG in ≤ 40 seconds. Battery replacement is typically performed rather than capacity testing based on economics (i.e., cost). The 36 month frequency is based on the vendor's recommendation contained in a letter from the engine manufacturer, Western Engine (Reference 3).

REFERENCES

1. NUMARC 87-00 (Rev 0), Appendix B, Alternate AC Power Criteria.
2. KPS Renewed Facility Operating License, § 2.C(15)(b), NUREG-1958, "Safety Evaluation Report Related to the Kewaunee Power Station," Appendix A, dated January 2011, License Renewal Commitment 30.
3. Commitment 95-090, Periodic Capacity Testing of the TSC SBO Diesel Starting Batteries per Letter from Western Engine dated July 26, 1988.
4. NUREG-0696 Functional Criteria for Emergency Response Facilities.
5. NUREG-0737 Clarification of TMI Action Plan Requirements.
6. Calculation C11450 Auxiliary Power System Modeling and Analysis Rev. 2.

7.0 USE AND APPLICATION

7.1 Definitions

-----NOTES-----

1. Terms are defined in Section 1.1 of the Technical Specifications and are applicable throughout the Technical Requirements Manual (TRM) and Bases. Only definitions specific to the TRM are defined in this section.

2. The defined terms of this section and the Technical Specifications (TS) appear in capitalized type and are applicable throughout the TRM and the TRM Bases.

Term	Definition
CHANNEL FUNCTIONAL TEST	A CHANNEL FUNCTIONAL TEST consists of injecting a simulated signal into the channel as close to the primary sensor as practicable to verify that it is FUNCTIONAL, including alarm and/or trip initiating action.
CONTINGENCY MEASURES	CONTINGENCY MEASURES shall be that part of a Requirement that prescribes CONTINGENCY MEASURES to be taken under designated Nonconformances within specified Restoration Times.
FUNCTIONAL — FUNCTIONALITY	A structure, system or component (SSC), shall be FUNCTIONAL or have FUNCTIONALITY when it is capable of performing its specified function(s) as set forth in the Current License Basis. FUNCTIONALITY does not apply to specified safety functions, but does apply to the ability of non-TS SSCs to perform other specified functions that have a necessary support function.
TECHNICAL NORMAL CONDITIONS (TNC)	Specify minimum requirements for ensuring safe management (storage and movement) of irradiated fuel. The CONTINGENCY MEASURES associated with a TNC state Nonconformances that typically describe the ways in which the requirements of the TNC can fail to be met. Specified with each stated Nonconformance are CONTINGENCY MEASURES and Restoration Time(s).
TECHNICAL VERIFICATION REQUIREMENTS (TVR)	TVRs are requirements relating to test, calibration, or inspection to assure that the necessary FUNCTIONALITY of systems and components are maintained, that facility operation will be maintained within the current licensing basis, and that the TNC for operation will be met.

7.2 Logical Connectors	Logical Connectors are discussed in Section 1.2 of the Technical Specifications and are applicable throughout the Technical Requirements Manual and Bases.
7.3 Restoration Times	Restoration Times are analogous to Completion Times as discussed in Section 1.3 of the Technical Specifications and are applicable throughout the Technical Requirements Manual. When "Immediately" is used as a Restoration Time, the CONTINGENCY MEASURE should be pursued without delay in a controlled manner.
7.4 Frequency	Frequency is discussed in Section 1.4 of the Technical Specifications and is applicable throughout the Technical Requirements Manual and Bases, with the exception that TECHNICAL VERIFICATION REQUIREMENTS are used in the place of Surveillance Requirements.

7.5 Technical Normal Condition (TNC) Applicability

TNC 7.5.1 TNCs shall be met during the specified conditions in the Applicability.

TNC 7.5.2 Upon discovery of a failure to meet the TNC, the CONTINGENCY MEASURES of the associated Nonconformance shall be met.

TNC 7.5.3 When it is discovered that a TNC has not been met and the associated CONTINGENCY MEASURES are not satisfied (or an associated CONTINGENCY MEASURE is not provided), the equipment subject to the TNC is in a nonconforming condition. In this situation, appropriate actions shall be taken as necessary to provide assurance of continued safe management of irradiated fuel. In addition, the condition shall be entered into the corrective action process and assessment of reasonable assurance of safety shall be conducted. Items to be considered for this assessment include the following:

- Availability of redundant or backup equipment;
- Compensatory measures, including limited administrative controls;
- Safety function and events protected against;
- Probability of needing the safety function;
- Conservatism and margins; and
- Risk Assessment or Individual Plant Evaluation results that determine how operating the facility in the manner proposed will impact management of irradiated fuel.

TNC 7.5.4 When a TNC is not met, entry into a specified condition in the Applicability shall only be made:

a. When the associated CONTINGENCY MEASURES to be entered permit continued operation in the specified condition in the Applicability for an unlimited period of time.
b. After performance of a risk assessment addressing NonFUNCTIONAL systems and components, consideration of the results, determination of the acceptability of entering the specified condition in the Applicability, and establishment of risk management actions, if appropriate; exceptions to this TNC are stated in the individual TNC; or
c. When an allowance is stated in the individual value, parameter, or other TNC.

This TNC shall not prevent entry into specified conditions in the Applicability that are required to comply with CONTINGENCY MEASURES.

TNC 7.5.5 Equipment removed from service or declared NonFUNCTIONAL to comply with CONTINGENCY MEASURES may be returned to service under administrative control solely to perform testing required to demonstrate its FUNCTIONALITY or the FUNCTIONALITY of other equipment. This is an exception to TNC 7.5.2 for the system returned to service under administrative control to perform the testing required to demonstrate FUNCTIONALITY.

7.6 Technical Verification Requirements (TVR) Applicability

TVR 7.6.1	TVRs shall be met during the specified conditions in the Applicability for individual TNCs, unless otherwise stated in the TVR. Failure to meet a TVR, whether such failure is experienced during the performance of the TVR or between performances of the TVR, shall be failure to meet the TNC. Failure to perform a TVR within the specified Frequency shall be failure to meet the TNC except as provided in TVR 7.6.3. TVRs do not have to be performed on NonFUNCTIONAL equipment or variables outside specified limits.
TVR 7.6.2	Each TVR shall be performed within the specified time interval with a maximum allowable extension not to exceed 25% of the specified TECHNICAL VERIFICATION REQUIREMENT interval.
TVR 7.6.3	When it is discovered that a TVR frequency (including the 25% extension) has not been met, the TNC must immediately be declared not met and the applicable nonconformance entered for the equipment subject to the TVR. In this situation, the condition shall be entered into the corrective action process and, if indicated, determination to evaluate the impact on plant safety shall be performed in a timely fashion and in accordance with plant procedures. Actions should be taken to restore conformance with the TNCs / TVRs in a timely fashion.

8.7 PLANT SYSTEMS

8.7.8 Spent Fuel Pool (SFP) Temperature

TNC 8.7.8 SFP temperature shall be ≤ 150°F.

APPLICABILITY: Whenever any irradiated fuel assembly is stored in the SFP.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. SFP Temperature not within limit.	A.1 Initiate actions to restore SFP temperature to within limit.	Immediately
	AND	
	A.2 Verify that a SFP makeup water source is available.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION	FREQUENCY
TVR 8.7.8.1 Verify that SFP temperature is ≤ 150°F	24 hours

BASES

BACKGROUND

The water temperature in the fuel storage pool is normally controlled by the SFP Cooling system. This system is designed to maintain the pool temperature ≤ 150°F.

In the unlikely event that cooling is interrupted for an extended period of time, the volume of water in the SFP provides an adequate heat sink for the heat generated by the irradiated fuel. The potential for an extended loss of forced cooling has been evaluated and is described in the USAR. Conservative calculations were performed to determine the time to boil from an initial temperature of 150°F. The results indicate that the time to boil will increase from an initial value of 6.5 hours immediately after core offload to greater than 113 hours after one year. Boiling and evaporation at the surface of the pool would continue to provide an adequate heat sink for the irradiated fuel assemblies stored in the pool as long as the fuel assemblies remain covered with water. For the worst-case scenario, the boil-off rate of SFP water is 42 gpm.

Since there is a large capacity for heat absorption in the spent fuel pool, active cooling system components are not redundant. Alternate cooling capability can be made available under anticipated malfunctions or failures. Sufficient time exists to either repair a failed SFP cooling pump or to connect a temporary pump in the system. Heat exchanger failure is not considered to be likely; however, heat exchanger repair (e.g., tube plugging) is a short-term operation and can be accomplished before a significant increase in pool temperature occurs. Both temperature and level indicators in the pool would alert operator to a loss of cooling. Local and remote alarms are provided. This allows the operator to take corrective measures in a timely manner to restore cooling capability to the spent fuel pool cooling loop.

Two sources of water (the refueling water storage tank and a 6" service water supply line) are available to provide a cooling water source until the failed pump is placed into service. In an event of a loss of both SFP pumps and/or SFP heat exchanger, alternate cooling is provided by evaporative cooling process.

The spent fuel pool cannot be drained as a result of component failure due to valving and piping arrangements. The spent fuel pool pump suction line connections extend no more than 2 feet below normal water level (this leaves a margin of 23 feet above the top of the fuel assemblies), thus there is no possibility of inadvertently draining pool water below that level due to a cooling system failure. The SFP cooling system return lines enter the pool above the top of the fuel assemblies and the lines contain check valves at the point of entry into the pool shielding concrete. Thus, line failure outside of the spent fuel pool cannot cause a loss of pool water due to siphon action.

BACKGROUND (continued)

If the normal heat removal capability for the SFP (SFP cooling system) is lost for an extended period, decay heat produced by the spent fuel will heat the SFP coolant to a point of boiling and then boil the coolant down to the top of the fuel. DEK assessed the decay heat load over time and calculated the times required for boiling to occur in the SFP and for the time available to take actions before any fuel uncovery occurs. This assessment was based on the fuel assembly characteristics following permanent shutdown of the reactor that occurred May 7, 2013.

The SFP contains 805.3 gallons of water per inch, with canal weir gate removed (681.4 gal/in with the weir gate installed), of height above the top of the fuel assemblies. Technical Specification (TS) 3.7.13 specifies a minimum of 23 feet of water above the top of the fuel assemblies in the SFP. A worst case boil off rate (freshly discharged core) had previously been calculated to be 42 gallons/min. Under such conditions, fuel uncovery would begin to occur approximately 88 hours (74 hours with the weir gate installed) after the pool water was heated to saturation temperature.

The Reactor Data Manual contains information that can be used to show the amount of time required for the water in the SFP to reach saturation temperature (212°F) and begin to boil following a loss heat removal capability (loss of cooling) that was not recovered. A starting SFP water temperature of 100°F was chosen because SFP temperature is annunciated when temperature rises to 100°F, requiring an operator response. Time to boil curves were developed for the SFP based on the permanent shutdown on May 7, 2013. As the fission products in the fuel decay over time, the decay heat being produced continuously lessens and the length of time required to achieve boiling in the SFP increases correspondingly. These curves can be used to show the time required for all the water in the SFP above the top of the fuel assemblies to boil off. Sufficient heat is removed from the fuel during the boiling process, such that no fuel damage occurs, while the water level remains above the top of the fuel.

Because of the lengthy period available until fuel uncovery would occur and because of the relative ease with which alternative means of supplying cooling water to the SFP can be restored, it is not reasonable to postulate that fuel damage can occur due to loss of normal cooling capability to the SFP.

BASES

TNC and APPLICABILITY

This TNC requires SFP temperature to be maintained less than or equal to the design value of 150°F while spent fuel is stored in the SFP. Based on SFP heat load calculations, the SFP cooling system is capable of maintaining this temperature following the initial 100 hour in-core hold time. SFP bulk temperatures that are greater than 150°F indicate the need for corrective actions.

CONTINGENCY MEASURES

A.1

An increase in the temperature of water in the SFP above the specified limit could indicate that the cooling system is not in service. Therefore Action A.1 requires immediate action be taken to restore the SFP temperature to within limit. Should temperature increase to the point that the water level in the SFP decreases to less than 23 feet above the top of the fuel, LCO 3.7.13 prohibits movement of irradiated fuel assemblies in the SFP.

A.2

Since a continued increase in the temperature of the water could eventually lead to a loss of water inventory due to increased evaporation and subsequent boiling, contingency measure requires that a source of make-up water be made available to replenish SFP water inventory.

For the worst-case scenario, the boil-off rate of the SFP water is 42 gpm.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.7.8.1

This TVR verifies that the SFP temperature is within limits on a 24 hour frequency. The 24 hour frequency is appropriate since the temperature of the SFP is not subject to rapid changes. This frequency ensures than an increasing temperature is detected prior to the beginning of a loss of SFP inventory due to boiling and evaporation of the coolant.

REFERENCES

1. Calculation C12026 Kewaunee Offload Specific SFP Heat Removal Calculation for Cycle 32
2. ER-AA-RXE-103 Spent Fuel Pool Heatup
3. ETE-KW-2013-0016 TRM 8.7.8 Fuel Uncovery Times

8.9 FUEL HANDLING OPERATIONS

8.9.1 Spent Fuel Pool – Control of Heavy Loads

TNC 8.9.1 Heavy loads greater than the weight of a fuel assembly, including its heaviest insert and handling tool, will not be transported over or placed in either spent fuel pool when spent fuel is stored in that pool, unless:

a. The heavy load does not traverse directly above spent fuel stored in the pool's spent fuel storage racks, and

b. The load handling system (e.g., crane, associated lifting devices, and interfacing lift points) used for these lifts meets the single-failure-proof handling system criteria.

APPLICABILITY: Whenever a load greater than the weight of a fuel assembly, including its heaviest insert and handling tool, is lifted in or around the spent fuel pool.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. TNC 8.9.1 not met.	A.1 Place load in a safe condition no longer suspended over the spent fuel pool.	Immediately
	<u>AND</u>	
	A.2 Cease further movement in or over the spent fuel pool.	Immediately
	<u>AND</u>	
	A.3 Initiate actions to restore compliance to TNC 8.9.1.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION	FREQUENCY
None	N/A

BASES

BACKGROUND

A "heavy load" is defined as any load (a mass or weight suspended from the crane's hook) greater than the weight of a fuel assembly, including its heaviest insert and handling tool. The purpose of this administrative limiting condition for operation is to control the movement of heavy loads in or around the spent fuel pool.

This administrative limiting condition for operations was relocated from the Kewaunee Power Station Technical Specifications because it no longer meets any of the four criteria 10 CFR 50.36 lists for items required in technical specifications.

The Auxiliary Building crane (part of the load handling system[1]) was modified to meet the criteria of a single-failure-proof crane found in NUREG-0612, Section 5.1.6(2) and the crane is designed, fabricated, installed, and tested to the guidance of NUREG-0554, as approved for KPS. The crane will be inspected, tested, and maintained in accordance with ASME B30.2-1976. In addition, the modified Auxiliary Building crane was load-tested to 156.25 tons (125%). The lifting devices and interfacing lift points associated with the Auxiliary Building crane also meet the guidance in NUREG-0612 to be considered a single-failure-proof lifting system. Specifically, special lifting devices will meet the guidance in NUREG-0612, Section 5.1.6(1)(a) and lifting devices not specifically designed will meet the guidance in NUREG-0612, Section 5.1.6(1)(b). Interfacing lift points will meet the guidance in NUREG-0612, Section 5.1.6(3). A single-failure-proof AB crane lifting system allows for the removal of the cask-drop accident from the licensing basis of the Kewaunee Power Station, as the accident is no longer credible.

With the cask-drop accident removed from the licensing basis, Criterion 2 of 10 CFR 50.36 no longer applied, and the crane load limits were relocated from the TSs to the TRM.

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[1] *All load bearing components used to lift the load, including the crane or hoist, the lifting device, and the interfacing load lift points.*

BASES

BACKGROUND (continued)

Crane interlocks are utilized to ensure safe load handling. Crane interlocks and administrative procedures will prevent the movement of heavy loads over spent fuel in the storage racks in spent fuel pool. Movement of necessary heavy loads over irradiated fuel in the spent fuel canister during cask handling operations will only be performed as required by the design of the spent fuel cask system. Removal / placement of additional spent fuel racks and support hardware will be controlled by procedures to prevent movement to directly above spent fuel. Handling of spent fuel storage casks and associated other heavy loads is controlled by procedures to prevent movement to directly above spent fuel, except as necessary to correctly load the cask system in accordance with the cask vendor's operating procedure.

REFERENCES

1. License Amendment No. 200, dated November 20, 2008 and License Amendment No. 205, dated April 30, 2009.
2. Kewaunee Power Station Updated Safety Analysis Report (USAR) section 9.5, "Fuel Handling System."
3. USAR section 14.2.1, "Fuel Handling Accidents."
4. NUREG 0612, "Control of Heavy Loads at Nuclear Power Plants."
5. Letter from Darrell G. Eisenhut (NRC) to All Licensees of Operating Plants, Applicants for Operating Licenses, and Holders of Construction Permits, "Control of Heavy Loads," dated December 22, 1980.
6. Letter from Darrell G. Eisenhut (NRC) to Licensees, "Control of Heavy Loads (Generic Letter 81-07)," dated February 3, 1981.
7. Letter from Steven A. Varga (NRC) to C.W. Geisler (WPSC), "Control of Heavy Loads (Phase I)," dated March 16, 1984.
8. Letter from C.W. Geisler (WPSC) to D.G. Eisenhut (NRC), "Control of Heavy Loads – Nine-Month Response," dated March 9, 1983.
9. Letter from C.W. Geisler (WPSC) to D.G. Eisenhut (NRC), "Control of Heavy Loads," dated April 4, 1983.
10. Letter from A. Schwencer (NRC) to E.W. James (WPSC), dated March 6, 1979 (License Amendment 26).
11. 52 FR 3788, "Nuclear Regulatory Commission - Proposed Policy Statement on Technical Specification Improvements for Nuclear Power Reactors," dated February 6, 1987.
12. WCAP-11618, "Methodically Engineered, Restructured and Improved, Technical Specifications," dated November 1987.
13. NUREG 0554, "Single-Failure-Proof Cranes for Nuclear Power Plants."

8.9 FUEL HANDLING OPERATIONS

8.9.2 Spent Fuel Pool Bridge Crane

TNC 8.9.2 Spent fuel pool bridge crane shall be FUNCTIONAL.

APPLICABILITY: During movement of irradiated fuel assemblies or fuel assembly components.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. Spent fuel pool bridge crane NonFUNCTIONAL.	A.1 Suspend movement of fuel or fuel assembly components.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.9.2.1	------------------------------NOTE---------------------------- The load assumed by the crane must be equal to or greater than the maximum load assumed by the crane during fuel movement. --- Perform dead load test on spent fuel pool bridge crane.	Prior to movement of fuel assemblies
TVR 8.9.2.2	Perform visual inspection of spent fuel pool bridge crane.	After every dead load test AND Prior to movement of fuel assemblies

BASES

BACKGROUND

The spent fuel pool bridge crane is required for movement of fuel and fuel assembly components. A dead-load test shall be successfully performed on the spent fuel pool bridge crane before movement of fuel or fuel assembly components begins. The load assumed by the crane for this test must be equal to or greater than the maximum load to be assumed by the crane during fuel handling (fuel or assembly component). A thorough visual inspection of the crane shall be made after the dead-load test and prior to fuel handling.

TNC and APPLICABILITY

This TNC requires the spent fuel pool bridge crane be FUNCTIONAL. To be FUNCTIONAL, the crane must meet its respective TVRs. In the event that the crane cannot meet its respective TVRs, the crane is NonFUNCTIONAL.

The spent fuel pool bridge crane must be FUNCTIONAL to move fuel or fuel assembly components.

CONTINGENCY MEASURES

A.1

If the spent fuel pool bridge crane is NonFUNCTIONAL, movement of fuel or fuel assembly components shall be stopped. This does not preclude movement of a fuel assembly or fuel assembly component to a safe position.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.9.2.1

Dead-load testing shall be successfully performed on the spent fuel pool bridge crane before fuel movement begins. Testing ensures the lifting device has adequate capacity to lift the weight of a fuel assembly and fuel assembly components.

TVR 8.9.2.2

Visual inspection shall be made after dead-load testing and prior to fuel movement. The inspection is performed to detect component defects.

REFERENCES

1. USAR 9.5, Fuel Handling System
2. USAR 14.2.1, Fuel Handling Accidents

8.9 FUEL HANDLING OPERATIONS

8.9.4 Radiation Monitoring During Fuel Movement

TNC 8.9.4 Monitor radiation levels in the fuel handling area:

a. Spent Fuel Pool

APPLICABILITY: During movement of irradiated fuel assemblies or fuel assembly components.

CONTINGENCY MEASURES

NONCONFORMANCES	CONTINGENCY MEASURES	RESTORATION TIME
A. Radiation levels not continuously monitored.	A.1 If movement of fuel or fuel assembly components are in progress, place in safe condition.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.9.4.1	Verify radiation levels are continuously monitored in spent fuel pool areas.	Prior to movement of fuel or fuel assembly components and every 24 hours thereafter.

BASES

BACKGROUND

Continuous monitoring of radiation levels provides immediate indication of an unsafe condition.

TNC and APPLICABILITY

This TNC requires that radiation levels be monitored in the spent fuel pool area during fuel movement or during movement of fuel assembly components. A minimum of one radiation monitor capable of detecting releases from a postulated fuel handling accident must be in operation in this area during fuel movement or during movement of fuel assembly components.

Radiation monitors that are acceptable for satisfying this TNC are as follows.

Spent Fuel Pool

R-5

Other radiation monitors may be used to satisfy this TNC provided that an evaluation determines that the monitor is capable of detecting releases from a postulated fuel handling accident.

CONTINGENCY MEASURES

A.1

If at least one required radiation monitor is not in operation in the spent fuel pool area, actions must immediately be initiated to: place any fuel assemblies or fuel assembly components that are being moved into a safe condition and cease fuel movement

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.9.4.1

A verification that radiation levels are continuously monitored in the spent fuel pool area is required to be performed before fuel movement or movement of fuel assembly components begins and every 24 hours thereafter.

REFERENCES

1. USAR 14.2.1.3 Fuel Handling Accident Method of Analysis

8.9 REFUELING OPERATIONS

8.9.6 Spent Fuel Pool Sweep System

TNC 8.9.6 Two spent fuel pool sweep trains including the charcoal absorbers and Radiation Monitors R-13 and R-14 shall be operating and FUNCTIONAL.

APPLICABILITY: During fuel handling if irradiated fuel in the pool has decayed less than 30 days,
When any load is carried over the pool if irradiated fuel in the pool has decayed less than 30 days.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. Spent Fuel Pool Sweep System is not operating or NonFUNCTIONAL.	A.1 -------------NOTE------------- Fuel assemblies may be placed in a safe condition. --------------------------------------- Suspend any fuel assembly movements.	Immediately
	AND	
	A.2 Relocate any load carried over the pool such that it is no longer suspended over the pool.	Immediately

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
B. Radiation Monitors R-13 and R-14 are not operating or are NonFUNCTIONAL	B.1.1 --------------NOTE------------- Fuel assemblies may be placed in a safe condition. ----------------------------------- Suspend any fuel assembly movements.	Immediately
	<u>AND</u>	
	B.1.2 Relocate any load carried over the pool such that it is no longer suspended over the pool.	Immediately
	<u>OR</u>	
	B.2 Operate both trains of the Spent Fuel Pool Sweep System including the charcoal adsorbers.	Immediately

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October 15, 2013

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.9.6.1	Each HEPA filter shall be demonstrated FUNCTIONAL by performing an in place cold DOP test. The DOP removal capability for each train shall be ≥ 99%.	18 months <u>AND</u> After each complete or partial replacement of the HEPA filter bank <u>AND</u> After any maintenance on the system that could affect the HEPA bank bypass leakage
TVR 8.9.6.2	Verify each Spent Fuel Pool Sweep train starts automatically.	18 months
TVR 8.9.6.3	Verify the combined HEPA filter and charcoal adsorber bank attain a pressure drop < 5.5 inches of water gauge for each HEPA filter and charcoal adsorber train at ± 10% of system design flow rate.	18 months
TVR 8.9.6.4	Verify each Spent Fuel Pool Sweep train fan operates within ± 10% of design flow rate.	Whenever the fans are tested
TVR 8.9.6.5	Verify each charcoal adsorber bank has Halogenated Hydrocarbon removal capability of ≥ 99%.	After complete or partial replacement of charcoal adsorber bank <u>OR</u> After any maintenance on the system that could affect the charcoal adsorber bank bypass leakage

TECHNICAL VERIFICATION REQUIREMENTS (continued)

VERIFICATION		FREQUENCY
TVR 8.9.6.6	Verify air distribution flow within the system of the HEPA filter bank is uniform within ± 20%. Air distribution shall be performed at ± 10% of design flow rate.	After any maintenance or testing that could affect the air distribution within the system
TVR 8.9.6.7	-------------------------------NOTE-------------------------- Testing of activated carbon shall be performed in accordance with ASTM D3803-89 at conditions of 30°C and 95% RH. --- Verify activated carbon in the charcoal filters has a removal capability of ≥ 95% radioactive methyl iodine.	18 months for filters in standby status OR After 720 hours of filter operation AND Following painting, fire, or chemical release in any ventilation zone communicating with the system
TVR 8.9.6.8	Test R-13 and R-14.	In accordance with the ODCM

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October 15, 2013

BACKGROUND

The requirement for the spent fuel pool sweep system, including charcoal adsorbers, to be operating when spent fuel movement is being made provides added assurance that the off-site doses will be within acceptable limits in the event of a fuel handling accident. The spent fuel pool sweep system is designed to sweep the atmosphere above the refueling pool and release to the Auxiliary Building vent during fuel handling operations. Normally, the charcoal adsorbers are bypassed, but for purification operation, the bypass dampers are closed routing the air flow through the charcoal adsorbers. If the dampers do not close tightly, bypass leakage could exist to negate the usefulness of the charcoal adsorber. If the spent fuel pool sweep system is found not to be operating, fuel handling within the Auxiliary Building will be terminated until the system can be restored to the operating condition.

The bypass dampers are integral to the filter housing. The test of the bypass leakage around the charcoal adsorbers will include the leakage through these dampers.

High efficiency particulate absolute (HEPA) filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential radioiodine releases to the atmosphere. Bypass leakage for the charcoal adsorbers and particulate removal efficiency for HEPA filters are determined by halogenated hydrocarbon and DOP, respectively. The laboratory carbon sample test results indicate a radioactive methyl iodide removal efficiency under test conditions which are more severe than accident conditions.

Operation of the fans significantly different from the design flow will change the removal efficiency of the HEPA filters and charcoal adsorbers. If the performances are as specified, the calculated doses would be less than the guidelines stated in 10 CFR Part 50.67 for the accidents analyzed.

The spent fuel pool sweep system will be operated for the first month after the reactor is shutdown for refueling during fuel handling and crane operations with loads over the pool. The potential consequences of a postulated fuel handling accident without the system are a very small fraction of the guidelines of 10 CFR Part 50.67 after one month decay of the spent fuel. Heavy loads greater than one fuel assembly are not allowed over the spent fuel.

In-place testing procedures will be established utilizing applicable sections of ANSI N510 - 1975 standard as a procedural guideline only.

BASES

BACKGROUND (continued)

Although committing to ASTM D3803-89, it was recognized that ASTM D3803-89 Standard references Military Standards MIL-F-51068D, Filter, Particulate High Efficiency, Fire Resistant, and MIL-F-51079A, Filter, Medium Fire Resistant, High Efficiency. These specifications have been revised and the latest revisions are, MIL-F-51068F and MIL-F-51079D. These revisions have been canceled and superseded by ASME AG-1, Code on Nuclear Air and Gas Treatment. ASME AG-1 is an acceptable substitution. Consequently, other referenced standards can be substituted if the new standard or methodology is shown to provide equivalent or superior performance to those referenced in ASTM D3803-89.

In WPS letter of August 25, 1976 to Mr. Al Schwencer (NRC) from Mr. E. W. James, KPS relayed test results for flow distribution for tests performed in accordance with ANSI N510-1975. This standard refers to flow distribution tests performed upstream of filter assemblies. Since the test results upstream of filters were inconclusive due to high degree of turbulence, tests for flow distribution were performed downstream of filter assemblies with acceptable results (within 20%). The safety evaluation attached to Amendment 12 references the station's letter of August 25, 1976 and acknowledges acceptance of the test results.

TECHNICAL VERIFICATION REQUIREMENTS

Pressure drop across the combined HEPA filters and charcoal adsorbers of < 5.5 inches of water at the system design flow rate (±10%) will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter (reference 2). A test frequency of once per operating cycle establishes system performance capability. This pressure drop is approximately 2 inches of water when filters are clean.

The frequency of tests and sample analysis are necessary to show that the HEPA filters and charcoal adsorbers can perform as evaluated. Replacement adsorbent should be qualified according to the guidelines of Regulatory Guide 1.52 (Rev. 1) dated July 1976, except that ASTM D3803-89 standard will be used to fulfill the guidelines of Table 2, item 5, "Radioiodine removal efficiency." The charcoal adsorber efficiency test procedures should allow for the removal of one adsorber tray, emptying of one bed from the tray, mixing the adsorbent thoroughly, and obtaining at least two samples. Each sample should be at least 2 inches in diameter and a length equal to the thickness of the bed. The use of multi-sample assemblies for test samples is an acceptable alternate to mixing one bed for a sample. If the iodine removal efficiency test results are unacceptable, all adsorbent in the system should be replaced. Any HEPA filters found defective should be

BASES

TECHNICAL VERIFICATION REQUIREMENT (continued)

replaced with filters qualified pursuant to Regulatory Position C.3.d of Regulatory Guide 1.52 (Rev. 1) dated July 1976.

If painting, fire, or chemical release occurs such that the charcoal adsorbers become contaminated from the fumes, chemicals, or foreign materials, the same tests and sample analysis should be performed as required for operational use.

Degradation of the HEPA filters due to painting, fire or chemical release in a communicating ventilation zone would be detected by an increased pressure drop across the filters. Should the filters become contaminated, engineering judgment would be used to determine if further leakage and/or efficiency testing was required.

Demonstration of the automatic initiation capability is necessary to assure system performance capability.

In-place testing procedures will be established utilizing applicable sections of ANSI N510 – 1975 standard as a procedural guideline only.

REFERENCES

1. USAR TABLE 14.3-8, "Major Assumptions for Design Basis LOCA Analysis."
2. CA128814, "Revise Calc 12107 SFP Sweep total syst pressure drop to det max allowed DP."

8.3 INSTRUMENTATION

8.3.7 Explosive Gas Monitoring System

TNC 8.3.7 The Waste Gas Analyzer (WGA) shall be FUNCTIONAL and aligned to monitor the in service Waste Gas Decay Tank (WGDT) such that its oxygen concentration does not exceed 4% by volume.

APPLICABILITY: Whenever a WGDT is in service.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. WGA NonFUNCTIONAL. OR WGA not aligned to in service WGDT.	A.1	Take and analyze samples from in service WGDT.	Once per 4 hours during degassing of primary system (other than normal gas stripping of the letdown flow) OR Once per 24 hours during normal power operation
B. Oxygen concentration in the in service WGDT > 4% by volume.	B.1	Suspend additions of waste gas to affected WGDT.	Immediately
	AND		
	B.2	Initiate action to reduce the oxygen concentration to < 4% by volume.	Immediately

DELETED January 28, 2014

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
	--------------------------------NOTE-------------------------- Test consists of an analysis of a known gas standard. ---	
TVR 8.3.7.1	Perform FUNCTIONAL TEST on Waste Gas Analyzer.	31 days
	--------------------------------NOTE-------------------------- Test consists of an analysis of a known gas standard. ---	
TVR 8.3.7.2	Perform CHANNEL CALIBRATION.	92 days

BASES

BACKGROUND

The Explosive Gas Monitoring System utilizes an inline Waste Gas Analyzer (WGA) to monitor the in service Waste Gas Decay Tank (WGDT) on a continuous basis. Grab sample analysis of the in service WGDT can be accomplished by obtaining a sample locally from the in service gas decay tank or from a sample point located on the WGA. Grab samples are analyzed with chemistry laboratory analytical equipment. If inline or grab sample analysis indicates an explosive mixture, actions will be taken to reduce the oxygen concentration as soon as possible.

The WGA provides a method for monitoring the concentrations of potentially explosive gas mixtures in the waste gas holdup system (Reference 5). An explosive gas mixture consists of a hydrogen gas concentration above the lower flammability limit of 4% AND an oxygen gas concentration above 4%. Technical Specification 5.5.10 requires a program that provides controls for potentially explosive gas mixtures in the gaseous radioactive waste disposal system (Reference 6).

The WGA has alarm capability that will alert operations personnel of oxygen concentrations approaching an explosive mixture and is set to 2% oxygen by volume. The 2% alarm setpoint on the WGA is based on the 4% oxygen concentration required for flammability. This allows for a 100% safety margin in the setpoint. The WGA alarms in the control room and is locally monitored at least daily. Laboratory analysis of a grab sample is performed periodically to confirm instrument accuracy.

TNC and APPLICABILITY

The hydrogen concentration inside an in service (aligned for fill) WGDT always has the potential to exceed 4% by volume. Therefore, the WGA is required to be FUNCTIONAL whenever a WGDT is in service.

A FUNCTIONAL WGA serves to alert operators of oxygen concentrations that could cause an explosive gas mixture (when oxygen is mixed with hydrogen). To prevent an explosive gas mixture, oxygen concentration inside the in service WGDT is not allowed to exceed 4% by volume. Operator action ensures that the concentration of potentially explosive gas mixtures contained in the waste gas holdup system is maintained below the flammability limits for hydrogen and oxygen. This will minimize the probability of a WGDT rupture, thus, minimizing the probability of an accidental radioactive gas release (Reference 7).

BASES

TNC and APPLICABILITY (continued)

The WGA is FUNCTIONAL when it is operating properly and capable of monitoring oxygen concentration. The WGA shall normally be aligned to the in service WGDT. The WGA can be temporarily aligned to monitor various points in the waste gas holdup system and remain FUNCTIONAL. The duration of any temporary alignment to other points in the waste gas holdup system is limited by the Restoration Time specified for Nonconformance A (which depends on plant operating condition).

CONTINGENCY MEASURES

A.1

If the WGA is NonFUNCTIONAL, manual grab samples must be periodically obtained and analyzed from the in service (aligned for fill) WGDT.

If a FUNCTIONAL WGA is not aligned to the in service WGDT, either a grab sample must be obtained or the WGA realigned to the normal configuration (such that the in service WGDT is monitored at the same periodicity as for a NonFUNCTIONAL WGA).

During normal power operation, manual sampling from the in service WGDT is required at 24 hour intervals (grab sample or realigning the WGA to normal). This sampling interval is sufficient since there should be no significant oxygen content in the tank during normal operation.

During primary system degassing operations, more frequent compensatory sampling is required when the WGA is not FUNCTIONAL (or not aligned to the in service WGDT). This manual sampling is required at 4 hour intervals when degassing of the primary system is in progress. Primary system degassing refers to the intentional removal of hydrogen from the reactor coolant system by either mechanical or chemical means and displacement with an alternate gas (e.g. nitrogen). Degassing does not include normal gas stripping of the letdown flow in the volume control tank (Reference 8).

B.1 and B.2

If oxygen concentration in the in service WGDT > 4% by volume, the potential for an explosive gas mixture exists. This condition requires both immediate action to suspend additions of waste gas to the affected WGDT and immediate initiation of action to reduce the oxygen concentration below 4% by volume. Another tank may be placed in service while the source of oxygen is located and eliminated (Reference 8).

BASES

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.3.7.1

A FUNCTIONAL TEST on the WGA must be performed every 31 days to confirm instrument accuracy. This test consists of an analysis of a known gas standard to perform an accuracy check of the WGA.

TVR 8.3.7.2

A CHANNEL CALIBRATION must be performed every 92 days. The WGA is calibrated using a known oxygen and hydrogen calibration gas standard.

REFERENCES

1. Comtrak Commitment Number 85-052, RETS-Explosive Gas Mixtures (DCR 1638).
2. Letter from Carl W. Giesler (WPSC) to Harold Denton (NRC), “Proposed Amendment No. 66 to the KNPP Technical Specifications,” dated March 29, 1985.
3. Comtrak Commitment Number 96-122, Item D, Analyze for Explosive Gas Mixtures with Waste Gas Holdup System.
4. Letter from Morton B. Fairtile (NRC) to D.C. Hintz (WPSC), “Amendment 64,” dated July 29, 1985.5. USAR 11.1.2.3, Waste Disposal System, Gas Processing.
6. Technical Specification 5.5.10, Explosive Gas and Storage Tank Radioactivity Monitoring Program.
7. USAR 14.2.3.1, Gas Decay Tank Rupture.
8. USAR 9.2.2, Chemical and Volume Control System (CVCS), System Design and Operation.

8.7 PLANT SYSTEMS

8.7.5 Snubbers

TNC 8.7.5 Each snubber listed in Table 8.7.5-1 shall be FUNCTIONAL.

APPLICABILITY: When the associated supported system is required to be OPERABLE.

CONTINGENCY MEASURES

-----NOTE-----
Separate entry is allowed for each snubber.

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. One or more required snubbers NonFUNCTIONAL.	A.1	Evaluate Technical Specification LCO 3.0.8 compliance.	Immediately
	AND		
	A.2	Verify at least one train (or subsystem) of systems supported by the NonFUNCTIONAL snubber(s) would remain capable of performing its required safety or support function for postulated design loads other than seismic loads.	Immediately
	AND		

CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. (continued)	A.3.1 -------------NOTE------------------ Only applicable if LCO 3.0.8.a is used. ---------------------------------------	
	Verify at least one AFW train not associated with the NonFUNCTIONAL snubber is available.	Immediately
	<u>OR</u>	
	A.3.2 -------------NOTE------------------ Only applicable if LCO 3.0.8.b is used. ---------------------------------------	
	Verify at least one AFW train not associated with the NonFUNCTIONAL snubber or alternative means of core cooling is available.	Immediately
B. CONTINGENCY MEASURE A.2 and associated Restoration Time not met.	B.1 Declare supported system LCO not met and enter applicable Required Action.	Immediately
C. CONTINGENCY MEASURE A.3 and associated Restoration Time not met.	C.1 Initiate action to restore associated snubber to a FUNCTIONAL status.	Immediately
	<u>AND</u>	
	C.2 Initiate action to manage risk.	Immediately

DELETED
January 8, 2014

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.7.5.1	Perform snubber examination and testing in accordance with the Snubber Test Program.	In accordance with the Snubber Test Program

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
AC-H68	Seismic	Component Cooling	TS 3.7.7	1, 2, 3, 4	Dual
AC-H78	Seismic	Reactor Coolant System Containment	TS 3.4.8 TS 3.6.1	5 1, 2, 3, 4	Dual
CS-H33A	Seismic	ECCS ECCS Internal Containment Spray Containment	TS 3.5.2 TS 3.5.3 TS 3.6.6 TS 3.6.1	1, 2, 3 4 1, 2, 3, 4 1, 2, 3, 4	Dual
CS-H39	Seismic	ECCS ECCS Internal Containment Spray Containment	TS 3.5.2 TS 3.5.3 TS 3.6.6 TS 3.6.1	1, 2, 3 4 1, 2, 3, 4 1, 2, 3, 4	Dual
CVC-H84	Seismic	ECCS ECCS Internal Containment Spray	TS 3.5.2 TS 3.5.3 TS 3.6.6	1, 2, 3 4 1, 2, 3, 4	Dual
CVC-H96	Seismic	ECCS ECCS Internal Containment Spray	TS 3.5.2 TS 3.5.3 TS 3.6.6	1, 2, 3 4 1, 2, 3, 4	Dual
CVC-H143	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
CVC-H161	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
CVC-H162	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
CVC-H173	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
CVC-H355	Seismic	CVCS	TRM 8.1.1	1, 2, 3, 4, 5, 6	Dual
CVC-H356	Seismic	CVCS	TRM 8.1.1	1, 2, 3, 4, 5, 6	Dual
CVC-H357	Seismic	CVCS	TRM 8.1.1	1, 2, 3, 4, 5, 6	Dual
CVC-H449	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
CVC-H450	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
ICS-H7	Seismic Dynamic	Internal Containment Spray Containment	TS 3.6.6 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Single
ICS-H8	Seismic Dynamic	Internal Containment Spray Containment	TS 3.6.6 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Single
ICS-H9	Seismic Dynamic	Internal Containment Spray Containment	TS 3.6.6 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Single
ICS-H10	Seismic Dynamic	Internal Containment Spray Containment	TS 3.6.6 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Single
ICS-H11	Seismic Dynamic	Internal Containment Spray Containment	TS 3.6.6 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Single
ICS-H12	Seismic Dynamic	Internal Containment Spray Containment	TS 3.6.6 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Single
MS-H121	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3, 4	Dual
MS-H129	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3, 4	Dual
RAC-H21	Seismic	Component Cooling Containment	TS 3.7.7 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Dual
RAC-H37	Seismic	Component Cooling Containment	TS 3.7.7 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Dual
RAC-H38	Seismic	Component Cooling Containment	TS 3.7.7 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Dual
RAC-H39	Seismic	Component Cooling Containment	TS 3.7.7 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Dual
RAC-H75	Seismic	Component Cooling Containment	TS 3.7.7 TS 3.6.1	1, 2, 3, 4 1, 2, 3, 4	Dual

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Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RAC-H76NE	Seismic	Component Cooling	TS 3.7.7	1, 2, 3, 4	Dual
		Containment	TS 3.6.1	1, 2, 3, 4	
RAC-H76SE	Seismic	Component Cooling	TS 3.7.7	1, 2, 3, 4	Dual
		Containment	TS 3.6.1	1, 2, 3, 4	
RC-H29A	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RC-H72	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RC-H86	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Containment	TS 3.6.1	1, 2, 3, 4	
RC-H87	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Containment	TS 3.6.1	1, 2, 3, 4	

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RCVC-H31A	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RCVC-H31B	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RCVC-H32	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RCVC-H33A	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RCVC-H33B	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RCVC-H34	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	

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Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RCVC-H35	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RCVC-H36	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
RCVC-H186	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
RCVC-H191	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
RCVC-H245	Seismic	Containment	TS 3.6.1	1, 2, 3, 4	Dual
RHR-H10H	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RHR-H12A	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RHR-H12B	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RHR-H16A	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RHR-H21A	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RHR-H35A	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RHR-H36A	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RHR-H38A	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RHR-H41A	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RHR-H49	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	

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Table 8.7.5-1
Snubbers

Snubber	**Support Loads**	**Associated System(s)**	**Associated TS/TRM**	**Applicable MODES**	**Trains Affected**
RRHR-H14	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RRHR-H15	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
RRHR-H18	Seismic	Residual Heat Removal	TS 3.5.3	1, 2, 3	Dual
		Residual Heat Removal	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RRHR-H55	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RRHR-H57	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H15A	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H2	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	

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Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RSI-H2A	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H38	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H59	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RSI-H61	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H63	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H67	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	

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Table 8.7.5-1
Snubbers

Snubber	**Support Loads**	**Associated System(s)**	**Associated TS/TRM**	**Applicable MODES**	**Trains Affected**
RSI-H78	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H83	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H94	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H95	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RSI-H96	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H97W	Seismic	Safety Injection	TS 3.5.2	1, 2, 3	Dual
		Safety Injection	TS 3.5.3	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H97S	Seismic	Safety Injection	TS 3.5.3	1, 2, 3	Dual
		Safety Injection	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H98	Seismic	Safety Injection	TS 3.5.3	1, 2, 3	Dual
		Safety Injection	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RSI-H99	Seismic	Safety Injection	TS 3.5.3	1, 2, 3	Dual
		Safety Injection	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H100	Seismic	Safety Injection	TS 3.5.3	1, 2, 3	Dual
		Safety Injection	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RSI-H101	Seismic	Safety Injection	TS 3.5.3	1, 2, 3	Dual
		Safety Injection	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
RSI-H102	Seismic	Safety Injection	TS 3.5.3	1, 2, 3	Dual
		Safety Injection	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Containment	TS 3.6.1	1, 2, 3, 4	
RTD-H2	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RTD-H6	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RTD-H8	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
RTD-H11	Seismic	Reactor Coolant System	TS 3.4.4	1, 2	Dual
		Reactor Coolant System	TS 3.4.5	3	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
SGB-H189	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3	Dual

Table 8.7.5-1
Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
SI-H6D	Seismic	Safety Injection	TS 3.5.3	1, 2, 3	Dual
		Safety Injection	TS 3.5.4	4	
		Reactor Coolant System	TS 3.4.6	4	
		Reactor Coolant System	TS 3.4.7	5	
		Reactor Coolant System	TS 3.4.8	5	
		Refueling	TS 3.9.3	6	
		Refueling	TS 3.9.4	6	
		Internal Containment Spray	TS 3.6.6	1, 2, 3, 4	
SI-H35	Seismic	Safety Injection	TS 3.5.3	1, 2, 3	Dual
		Safety Injection	TS 3.5.4	4	
		Containment	TS 3.6.1	1, 2, 3, 4	
SS-H67	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3	Dual
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
SS-H73	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3	Dual
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
SS-H76	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3	Dual
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
SS-H86	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3	Dual
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
SS-H87	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3	Dual
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	
SS-H88	Seismic	Auxiliary Feedwater	TS 3.7.5	1, 2, 3	Dual
		Reactor Coolant System	TS 3.4.4	1, 2	
		Reactor Coolant System	TS 3.4.5	3	

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Snubbers

Snubber	Support Loads	Associated System(s)	Associated TS/TRM	Applicable MODES	Trains Affected
SS-H103	Seismic	Auxiliary Feedwater Reactor Coolant System Reactor Coolant System	TS 3.7.5 TS 3.4.4 TS 3.4.5	1, 2, 3 1, 2 3	Dual
SS-H129	Seismic	Auxiliary Feedwater Reactor Coolant System Reactor Coolant System	TS 3.7.5 TS 3.4.4 TS 3.4.5	1, 2, 3 1, 2 3	Dual
SS-H146	Seismic	Auxiliary Feedwater Reactor Coolant System Reactor Coolant System	TS 3.7.5 TS 3.4.4 TS 3.4.5	1, 2, 3 1, 2 3	Dual
SS-H150	Seismic	Auxiliary Feedwater Reactor Coolant System Reactor Coolant System	TS 3.7.5 TS 3.4.4 TS 3.4.5	1, 2, 3 1, 2 3	Dual
SS-H156	Seismic	Auxiliary Feedwater Reactor Coolant System Reactor Coolant System	TS 3.7.5 TS 3.4.4 TS 3.4.5	1, 2, 3 1, 2 3	Dual
SW-H401	Seismic	Service Water	TS 3.7.8	1, 2, 3, 4	Dual

BASES

BACKGROUND

Shock suppressors (snubbers) are designed to prevent unrestrained pipe motion under dynamic loads, as might occur during seismic activity or severe plant transients, while allowing normal thermal motion during startup or shutdown. The consequence of a NonFUNCTIONAL snubber is an increase in the probability of structural damage to piping as a result of a seismic event or other events initiating dynamic loads. It is therefore required that all snubbers designed to protect the reactor coolant and other safety-related systems or components be FUNCTIONAL during reactor operation. The intent of TRM 8.7.5 is to restrict reactor operation with defective safety-related shock suppressors.

The requirements for snubbers were relocated from the previous Custom Technical Specification (TS) 3.14, "Shock Suppressors (Snubbers)", during the conversion to Improved TS (Reference 1).

TRM 8.7.5 also specifies the snubbers applicable to TS LCO 3.0.8, which establishes conditions under which systems are considered to remain capable of performing their intended safety function when associated snubbers are not capable of providing their associated support function(s).

LCO 3.0.8 was developed in TSTF-372, Revision 4, "Addition of LCO 3.0.8, Inoperability of Snubbers" (Reference 2). TSTF-372 documents a risk-informed analysis of NonFUNCTIONAL snubbers. The NRC issued a model safety evaluation (Reference 3) providing their acceptance of TSTF-372 with the associated analysis. Probabilistic risk assessment (PRA) results and insights were used, in combination with deterministic and defense-in-depth arguments, to identify and justify delay times for entering the actions for the supported equipment associated with NonFUNCTIONAL snubbers at nuclear power plants. This is in accordance with guidance provided in Regulatory Guides (RGs) 1.174 and 1.177. The risk impact associated with the proposed delay times for entering the TS actions for the supported equipment can be assessed using the same approach as for allowed completion time (CT) extensions. Therefore, the risk assessment was performed following the three-tiered approach recommended in RG 1.177 for evaluating proposed extensions in currently allowed completion times.

The first tier involves the assessment of the change in plant risk due to a NonFUNCTIONAL snubber. Such risk change is expressed by: (1) the change in the average yearly core damage frequency (ΔCDF) and the average yearly large early release frequency (ΔLERF); and, (2) the incremental conditional core damage probability (ICCDP) and the incremental conditional large early release probability (ICLERP).

BASES

BACKGROUND (continued)

The assessed ΔCDF and ΔLERF values are compared to acceptance guidelines, consistent with the Commission's Safety Goal Policy Statement as documented in RG 1.174, so that the plant's average baseline risk is maintained within a minimal range. The assessed ICCDP and ICLERP values are compared to acceptance guidelines provided in RG 1.177, which aim at ensuring that the plant risk does not increase unacceptably during the period the equipment is taken out of service.

This assessment was used to determine the delay times contained in TS LCO 3.0.8 for TSTF-372. Due to the low seismic activity at KPS, the LCO 3.0.8.b completion time was increased from the value listed in TSTF-372.

The second tier involves the identification of potentially high-risk configurations that could exist if equipment in addition to that associated with the change were to be taken out of service simultaneously, or other risk-significant operational factors such as concurrent equipment testing were also involved. The objective is to ensure that appropriate restrictions are in place to avoid any potential high-risk configurations.

This assessment was used to determine the contingency measures in TSTF-372, which are contained in TRM 8.7.5.

The third tier involves the establishment of an overall configuration risk management program (CRMP) to ensure that potentially risk-significant configurations resulting from maintenance and other operational activities are identified. The objective of the CRMP is to manage configuration-specific risk by appropriate scheduling of plant activities and/or appropriate compensatory measures. This activity is met by implementation of the Maintenance Rule (Reference 4).

The accident sequences contributing to the risk increase associated with NonFUNCTIONAL snubbers are assumed to be initiated by a seismically induced loss of offsite power (LOOP) event with concurrent loss of all safety system trains supported by the out of service snubbers. In the case of snubbers associated with more than one train (or subsystem) of the same system, it is assumed that all affected trains (or subsystems) of the supported system are failed.

BACKGROUND (continued)

The risk impact associated with non-LOOP accident sequences (*e.g.*, seismically initiated loss of coolant accident (LOCA) or anticipated transient without scram (ATWS) sequences) was not assessed. However, this risk impact is small compared to the risk impact associated with the LOOP accident sequences modeled in the simplified bounding risk assessment. Therefore, the risk impact of NonFUNCTIONAL snubbers associated with non-LOOP accident sequences is small compared to the risk impact associated with the LOOP accident sequences.

The second tier of the three-tiered approach recommended in RG 1.177 involves the identification of potentially high risk configurations that could exist if equipment in addition to that associated with the NonFUNCTIONAL snubbers were to be taken out of service simultaneously. Insights from the risk assessments, in conjunction with important assumptions made in the analysis and defense-in-depth considerations, were used to identify such configurations. To avoid these potentially high risk configurations, specific restrictions on operation with NonFUNCTIONAL snubbers were identified. TRM 8.7.5 is based on these Tier II restrictions.

TNC and APPLICABILITY

To ensure supported system OPERABILITY, each snubber listed in Table 8.7.5-1 is required to be FUNCTIONAL whenever the associated supported system is required to be OPERABLE. If a supported system is not required to be OPERABLE (e.g., outside the TS MODE of Applicability for that system), then its associated snubber is not a required snubber during the period that the supported system is not required to be OPERABLE. For consistency, those snubbers listed in Table 8.7.5-1 that are only associated with a TRM system (e.g., CVCS), are treated within the scope of TRM 8.7.5 applicability (i.e., the terms FUNCTIONAL and OPERABLE for these supported TRM systems are treated synonymously for purposes of TRM 8.7.5 compliance).

TRM Table 8.7.5-1 provides a listing of "required snubbers" within the application of LCO 3.0.8. LCO 3.0.8 does not apply to non-seismic snubbers. This table also lists the TS LCOs that are potentially affected by the FUNCTIONALITY of the listed snubbers. Although this table lists the potentially affected TS LCOs, the actual LCOs affected must be confirmed whenever the applicable specified period of LCO 3.0.8 is exceeded. Compliance with the CONTINGENCY MEASURES required by TNC 8.7.5 ensures that the risk associated with NonFUNCTIONAL "required snubbers" is "assessed and managed" as required by LCO 3.0.8.

TNC and APPLICABILITY (continued)

The list in Table 8.7.5-1 contains those snubbers from the Snubber Test Program that are identified as safety related (QA Type 1). For each listed snubber, Table 8.7.5-1 identifies the type of load support provided by the snubber (seismic or dynamic), systems associated with that snubber, associated TS/TRM section, applicable MODE, and whether the snubber affects a single train or dual trains.

In determining the identified information, the snubbers were located on the associated isometric drawing listed on the snubber table found in the Snubber Test Program. The location was then identified on the related analytical part flow drawing (e.g., snubber RTD-H11 was located on M-1461 and APX-100-10). From this information, the boundaries of the analytical part were determined and affected systems identified. A system was determined to be related if, for a listed Non-FUNCTIONAL snubber, no means of isolating the associated analytical part (i.e., isolated by a component that was outside the analytical part boundary) from the interconnected system was found. Once the affected systems were identified, the applicable TS and MODES were determined. Only internal containment spray (ICS) snubbers inside containment were found to provide dynamic support in addition to seismic support (Reference 5).

A snubber is FUNCTIONAL when it is capable of performing its specified design functions.

Snubbers are classified as component standard supports, which are designed to transmit loads from the pressure-retaining boundary of the system component to the building structure. However, they require special consideration due to their unique function. Snubbers are designed to provide no transmission of force during normal plant operations. Rather, they function as a rigid support only when subjected to dynamic transient loadings. Snubbers are chosen in lieu of rigid supports where restricting thermal growth during normal operation would induce excessive stresses in the piping nozzles or other equipment. The location and size of the snubbers are determined by stress analysis. Depending on the design classification of the particular piping, different combinations of load conditions are established. These conditions combine loading during normal operation, seismic loading and loading due to plant accidents and transients to four different loading sets. These loading sets are designated as: normal, upset, emergency, and faulted conditions. The actual loading included in each of the four conditions depends on the design classification of the piping. These design requirements establish snubber FUNCTIONALITY criteria.

CONTINGENCY MEASURES

The CONTINGENCY MEASURES are modified by a Note that allows a separate CONTINGENCY MEASURE entry for each NonFUNCTIONAL snubber. This is acceptable because the CONTINGENCY MEASURE for each Nonconformance provides appropriate compensatory actions for each NonFUNCTIONAL snubber.

A.1

TS LCO 3.0.2 and LCO 3.0.6 generally require immediate entry into the supported system Conditions and Required Actions when a snubber is found or made NonFUNCTIONAL. The only exceptions are:

1) Immediate entry may be delayed per LCO 3.0.8; or,

2) The supported system has been analyzed and determined to be OPERABLE without the snubber.

Whenever a required snubber is found or made NonFUNCTIONAL, compliance with LCO 3.0.8 must be evaluated immediately. The requirements of LCO 3.0.2 and LCO 3.0.6 are applicable to this evaluation. If the supported system has been analyzed and determined to be OPERABLE without reliance on the snubber, then the snubber can be considered as not required and LCO 3.0.8 remains satisfied.

TS LCO 3.0.8.a applies when one or more snubbers are not capable of providing their associated support function(s) to a single train or subsystem of a multiple train or subsystem supported system or to a single train or subsystem supported system. LCO 3.0.8.a allows 72 hours to restore the snubber(s) before declaring the supported system inoperable.

The 72 hour allowance in LCO 3.0.8.a is based, in part, on the availability of the redundant train of the supported system (for multiple train systems) and on the low probability of a seismic event concurrent with an event that would require operation of the supported system occurring while the snubber(s) are not capable of performing their associated support function. This allowance is also applicable to snubbers associated with single train or subsystem supported systems because such single train systems are not required to have a redundant system.

TS LCO 3.0.8.b applies when one or more snubbers are not capable of providing their associated support function(s) to more than one train or subsystem of a multiple train or subsystem supported system.
LCO 3.0.8.b allows 24 hours to restore the snubber(s) before declaring the supported system inoperable.

CONTINGENCY MEASURES (continued)

LCO 3.0.8 requires that risk be assessed and managed when one or more snubbers are NonFUNCTIONAL, which may include compensatory measures for NonFUNCTIONAL snubbers. This is met by assessing and managing the risk in accordance with the Maintenance Rule Program (Reference 4). Additional information on this requirement is contained in the LCO 3.0.8 Bases.

A.2

The risk impact of dynamic loadings other than seismic loads was not assessed in the development of the delay times in LCO 3.0.8. These shock-type (non-seismic) loads include thrust loads, blowdown loads, water hammer loads, steam hammer loads, LOCA loads and pipe rupture loads. In general, the risk impact of the out-of-service snubbers is smaller for non-seismic loads than for seismic loads. Since dynamic loading was not generically assessed for justifying LCO delay times, a specific assessment is required to be performed to determine appropriate system capability based on equipment that may be out of service for maintenance or due to failure.

Therefore, whenever the provisions of LCO 3.0.8 are used, an engineering assessment must immediately be initiated to show that at least one train (or subsystem) of each system that is supported by the NonFUNCTIONAL snubber(s) would remain capable of performing its required safety or support functions for postulated design loads other than seismic loads. This verification must be documented (typically in operator logs).

A train (or subsystem) that is supported by a NonFUNCTIONAL snubber that does not provide dynamic support (as stated in the "Support Loads" column of Table 8.7.5-1) would remain capable of performing its required safety or support function for postulated design loads other than seismic loads (provided it is otherwise capable of performing its required function). This means that a NonFUNCTIONAL snubber that is listed in Table 8.7.5-1 as only providing seismic support (in the "Support Loads" column) remains capable of performing its required support function for purposes of satisfying CONTINGENCY MEASURE A.2.

Conversely, a system supported by a snubber that provides dynamic support would not meet the capability requirement of CONTINGENCY MEASURE A.2 for the train supported by that snubber.

CONTINGENCY MEASURES (continued)

A.3.1

For cases where all NonFUNCTIONAL snubbers are associated with only one train (or subsystem) of multiple train systems (i.e., when LCO 3.0.8.a applies), the analysis assumes that there will be unaffected redundant trains (or subsystems) available to mitigate the seismically initiated LOOP accident sequences (single train systems are not required to have a redundant system). To prevent potentially high risk configurations in this condition, a restriction was established to require at least one AFW train that is not associated with the NonFUNCTIONAL snubber(s).

Thus, when LCO 3.0.8.a is used, at least one AFW train (including a minimum set of supporting equipment required for its successful operation) not associated with the NonFUNCTIONAL snubber(s), must be available.

A.3.2

For cases where one or more of the NonFUNCTIONAL snubbers are associated with multiple trains (or subsystems) of the same safety system (i.e., when LCO 3.0.8.b applies), the bounding analysis assumes that all safety systems are unavailable to mitigate the seismically initiated LOOP accident sequences. Credit is taken for using feed and bleed (F&B) to provide core cooling when a snubber impacting more than one train of the AFW system is NonFUNCTIONAL. To prevent potentially high risk configurations in this condition, a restriction was established to require either, at least one AFW train that is not associated with the NonFUNCTIONAL snubber(s); or, an alternate means of core cooling.

Thus, when LCO 3.0.8.b is used, one of the following two requirements must be met to mitigate a seismically initiated loss of offsite power (LOOP) accident:

1) At least one AFW train (including a minimum set of supporting equipment required for its successful operation) not associated with the NonFUNCTIONAL snubber(s); or,
2) An alternative means of core cooling (e.g., feed and bleed, fire water system or "aggressive secondary cooldown" using the steam generators) must be available.

BASES

CONTINGENCY MEASURES (continued)

B.1

CONTINGENCY MEASURE A.2 requires verification that at least one train (or subsystem) supported by the NonFUNCTIONAL snubber would remain capable of performing its required safety or support function for postulated design loads other than seismic loads. If this requirement is not satisfied, then LCO 3.0.8 cannot be used to delay performing the Required Actions of the supported system LCO. In this case, the support system LCO is not met and the applicable Required Action must be entered immediately in accordance with LCO 3.0.2 and 3.0.6.

C.1 and C.2

CONTINGENCY MEASURE A.3 (i.e., A.3.1 or A.3.2) requires verification of a means of providing core cooling independent of the components directly supported by the NonFUNCTIONAL snubber (either AFW or some alternate means). If another means of providing core cooling cannot be identified or becomes unavailable, the risk must be assessed and managed in accordance with the Maintenance Rule Program (Reference 4), as described in LCO 3.0.8 basis.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.7.5.1

All safety related hydraulic shock suppressors are visually inspected for overall integrity and FUNCTIONALITY. The inspection will include verification of proper orientation, adequate hydraulic fluid level and proper attachment of snubber to piping and structures.

The inspection frequency is based upon maintaining a constant level of snubber protection. Thus the required inspection interval varies with the observed snubber failures. The number of NonFUNCTIONAL snubbers found during a required inspection determines the time interval for the next required inspection.

Experience at operating facilities has shown that the surveillance program should assure an acceptable level of snubber performance provided that the seal materials are compatible with the operating environment.

BASES

TECHNICAL VERIFICATION REQUIREMENTS (continued)

To further increase the assurance of snubber reliability, FUNCTIONAL tests are performed in accordance with sampling plans. These tests include stroking of the snubbers to verify proper piston movement and snubbing action. Ten percent of the safety-related snubbers represents an adequate sample for such tests. Observed failures on these samples require testing of additional units.

REFERENCES

1. Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 207 to Facility Operating License No. DPR-43, Dominion Energy Kewaunee, Inc., Kewaunee Power Station, Docket No. 50-305, dated February 2, 2011.
2. TSTF-372, "Addition of LCO 3.0.8, Inoperability of Snubbers," Revision 4.
3. Federal Register Notice, 70 FR 23252, dated May 4, 2005.
4. 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."
5. USAR Section 6.2.2.3, Protection Against Dynamic Effects.

8.7 PLANT SYSTEMS

8.7.7 Flooding Protection – Circulating Water Pump Trip Circuitry

TNC 8.7.7 Two trains of circulating water pump trip circuitry shall be FUNCTIONAL.

APPLICABILITY: Whenever the circulating water system is in operation.

CONTINGENCY MEASURES

----------NOTE----------
Separate Nonconformance entry is allowed for each circulating water pump train.

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. One channel of circulating water pump trip circuitry per train NonFUNCTIONAL.	A.1	Place channel in the trip condition.	6 hours
	OR		
	A.2.1	Declare the affected train of Circulating Water pump trip circuitry NonFUNCTIONAL.	6 hours
	AND		
	A.2.2	Restore to FUNCTIONAL status.	90 days
B. Two or more channels of circulating water pump trip circuitry per train NonFUNCTIONAL.	B.1	Declare the affected train of Circulating Water pump trip circuitry NonFUNCTIONAL.	Immediately
	AND		
	B.2	Restore to FUNCTIONAL status.	90 days

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CONTINGENCY MEASURES (continued)

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
C. Two trains of circulating water pump trip circuitry NonFUNCTIONAL.	C.1	Restore at least one train to FUNCTIONAL status.	72 hours
D. Required CONTINGENCY MEASURES and associated Restoration Time of Nonconformance A, B, or C not met.	D.1	Be in MODE 2.	7 hours
	<u>AND</u>		
	D.2	Be in MODE 3.	13 hours
	<u>AND</u>		
	D.3	Remove circulating water pumps from operation.	19 hours

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.7.7.1	Perform FUNCTIONAL TEST on Circulating Water Pump Trips.	18 months

BASES

BACKGROUND

The Circulating Water (CW) pump trip function is to provide a trip to both CW pump breakers whenever evidence of significant flooding in the Turbine Building (TB) basement could potentially impact operation of the emergency diesel generators, associated safety-related buses and motor control centers, and the auxiliary feedwater pumps and associated circuitry located in safeguards alley.

The detection, actuation, and logic circuitry used to actuate the CW Pump breaker trips, is designed and installed as non-safety-related, but with many attributes of a safety-related design such as redundancy, diversity, and separation. The outputs from the logic circuits and supplemental outputs from the actuation circuits will be used to electrically trip the CW pump breakers and indicate alarms to the operators. A supplemental alarm, including detector and associated circuitry, is installed to provide an early warning to the operators of potential flooding in the TB basement.

The design uses two independent trains of detection, actuation, and logic circuitry that will detect flooding on the TB basement in the vicinity of the north wall to provide 2 out of 3 logic matrix outputs to trip both CW pump circuit breakers. Additionally, any single detector actuation or logic matrix actuation will be alarmed in the Control Room to alert the operators of the abnormal condition.

The six TB basement high water level (flooding) detectors are listed for Underwriters Laboratories (UL) hazardous locations, are weatherproof and explosion proof, and have a leak proof lower body and an independent waterproof conduit seal. They can withstand up to 350 psig, can handle a minimum liquid specific gravity of 0.7; and have temperature limits of –4°F to +220°F. Thus their application to detect a water level due to flooding is assured. The float switch weighs approximately one pound. It is also sensitive to level changes of less than one-half inch.

Each of the three actuation relays (per train) will actuate an individual SER point to indicate to the operators that an individual actuation switch has tripped and associated actuation relay has energized. Thus, indication of a single switch actuation will be available to determine if the actuation occurred in the northwest (NW), north (N), or northeast (NE) section along the TB basement north wall. All six actuation relay SERs alarm the same annunciator window.

BASES

TNC and APPLICABILITY

The CW trip consists of two trains of trip function, each with three channels. Each train requires a minimum of two channels to be FUNCTIONAL as long as the NonFUNCTIONAL channel is placed in the tripped position within 6 hours. This allows the remaining 2 channels to function as a 1 out of 2 trip function to trip the pumps. If two or more channels are NonFUNCTIONAL, the train is considered NonFUNCTIONAL.

Based on Probabilistic Risk Assessment (PRA) application (reference 1) and consistent with Regulatory Guide 1.177, one train can be NonFUNCTIONAL for up to 90 days and both trains can be NonFUNCTIONAL for 72 hours. The core damage frequency for flooding from the CW System into the turbine building with one train inoperable is 1.92 x 10^{-7}/year and 4.76 x 10^{-5}/year for both trains inoperable. The core damage frequency results with one train NonFUNCTIONAL equates to 990 days of NonFUNCTIONALITY potential and 92 hours of NonFUNCTIONALITY potential for both trains NonFUNCTIONAL.

If the train CONTINGENCY MEASURE cannot be met, the plant will begin to shutdown within 1 hour and achieve MODE 2 within 6 hours and MODE 3 within another 6 hours. The CW pumps will then be removed from operation within 6 hours of entering MODE 3.

TECHNICAL VERIFICATION REQUIREMENT

<u>TVR 8.7.7.1</u>

The CW pump trip will require testing each refueling cycle to assure it will function as expected. This frequency is consistent with other systems of similar or higher safety significance.

REFERENCES

1. PRA Application # 05-16 dated May 13, 2005.

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January 25, 2014

8.8 ELECTRICAL SYSTEMS

8.8.3 Emergency Diesel Generator (EDG) Ventilation Damper Control Air Supply

TNC 8.8.3 EDG ventilation damper control air supply shall be FUNCTIONAL with the following provisions:

a. Two compressed air cylinders aligned to the damper controllers;

b. Pressure in each required air cylinder and air leakage downstream of isolation check valve shall be maintained within limits specified in Figure 8.8.3-1.

APPLICABILITY: Whenever the associated EDG is required to be OPERABLE.

CONTINGENCY MEASURES

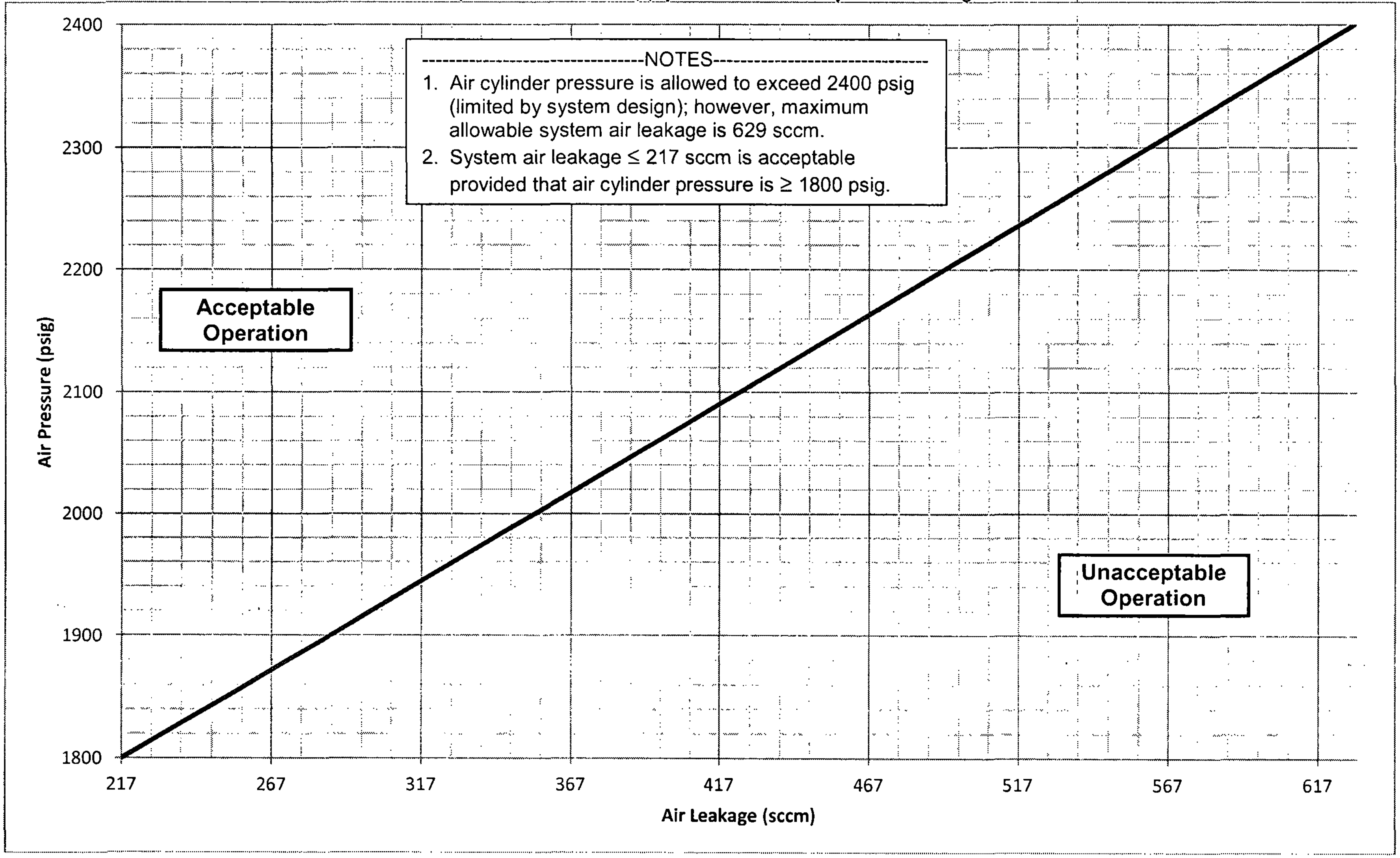
NONCONFORMANCE	CONTINGENCY MEASURES	RESTORATION TIME
A. Ventilation damper control air supply on EDG NonFUNCTIONAL for reasons other than Nonconformance B or C.	A.1 Evaluate OPERABILITY of affected EDG per Technical Specification 3.8.2.	Immediately
B. Requirements of TNC 8.8.3.b not met on EDG.	B.1 Restore parameter(s) to within limits.	24 hours
	<u>AND</u>	
	B.2 Evaluate OPERABILITY of affected EDG per Technical Specification 3.8.2.	Immediately

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
C. Pressure < 1800 psig in one or more required air cylinders on EDG.	C.1	Restore air cylinder pressure ≥ 1800 psig.	4 hours
	<u>AND</u>		
	C.2	Evaluate OPERABILITY of affected EDG per Technical Specification 3.8.2.	Immediately

TECHNICAL VERIFICATION REQUIREMENTS

	VERIFICATION	FREQUENCY
TVR 8.8.3.1	Verify required air cylinder pressure ≥ pressure limits specified in Figure 8.8.3-1 for the existent air leakage downstream of isolation check valve.	24 hours
TVR 8.8.3.2	----------------------------NOTE---------------------------- Air supply in excess of a seven-day supply is not required for damper control air supply functionality. --- Verify 30 day supply of compressed air cylinders available on site.	31 days
TVR 8.8.3.3	----------------------------NOTE---------------------------- TNC 8.8.3 remains met if leakage is within limits specified in Figure 8.8.3-1. --- Verify EDG ventilation system leakage downstream of isolation check valve ≤ 217 sccm.	92 days
TVR 8.8.3.4	Verify isolation check valve leakage within limits.	In accordance with the Augmented Inservice Testing (IST) Program
TVR 8.8.3.5	Perform calibration of backup air supply regulator.	18 months

Figure 8.8.3-1
EDG Ventilation Damper Control Air Supply Pressure and System Leakage Limitation Curve



--------------------------------NOTES--------------------------------

1. Air cylinder pressure is allowed to exceed 2400 psig (limited by system design); however, maximum allowable system air leakage is 629 sccm.
2. System air leakage ≤ 217 sccm is acceptable provided that air cylinder pressure is ≥ 1800 psig.

BASES

BACKGROUND

Emergency Diesel Generator (EDG) Rooms 1A and 1B are each provided with a ventilation system consisting of a normal-mode supply fan and a vent supply fan with automatic control dampers (reference 1). These dampers are operated by compressed air. Vent supply fans provide both combustion air for the diesel engine and sufficient cooling air to maintain the design basis room temperature (reference 2).

Compressed air is normally supplied to EDG ventilation control dampers from the instrument air system. A safety-related backup air supply is provided by two redundant sets of compressed air cylinders (two cylinders per set) for each EDG. One of the two sets of air cylinders is normally aligned to its respective EDG's ventilation damper control air supply. The second set is normally maintained isolated (in reserve). The reserve air cylinder set provides enhanced system reliability as well as flexibility for conduct of maintenance or testing.

During normal operation, control air is supplied from the instrument air system at a higher pressure than the backup air supply output. This results in the backup air supply remaining in standby. The aligned (inservice) compressed air cylinders provide backup control air to the damper controllers in the event the normal (instrument) air supply is lost concurrent with a loss of off-site power. Either set of backup air supply cylinders (when placed in service) is capable of supplying compressed air to its respective EDG's damper actuators for seven days.

A pressure regulator, at the outlet of each compressed air cylinder set, supplies backup air at reduced pressure of approximately 80 psig. In the event instrument air pressure drops below 80 psig, air to the EDG ventilation damper actuators would continue to be provided from the backup air supply. An isolation check valve in the instrument air supply allows flow of instrument air to the damper controllers, but prevents backflow of backup air (and depletion of the air cylinders) in the event of pressure loss in the instrument air system.

Based on a design system leakage of 217 sccm downstream of the isolation check valve, and minimum allowed cylinder air pressure of 1800 psig, the backup air supply can provide control air to the damper actuators on its respective EDG for seven days.

TNC and APPLICABILITY

The EDG ventilation damper control air supply supports EDG OPERABILITY. Therefore, the EDG ventilation damper control air supply must be FUNCTIONAL whenever the associated EDG it supports is required to be OPERABLE.

BASES

TNC and APPLICABILITY (continued)

To be FUNCTIONAL, the EDG ventilation damper control air supply must be capable of supplying air to its associated EDG ventilation damper controllers. The instrument air system provides the normal supply of control air, but is not required for EDG ventilation damper control air supply FUNCTIONALITY. The required control air supply is provided by the compressed air cylinders that comprise the backup air supply. Two compressed air cylinders (one set) are required and must be aligned to provide backup air supply to the damper controllers. The second set of air cylinders enhance system reliability, but are not required for air supply FUNCTIONALITY (references 3 and 4).

To ensure the required seven day supply of control air from the aligned cylinders, air leakage downstream of the isolation check valves must not be excessive and the minimum pressure in each of the two required backup compressed air cylinders must be at least 1800 psig (pressure in the two inservice cylinders in each set remains equalized via their common air header).

Air leakage and corresponding pressure limits are specified in Figure 8.8.3-1 (and in procedures). Maximum allowable air system leakage varies depending on actual air cylinder pressure. The pressure and leakage limits specified in Figure 8.8.3-1 are based on maintaining a seven-day air supply. This correlates to an allowed leak rate of 217 sccm with air cylinder pressure at the minimum allowed value of 1800 psig, and 629 sccm with air cylinder pressure at 2400 psig.

Cylinder air pressure and system air leakage must be maintained in the Acceptable Operation portion of the limitation curve of Figure 8.8.3-1. This figure is modified by two Notes. Note 1 permits operation with cylinder air pressure above 2400 psig, provided air leakage is ≤ 629 sccm. Air pressure above 2400 psig results in a larger supply of air and is acceptable. The maximum allowable pressure is limited by system design and is administratively controlled. However, air leakage above 629 sccm indicates unacceptable system degradation and is not allowed. Such excessive leakage must be addressed in accordance with Nonconformance B. Note 2 permits operation with air leakage ≤ 217 sccm, provided cylinder air pressure is ≥ 1800 psig.

Each EDG is supported by its associated ventilation damper control air supply. The ventilation damper control air supply for its associated EDG is required to be FUNCTIONAL whenever that EDG is required to be OPERABLE.

CONTINGENCY MEASURES

A.1

If the ventilation damper control air supply on one EDG is NonFUNCTIONAL for reasons other than excessive system leakage downstream of the isolation check valve or pressure < 1800 psig in one or more required air cylinders, OPERABILITY of the associated EDG may have been adversely affected. Therefore, actions are immediately required to be initiated to evaluate EDG OPERABILITY per Technical Specification 3.8.2.

Because of the immediate completion time, performance of an evaluation that demonstrates the OPERABILITY of the affected EDG as required by CONTENGENCY MEASURE A.1 would need to be completed in advance of entering Condition A.

B.1 and B.2

If system leakage in the ventilation damper control air supply flow path downstream of the isolation check valve on one EDG exceeds limits specified in Figure 8.8.3-1, the capability of the system to supply backup control air for the required period of time is degraded. Action is needed within 24 hours to reduce leakage to acceptable values (or to raise air pressure to within limits if leakage ≤ 629 sccm).

Because increases in air system leakage generally develop gradually, discovery of excessive air leakage is likely to occur prior to onset of significant leakage or gross system failure. As such, loss of control air to the dampers is not expected to be imminent under normal operating conditions. Therefore, 24 hours is an acceptable period of time for operators to identify and correct the source of leakage (or raise air pressure as appropriate). During this 24 hour period, the system remains capable of supplying air to the ventilation damper controllers considering the heightened operator awareness and availability of the redundant (standby) compressed air cylinders to be placed in service (including availability of additional air cylinders stored onsite).

Additionally, to determine whether OPERABILITY of the associated EDG has been adversely affected by excessive control air leakage, actions are immediately required to be initiated to evaluate EDG OPERABILITY per Technical Specification 3.8.2. These additional actions address conditions where significant or abnormal types of air leakage (e.g., structural failure of air piping integrity) may have adversely impacted EDG OPERABILITY. Provided that air leakage is not gross (e.g., air supply pressure is reasonably capable of being

CONTINGENCY MEASURES (continued)

maintained above 1800 psig and capable of supplying compressed air to its respective EDG's damper actuators for seven days (allowing for replacement of air cylinders to maintain pressure)), then the EDG may be considered OPERABLE with this Nonconformance during the 24 hour restoration time.

C.1 and C.2

If pressure is < 1800 psig in one or more required air cylinders on one EDG, the capability of the system to supply backup control air for the required period of time is significantly degraded. Action is needed within four hours to restore air cylinder pressure to acceptable values.

Because pressure in the compressed air cylinders generally decreases gradually and a low pressure alarm is provided to operators, discovery of low pressure is likely to occur prior to significant loss of air from the air cylinders. As such, loss of control air to the dampers is not expected to be imminent under normal operating conditions. Therefore, four hours is an acceptable period of time for operators to identify and correct the cause of the low air pressure. During this four hour period, the system remains capable of supplying air to the ventilation damper controllers considering the heightened operator awareness and availability of the redundant (standby) compressed air cylinders to be placed in service (including availability of additional air cylinders stored onsite). Nonconformance C provides defense in depth to the limits specified in Figure 8.8.3-1 against loss of required air supply.

Additionally, to determine whether OPERABILITY of the associated EDG has been adversely affected by significantly low air pressure, actions are immediately required to be initiated to evaluate EDG OPERABILITY per Technical Specification 3.8.2. These additional actions address conditions where significant or abnormal types of pressure loss (e.g., structural failure of air piping integrity) may have adversely impacted EDG OPERABILITY.

TECHNICAL VERIFICATION REQUIREMENTS

TVR 8.8.3.1

Verification that pressure in the required (aligned) air cylinders is ≥ minimum required pressure specified in Figure 8.8.3-1, corresponding to the existent air leakage downstream of isolation check valve, must be performed every 24 hours. Although only the aligned (inservice) air cylinders are required to be verified, pressure in the isolated (standby) compressed air cylinders is also typically monitored to maintain their availability for use.

TVR 8.8.3.2

Verification must be performed every 31 days that a 30-day supply of EDG ventilation control air, contained in appropriate compressed air cylinders, is available on site. This verification is modified by a Note that an air supply beyond a seven-day supply is not required for damper control air supply FUNCTIONALITY. This is an allowed exception to TVR 7.6.1. A 30-day supply is provided as defense in depth. Deficiency in the 30-day air supply would be addressed via the corrective action process.

TVR 8.8.3.3

Verification that EDG ventilation system leakage, downstream of the instrument air isolation check valve, is ≤ 217 sccm, must be performed every 92 days.

This verification is modified by a Note, which states that TNC 8.8.3 remains met if system air leakage is within limits specified in Figure 8.8.3-1. This is an allowed exception to TVR 7.6.1. Since leakage limits are based on actual air cylinder pressure, leakage is permitted to exceed 217 sccm if air pressure is sufficiently high. However, Figure 8.8.3-1 allows a minimum cylinder air pressure of 1800 psig. Therefore, leakage should not normally exceed 217 sccm. Leakage that exceeds 217 sccm, although allowed by Figure 8.8.3-1, is not desired long term. Undesired leakage would be addressed via the corrective action (or other appropriate) process.

The minimum required cylinder air pressure corresponding to the existent system air leakage (per Figure 8.8.3-1) must be administratively maintained (e.g., if system air leakage is 355 sccm, then a required minimum cylinder air pressure of 2000 psig must be administratively maintained).

BASES

TECHNICAL VERIFICATION REQUIREMENTS (continued)

TVR 8.8.3.4

Verification that instrument air isolation check valve leakage is within limits must be performed In accordance with the periodicity specified in the Augmented IST Program.

TVR 8.8.3.5

The air pressure regulator on the outlet of each required set of compressed air cylinders must be calibrated every 18 months.

REFERENCES

1. USAR 9.6.7, Turbine Building and Screenhouse Ventilation System
2. USAR 8.2.3, Emergency Power
3. Design Change KW-10-01101, EDG Ventilation Air Supply Modification
4. Calculation C11965

8.3 INSTRUMENTATION

8.3.6 Seismic Monitoring Instrumentation

TNC 8.3.6 Seismic monitoring instrumentation shall be FUNCTIONAL.

APPLICABILITY: At all times.

CONTINGENCY MEASURES

NONCONFORMANCE	CONTINGENCY MEASURES		RESTORATION TIME
A. Seismic monitoring instrumentation NonFUNCTIONAL.	A.1	------------NOTE--------------- Seismic Monitoring instrumentation may be NonFUNCTIONAL for up to 12 hours for surveillance testing. ---------------------------------------	
		Initiate action to restore instrumentation to FUNCTIONAL status.	Immediately
	AND		
	A.2	Establish other means to estimate Seismic Intensity of an earthquake felt at Kewaunee Power Station.	Immediately

DELETED
February 24, 2014

TECHNICAL VERIFICATION REQUIREMENTS

VERIFICATION		FREQUENCY
TVR 8.3.6.1	Perform CHANNEL CHECK.	6 months
TVR 8.3.6.2	---------------------------NOTE------------------------------ Frequency not to exceed once per operating cycle. --- Perform CHANNEL FUNCTIONAL TEST.	18 months

BASES

BACKGROUND

Several different seismic loads were used in the design the Kewaunee Power Station. The three different loads are 1) an Operational Basis Earthquake (OBE) which is based upon a maximum horizontal ground acceleration of 0.06g and the response spectra are given on Plate 8-A in USAR, Appendix A, 2) a Design Basis Earthquake (DBE) which was based upon a maximum horizontal ground acceleration of 0.12g and the response spectra are given on Plate 8-B in USAR Appendix A, and 3) Uniform Building Code Earthquake Loads which specifies the location of the plant site to be in a "Zero" earthquake area. However, for conservatism, earthquake loads applicable to Zone 1 areas were used in the design under this category.

A seismic event is defined at two levels of severity, named the Operating Basis Earthquake (OBE) and the Safe Shutdown Earthquake (SSE), which is also referred to as the Design Basis Earthquake (DBE) or the Maximum Credible Earthquake (MCE).

The licensing basis SSE design response spectra horizontal components have a peak ground acceleration of 0.12 g. The OBE was based upon a maximum horizontal ground acceleration of 0.06 g. The plant is capable of being brought to, and maintained in, a safe shutdown condition for 72 hours following a SSE (Reference 1).

Seismic monitoring instrumentation is used to provide data on seismic events in order to permit a timely determination of the need for shutting down the reactor as a result of the event. This system, which is described in USAR Section 1.6.10 (Reference 2), is required to have automatic recording capability, record multiple independent channels of data, alert the operator of an event in progress, and provide peak accelerations of the event.

Seismic monitoring instrumentation provides data on frequency, amplitude and phase relationship of all accelerometer channels for future analytical review. The seismic instrumentation system consists of field mounted tri-axial accelerometers, field mounted seismic recorders, and Network Control Center (NCC) (Reference 3). The NCC contains a readout device and a port for interfacing with a personal computer (PC). The PC is used for performance of periodic system checks and to view data from the seismic event.

BACKGROUND (continued)

Normally the seismic sensing and recording system is in a quiescent state; the system will start recording data when the intensity of the acceleration reaches a preset level as detected by two of the three accelerometers. The system will return to the quiescent condition a short period after the intensity of the acceleration has gone below the preset level.

Each tri-axial accelerometer consists of three single channel accelerometers, which are mounted on mutually perpendicular axes. One set of tri-axial accelerometers is located on the basement floor of the containment structure (Elevation 592 ft), another directly above the first on the refueling floor (Elevation 649 ft 6 in) and the third set on the floor of the Auxiliary Building (Elevation 657 ft 6 in). (Since the Auxiliary Building and Reactor Building share the same base slab, another accelerometer is not needed in the basement of the Auxiliary Building.) The output of each accelerometer provides an independent analog signal to its associated seismic recorder. The seismic recorder provides input to the NCC via interconnecting electrical cables.

An annunciator will immediately alert operators when a seismic event has occurred. The seismic recorder is used to record seismic data and time base information for its associated accelerometer. Three seismic recorders provide seismic event information to the NCC. Peak accelerations are displayed on the NCC's display monitor. More detailed seismic data can be obtained from the PC. In the event of a seismic disturbance, written administrative procedures are implemented to cover operation of the plant. Inspection of crucial areas and components would be made immediately, with the inspection results documented. In the absence of any unusual observations, the plant would continue to be operated.

BASES

TNC and APPLICABILITY

Seismic instrumentation is FUNCTIONAL if it is capable of immediately alerting the operator when a seismic event has occurred. Additionally, it must be capable of automatically recording data on acceleration levels, including peak levels, from any accelerometer and providing the data within a few minutes after the seismic event.

Seismic events are independent of plant operating status. Should a seismic event occur, inspection of crucial areas and components would need to be made regardless of plant operating status. Therefore, required seismic monitoring instrumentation must be FUNCTIONAL at all times.

CONTINGENCY MEASURES

If any required seismic monitoring instrument is determined to be NonFUNCTIONAL, action is immediately required to initiate restoration of the NonFUNCTIONAL instrumentation to FUNCTIONAL status. A Note modifies the restoration CONTINGENCY MEASURE to allow TVRs to be performed without the requirement to immediately initiate action to restore the instrumentation.

The immediate Restoration Time requires that actions to initiate restoration should be pursued without delay and in a controlled manner." Full restoration of the instrument(s) to FUNCTIONAL status would be controlled in accordance with the corrective action program, as required by 10 CFR 50, Appendix B, "Corrective Action", Criterion XVI, "Corrective Action".

When the seismic instrumentation is NonFUNCTIONAL, measures must be established to ensure an estimate of the Seismic Intensity of an earthquake felt at Kewaunee Power Station can be obtained. This is necessary to ensure the affect(s) on the felt earthquake on plant systems, structures, and components can be assessed.

BASES

TECHNICAL VERIFICATION REQUIREMENTS

Required seismic instrumentation must be periodically checked for proper operation.

TVR 8.3.6.1

This TVR requires performance of a CHANNEL CHECK of seismic monitoring instrumentation every 6 months.

TVR 8.3.6.2

This TVR requires performance of a CHANNEL FUNCTIONAL TEST of seismic monitoring instrumentation every 18 months or once per operating cycle, whichever occurs first.

REFERENCES

1. NRC Safety Evaluation Regarding USI A-46 Program Implementation, Revision 1, dated May 26, 1998
2. USAR Section 1.6.10, Seismograph
3. DC KW-10-01007, "Replace Seismic Monitoring System", June 8, 2010.

ATTACHMENT 2

TECHNICAL SPECIFICATIONS BASES CHANGES AND TECHNICAL REQUIREMENTS MANUAL CHANGES

KEWAUNEE POWER STATION TECHNICAL REQUIREMENTS MANUAL

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DOMINION ENERGY KEWAUNEE, INC.

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