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Dominion®

September 14, 2007

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

Serial No. 07-388
KPS/LIC/GR: R1
Docket No. 50-305
License No. DPR-43

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
LICENSE AMENDMENT REQUEST 210
SUBJECT: TECHNICAL SPECIFICATION MODIFICATIONS REGARDING CONTROL ROOM ENVELOPE HABITABILITY

Pursuant to 10 CFR 50.90, Dominion Energy Kewaunee, Inc. (DEK) requests an amendment to Facility Operating License Number DPR-43 for Kewaunee Power Station (KPS). This proposed amendment would revise the Operating License by modifying the KPS Technical Specifications (TS) to adopt Technical Specification Task Force (TSTF) Traveler TSTF-448-A, Revision 3, "Control Room Habitability," (TSTF-448-A) consistent with the KPS plant design. DEK also proposes additional changes including:

- Applicable changes from TSTF-51-A, Revision 2, "Revise Containment Requirements During Handling of Irradiated Fuel and Core Operations;"
- Applicable changes from TSTF-287-A, Revision 5, "Ventilation System Envelope Allowed Outage Time;"
- Inclusion of Control Room Ventilation Radiation Monitor R-23; and
- Other changes from NUREG-1431, "Standard Technical Specifications, Westinghouse Plants."

Because KPS TS are custom TS these additional changes are needed to adopt TSTF-448-A. For simplicity, the proposed changes are divided into four initiatives and justified separately. These initiatives are: 1) changes to adopt TSTF-448-A, 2) changes necessary to make the KPS TS consistent with NUREG-1431, Revision 3, "Standard Technical Specifications, Westinghouse Plants," to allow adoption of TSTF-448-A, 3) changes to incorporate limiting conditions for operation associated with the control room ventilation radiation monitor, and 4) administrative changes to address format inconsistencies and to provide greater TS clarity. These additional changes will also reconcile the KPS fuel handling accident analysis with the KPS TS.

The availability of TSTF-448-A was approved and announced in the Federal Register on January 17, 2007 (72FR2022), as part of the consolidated line item improvement process (CLIIP). The proposed amendment would incorporate TSTF-448-A and align the KPS TS with NUREG-1431, Revision 3. Due to KPS TS being custom TS, there are differences between the proposed wording in TSTF-448-A and the proposed wording in

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this request. The proposed wording in this amendment request aligns KPS TS with NUREG-1431, Revision 3, as appropriate.

This proposed amendment fulfills the commitment made in the KPS response to NRC Generic Letter 2003-01, "Control Room Habitability," to submit proposed changes to the TS based upon the final, approved version of TSTF-448 (Reference 1). Because of the unforeseen complexity of this submittal, DEK modified the commitment submittal date to September 14, 2007 (Reference 2).

Dominion requests approval of the proposed amendment by September 30, 2008. Once approved, the amendment will be implemented within 60 days.

Attachment 1 to this letter contains a description, a safety evaluation, a no significant hazards consideration determination, and environmental considerations for the proposed changes. Attachment 2 contains the marked-up TS pages. Attachment 3 contains the proposed TS pages, as revised. Attachments 4 and 5 contain the associated TS Bases pages, marked-up and affected for information only. Attachment 6 provides annotated marked-up TS pages, showing the applicable change initiative. Attachment 7 provides a summary of the revised control room radiological accident analysis for a gas decay tank rupture and volume control tank rupture.

The KPS Plant Operations Review Committee has approved the proposed changes and a copy of this submittal has been provided to the State of Wisconsin in accordance with 10 CFR 50.91(b).

If you have any questions or require additional information, please contact Mr. Gerald Riste at (920) 388-8424.

Very truly yours,

Gerald T. Bischof
Vice President – Nuclear Engineering

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Gerald T. Bischof, who is Vice President – Nuclear Engineering of Dominion Energy Kewaunee, Inc. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 14th day of September, 2007.

My Commission Expires: August 31, 2008.

Margaret B. Bennett
Notary Public

(SEAL)

MARGARET B. BENNETT
Notary Public 354302
Commonwealth of Virginia
My Commission Expires Aug 31, 2008

References:

1. Letter from Craig W. Lambert (NMC) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability - Supplemental Response," dated April 1, 2005. (ADAMS Accession No. ML050970303)
2. Letter from Eugene S. Grecheck (DEK) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability – Change in Schedule for Submitting Technical Specification," dated July 20, 2007 (ADAMS Accession No. ML072040347)

Attachments:

1. Discussion of Change, Safety Evaluation, No Significant Hazards Consideration Determination and Environmental Considerations
2. Marked-up TS Pages
3. Affected TS Pages
4. Marked-up TS Bases Pages
5. Affected TS Bases Pages
6. Annotated Marked-up TS Pages by Item Designations
7. Revised Gas Decay Tank Rupture and Volume Control Tank Rupture Control Room Radiological Accident Analysis

Commitments made in this letter: None

cc: Regional Administrator
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ATTACHMENT 1

LICENSE AMENDMENT REQUEST 210
TECHNICAL SPECIFICATION MODIFICATIONS REGARDING CONTROL ROOM ENVELOPE HABITABILITY

DISCUSSION OF CHANGE, SAFETY EVALUATION, NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION AND ENVIRONMENTAL CONSIDERATIONS

KEWAUNEE POWER STATION

DOMINION ENERGY KEWAUNEE, INC.

Kewaunee Power Station Technical Specification Modifications Regarding Control Room Envelope Habitability

1.0 DESCRIPTION

This letter is a request to amend Operating License DPR-43 for the Kewaunee Power Station (KPS).

In the Nuclear Regulatory Commission (NRC) Generic Letter (GL) 2003-01 (Reference 1), licensees were alerted to findings at facilities that existing technical specification surveillance requirements for the systems necessary to maintain control room habitability may not be adequate. Specifically, the results of tracer gas tests at facilities indicated that the differential pressure surveillance is not a reliable method for demonstrating control room envelope integrity.

The Technical Specification Task Force (TSTF) and the Nuclear Energy Institute (NEI) Control Room Habitability Task Force (CRHTF) developed proposed changes to the Improved Standard Technical Specifications (ISTS) (NUREGs-1430 through 1434) to address the control room habitability issue by replacing the differential pressure surveillance with a tracer gas surveillance, adding a Technical Specification Action for an inoperable control room envelope, and instituting a Control Room Envelope Habitability Program developed to ensure that control room envelope habitability is maintained. It should be noted that the KPS control room is a neutral-pressure control room, i.e., it is not intentionally pressurized during accident conditions.

The proposed amendment would modify KPS technical specification (TS) requirements related to control room envelope habitability in TS 3.12, "Control Room Post-Accident Recirculation (CRPAR) System," TS Table 3.5-4, "Instrument Operating Conditions for Isolation Functions," TS 4.17, "Control Room Post-Accident Recirculation System," and add TS Section 6.23, "Control Room Envelope Habitability Program." The changes are consistent with NRC approved TSTF ISTS change TSTF-448-A, Revision 3 (TSTF-448-A), except for the differential pressure surveillance (TSTF-448-A SR 5.5.18.d) because KPS is a neutral-pressure control room when isolated. The availability of this TS improvement was published in the Federal Register on January 17, 2007, as part of the consolidated line item improvement process (CLIIP).

This license amendment request has been prepared consistent with the NRC's CLIIP for TSTF-448-A and pursuant to the requirements of 10 CFR 50.90, but is not being requested to be approved under the CLIIP process due to additional proposed changes. Additional supporting TS changes are being proposed to facilitate incorporation of the TSTF-448-A revisions into KPS custom TS (CTS) format. These additional TS proposed changes include adoption of the necessary portions of NRC approved TSTF-51-A, "Revise Containment Requirements During Handling of Irradiated Fuel and Core Alterations," Revision 2, and TSTF-287-A, "Ventilation System Envelope Allowed Outage Time," Revision 5. Associated TS Bases changes are also being made to facilitate incorporation of the proposed changes. These changes will be implemented at

the same time as the proposed TS changes. The TS Bases changes are provided for information.

Additionally, DEK is relocating the discussion of the gas decay tank and volume control tank rupture radiological analysis from KPS Updated Safety Analysis Report (USAR) Chapter 14, "Safety Analysis," to Chapter 11, "Waste Disposal and Radiation Protection System." The acceptance criteria for the gas decay tank and volume control tank ruptures will be as delineated in Attachment 7.

2.0 PROPOSED CHANGE

This proposed amendment request consists of four separate initiatives. These initiatives are described below. Table 1 lists the proposed changes, and the initiatives that support these proposed changes, and Attachment 6 annotates the proposed changes by initiative.

Initiatives:

1. Proposed changes to the KPS TS to incorporate the NRC approved TSTF 448-A, Revision 3, "Control Room Habitability."
2. Proposed changes necessary to make the KPS TS consistent with NUREG-1431, Revision 3, "Standard Technical Specifications, Westinghouse Plants," for the appropriate control room habitability items. These changes include adoption of necessary portions of TSTF-51-A, Revision 2, and TSTF-287-A, Revision 5.
3. Incorporation of limiting conditions for operation associated with the control room ventilation radiation monitor.
4. Clarification / Reformatting of current TS.

Specifically, the proposed changes are as follows:

1. Modify TS 3.12, Control Room Post-Accident Recirculation System.

   KPS TS 3.12.a. and b. currently state:

   "**SPECIFICATION**

   a. The reactor shall not be made critical unless both trains of the Control Room Post-Accident Recirculation System are OPERABLE.

   b. Both trains of the Control Room Post-Accident Recirculation System, including filters, shall be OPERABLE or the reactor shall be shut down within 12 hours, except that when one of the two trains of the Control Room Post-Accident Recirculation System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 7 days."

DEK is proposing to change KPS TS 3.12.a. and b. to read as follows:

SPECIFICATION

Note: The control room envelope (CRE) boundary may be opened intermittently under administrative control.

a. The reactor coolant system shall not be heated above 200°F, or recently irradiated fuel assemblies moved, unless both trains of the Control Room Post-Accident Recirculation System are OPERABLE, except as allowed by TS 3.12.b, TS 3.12.d, TS 3.12.e, and TS 3.12.f.

b. When the reactor coolant system is > 200°F, the following conditions of inoperability may exist during the time intervals specified:

1. One control room post-accident recirculation train may be inoperable for 7 days, except as provided by TS 3.12.b.2.

2. One or more control room post-accident recirculation train(s) may be inoperable, due to an inoperable control room envelope boundary, for 90 days provided:

A. Actions are immediately initiated to implement mitigating actions, and

B. Within 24 hours, implemented mitigative actions are verified as ensuring control room envelope occupant exposures to radiological, chemical, and smoke hazards will not exceed limits.

c. When the reactor coolant system is > 200°F, if the requirements of TS 3.12.b cannot be met within the times specified or if two control room post-accident recirculation trains are inoperable for any reason other than an inoperable control room envelope boundary, then within 1 hour action shall be initiated to:

- Achieve HOT SHUTDOWN within 12 hours, and

- Achieve COLD SHUTDOWN within an additional 36 hours.

d. During movement of recently irradiated fuel assemblies, one control room post-accident recirculation train may be inoperable for 7 days.

e. If, during movement of recently irradiated fuel assemblies, the requirements of TS 3.12.d cannot be met within the times specified, then immediately either:

1. Place the OPERABLE control room post-accident recirculation train in the emergency mode of operation, or

2. Suspend movement of recently irradiated fuel assemblies.

f. If, during movement of recently irradiated fuel assemblies, two control room post-accident recirculation trains are inoperable or the inoperability is due to an inoperable CRE boundary, immediately:

1. Place any suspended recently irradiated fuel assembly in a safe condition, then

2. Cease any further movement of recently irradiated fuel assemblies."

2. Relocate TS 3.12.c to the control room post accident recirculation surveillance requirement Section TS 4.17.

DEK is proposing to relocate current KPS TS 3.12.c to item "d" under TS 4.17 (TS 4.17.d) with no change in the wording.

3. Modify KPS TS Table TS 3.5-4, "Instrument Operating Conditions for Isolation to include a "Control Room Isolation" function.

KPS current TS do not contain a control room isolation function. DEK is proposing to add this function to KPS TS Table TS 3.5-4 as follows:

		1	2	3	4	5	6
NO.	**FUNCTIONAL UNIT**	**NO. OF CHANNELS**	**NO. OF CHANNELS TO TRIP**	**MINIMUM OPERABLE CHANNELS**	**MINIMUM DEGREE OF REDUNDANCY**	**PERMISSIBLE BYPASS CONDITIONS**	**OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET**
5	Control Room Isolation						
	a. Safety Injection	Refer to Item 1 of Table TS 3.5-3					
	b. R-23	1	1	1			If the Reactor Coolant System is > 200°F (a) If handling recently irradiated fuel (b)

(a) Either 1) within 7 days close the control room air conditioning isolation dampers and place one train of control room post-accident recirculation in operation, or 2) follow the actions of TS 3.12.c for one train of CPRAR inoperable for greater than 7 days.

(b) Immediately suspend handling of recently irradiated fuel assemblies, or close the control room ventilation isolation dampers and place one train of control room post-accident recirculation in operation.

4. Modify KPS current TS 4.17.a.2.

KPS TS 4.17.a.2 currently reads:

"a. At least once per operating cycle or once every 18 months, whichever occurs first, the following conditions shall be demonstrated:

2. Automatic initiation of the system on a high radiation signal and a safety injection signal."

DEK is proposing to change KPS TS 4.17.a.2 to read as follows:

"a. At least once per operating cycle or once every 18 months, whichever occurs first, the following conditions shall be demonstrated:

2. Automatic initiation of each train on an actual or simulated actuation signal."

5. Add KPS TS 4.17.c.

DEK is proposing to add a new KPS TS 4.17.c to read as follows:

"c. Perform required control room envelope unfiltered air in-leakage testing in accordance with the Control Room Envelope Habitability Program (TS 6.23)."

6. Add KPS TS 6.23.

DEK is proposing to add a new KPS TS 6.23 to read as follows:

6.23 CONTROL ROOM ENVELOPE HABITABILITY PROGRAM

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE Control Room Post-Accident Recirculation System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of 5 rem total effective dose equivalent (TEDE) for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for:

(i) determining the unfiltered air in-leakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and

(ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

d. The quantitative limits on unfiltered air in-leakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air in-leakage measured by the testing described in paragraph c. The unfiltered air in-leakage limit for radiological challenges is the in-leakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air in-leakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

e. The provisions of TS 4.0.b are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered in-leakage, and assessing the CRE boundary as required by paragraph c.

In summary, DEK proposes to revise the KPS TS to incorporate the NRC approved TSTF-448-A, Revision 3, to fulfill a commitment contained in DEK's response to Generic Letter 2003-01, "Control Room Habitability." To effectively incorporate TSTF-448-A, Revision 3, into the KPS TS, additional changes are proposed to align KPS TS with ISTS, upon which TSTF-448-A is based. Additional TSTFs proposed to be incorporated, to the extent practicable, include: TSTF-51-A, "Revise Containment Requirements During Handling of Irradiated Fuel and Core Alterations, Revision 2," and TSTF-287-A, "Ventilation System Envelope Allowed Outage Time, Revision 5." Operability requirements for control room ventilation radiation monitor R-23 are also proposed to be added. Furthermore, because the KPS TS are custom TS, incorporation of TSTF-448-A also requires the reformatting of certain KPS TS requirements. Some TS clarifications are also being implemented.

DEK is also making changes to the KPS TS Bases to clarify the control room envelope habitability requirements. These proposed changes are included as Attachments 4 and 5 for information.

3.0 BACKGROUND

3.1 General

KPS is provided with a control room located within the Auxiliary Building, which contains the controls and instrumentation necessary for safe operation of the plant, including the reactor and the turbine-generator, under normal and accident conditions.

Sufficient design features (shielding, distances, containment integrity and filtration systems) are provided to assure that control room personnel are not subjected to doses, under postulated accident conditions during occupancy of the control room, which would exceed 5 rem TEDE (total effective dose equivalent), or 5 rem whole body or its equivalent to any part of the body, for 30 days following the accident.

The control room air conditioning system is designed to provide a reliable means of cooling and filtering air supplied to the control and relay rooms under both normal and post-accident conditions. The control room air conditioning system is shown on KPS USAR Figure 9.6-6.

The control room air conditioning system is normally in operation providing cooled and filtered air to the control room and relay room. There is normally a 20 percent fresh air makeup to the control room from the auxiliary building air conditioning unit air intake. Although the normal fresh air intake is the auxiliary building air conditioning intake, provisions are installed to allow for an alternate fresh air intake from the auxiliary building ventilation system intake should conditions warrant. The makeup air passes through roughing filters, cooling coils, and fans in one of the two 100 percent control room air conditioning units and is then distributed to the control and relay rooms. Heating coils supplied from the auxiliary building hot water converter provide for comfort heating. Service water can be aligned directly to the cooling coils in the air handler in the event that both chilled water units are not available.

The KPS control room air conditioning system provides a large percentage of recirculated air (approximately 80%) in the normal mode of operation. Process radiation monitor channel R-23 monitors control room air conditioning recirculation air for radiation. If a high radiation condition exists, the monitor initiates closure of the outside air intake and starting of the control room post-accident recirculation system fans. In addition, area radiation monitor channel R-1 monitors the control room area for radiation and alarms in the control room alerting the operators to the abnormal condition.

In response to NUREG-0737, Item III.D.3.4, the KPS staff performed a review of post-accident control room habitability for KPS and transmitted the results to the NRC. The NRC subsequently determined that the control room habitability systems were acceptable and would provide a safe, habitable environment within the control room under design basis accident radiation and toxic gas conditions (Reference 2). The analysis has since been revised to show that the doses remain below the appropriate limits based on the 10 CFR 50.67 requirements for implementation of alternate source

term (Reference 3). The results are presented in KPS USAR Chapter 14. In December of 2004, a tracer gas test was performed to confirm the unfiltered in-leakage into the KPS control room. Based on the results of the tracer gas test, a license amendment request revising the KPS radiological accident analysis was submitted to the NRC and subsequently approved by the NRC on March 8, 2007 (Reference 4). The KPS USAR update incorporating this change will be submitted to the NRC in accordance with 10 CFR 50.71.

3.2 Initiative 1 Background, adopt TSTF-448-A, Revision 3, "Control Room Habitability."

In June of 2003, the Nuclear Regulatory Commission issued Generic Letter (GL) 2003-01, "Control Room Habitability" (Reference 1). In GL 2003-01, the NRC requested that addressees submit information demonstrating that the control room complies with the current licensing and design bases and applicable regulatory requirements. The NRC also requested addressees to submit information demonstrating that suitable design, maintenance and testing control measures are in place for maintaining compliance. Licensees were also requested to provide information confirming their TS verify the integrity of the control room envelope and the assumed in-leakage rates of potentially contaminated air. In addition, the NRC stated that if a facility does not have a technical specification surveillance requirement for control room envelope integrity, the licensee was requested to explain how, and at what frequency control room envelope integrity is confirmed and why this frequency is adequate to demonstrate control room envelope integrity.

Based on GL 2003-01, it was determined that a change to the KPS TS is needed. By letter dated August 7, 2003, (Reference 5) the KPS staff committed to provide a schedule for the development of technical specification changes (and any associated plant modifications) to address information requested in GL 2003-01, Item 1 (c), after the results of the inleakage test (performed per ASTM E741) were analyzed. In November of 2003 (Reference 6), the KPS staff committed to perform ASTM E741 testing by December 2004 and to develop technical specification changes (and any associated plant modifications) to address GL 2003-01, Item 1(c), within 120 days contingent upon NRC approval of TSTF-448.

In April of 2005, the KPS staff revised this commitment (Reference 7). The KPS staff indicated proposed changes to the TS would be submitted within 180 days following NRC approval of the final version of TSTF-448. In September 2006, the NRC acknowledged this commitment (Reference 8).

On January 17, 2007, the NRC approved TSTF-448, Revision 3 (TSTF-448-A) (Reference 9). Therefore, the commitment date for submittal of the proposed Technical Specification changes consistent with NRC approved TSTF-448-A was July 16, 2007. Based on the complexity of this submittal, DEK revised the commitment date for submitting proposed TS changes consistent with TSTF-448-A to September 14, 2007 (Reference 10). This submittal satisfies the commitment to revise the KPS TS in accordance with NRC approved TSTF-448-A, adjusted, as needed, to account for the

plant specific control room envelope design and licensing bases. This submittal also adds a new surveillance requirement, TS 4.17.c, to reference an acceptable surveillance methodology for verification of the integrity of the control room envelope in light of the demonstrated inadequacy of a delta P measurement to provide such verification.

3.3 Initiative 2 Background, consistency with NUREG-1431, Revision 3, "Standard Technical Specifications, Westinghouse Plants."

KPS received its Operating License (DPR-43) on December 21, 1973. When KPS was in the initial operating licensing phase, the format used for TS was to place the specifications in an outline format. Subsequent to the licensing of KPS, the NRC and the industry undertook a joint activity to develop a standard format for technical specifications with different plant designs covered by different NUREGs.

The NRC/Industry first developed a standard technical specification format and published its results in NUREG-0452 for Westinghouse designed nuclear power plants. NUREG-0452 provided a template of standard format and content for Westinghouse plant TS based on NRC and industry experience. Nuclear power plants licensed to operate when this NUREG was published were not required to convert to these standard TS. If an industry issue was discovered that required licensees to review their TS for potential changes, the NRC made recommendations for changes based on the standard TS. When these recommendations were made, the KPS staff reviewed them and made appropriate changes consistent with the standard TS to the extent practical.

Based on further NRC and industry experience, the standard TS went through an improvement process. Instead of revising NUREG-0452, a new NUREG was issued (NUREG-1431 for Westinghouse plants). Again, the NRC did not require operating nuclear power plants to revise their TS to be consistent with the improved standard TS (ISTS). Similar to using NUREG-0452 as the template for recommending technical specification changes to the industry, the NRC now uses the ISTS as the template for proposed change recommendations to the industry, as with TSTF-448-A.

Therefore, for DEK to adopt the NRC approved TS contained in TSTF-448-A, the KPS TS require additional changes, which TSTF-448-A assumes have already been implemented because they are contained in NUREG-1431, that KPS has not previously adopted.

3.4 Initiative 3 Background, Control Room Radiation Monitor (R-23).

In November of 1980, the NRC published NUREG-0737, "Clarification of TMI Action Plan Requirements." NUREG-0737 contains Item III.D.3.4, "Control Room Habitability." Item III.D.3.4 stated:

> *"In accordance with Task Action Plan item III.D.3.4 and control room habitability, licensees shall assure that control room operators will be adequately protected against the effects of accidental release of toxic and*

radioactive gases and that the nuclear power plant can be safely operated or shut down under design basis accident conditions (Criterion 19, "Control Room," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50)."

In April of 1981, KPS staff responded (Reference 11) to NUREG-0737 Item III.D.3.4 indicating that the control room habitability review determined that KPS met the recommendations of NUREG-0737 and the NRC Standard Review Plan 6.4 (NUREG-0800) with exceptions. One of the exceptions was that KPS has a single radiation monitor (R-23) installed in the control room HVAC system. R-23 provides a signal on high radiation that isolates the control room ventilation system and starts the control room post-accident recirculation system. The response also stated that the control room is sufficiently protected because the safety injection signal provides a diverse actuation signal, which also switches the control room HVAC system to the emergency mode.

Initially, KPS staff committed to installing a redundant radiation monitor in the control room HVAC system air supply (Reference 12). By letter dated November 23, 1982, the KPS staff informed the NRC that the present design eliminates the need for a redundant radiation monitor while providing an equal level of protection based on diverse signals (Reference 13). The NRC responded in April of 1983 and questioned the removal of the KPS commitment for redundant radiation monitors in the control room air supply. The NRC stated that redundant radiation monitors were needed for radwaste storage accidents and fuel handling accidents and requested reinstatement of the commitment to provide redundant radiation monitors (Reference 14). In June of 1983, the KPS staff responded as follows:

"A design analysis has since shown that an actuation signal based on an inline radiation monitor is cost prohibitive and unduly complex."

The response further stated that a substantial amount of protection against such accidents precludes the need to reinstate the previous commitment, and that the design of the KPS control room ventilation system was previously approved by the NRC (including isolation on a single radiation monitor signal or SI signal (Reference 15)). The protective features stated for each accident included:

- Fuel Handling Accident
    - Spent Fuel Sweep System entrains the accident effluents, although not credited in the accident analysis.
    - Manual Action
        - Direct communication with the control room from the spent fuel pool.
        - Dose rate increase can be detected by radiation monitors R-5 [fuel handling area] and R-1 [control room area].

- Rupture of a Radwaste Tank
    - Accidents analyzed
        - VCT Tank Rupture
        - CVC Holdup Tank Rupture
        - Gas Decay Tank Rupture – (considered worse case)
    - Zone Special Ventilation (SV) activated by high radiation in the auxiliary building vent header (HEPAs and Charcoal)
    - Zone SV actuation, R-13/14 [auxiliary building ventilation exhaust] high radiation alarms, or R-1 alarm, alert the operators to isolate the control room.

By letter dated July 7, 1983, the NRC accepted the KPS position that a redundant radiation monitor was not required in the control room ventilation system intake (Reference 16). Subsequently, in January of 1987, the NRC commented that the recirculation filter system should be operable in all modes, and other equipment should be required to be operable if radiation monitor R-23 is inoperable (Reference 17). KPS staff stated they would review the TS and USAR and process any necessary changes to these documents. In March of 1990, the NRC closed the issue (Reference 18).

The KPS staff determined that no changes were necessary based on the review performed at the time. However, based on further review, DEK has determined that additional changes are necessary and are therefore included as part of initiative 3.

3.5 Initiative 4 Background, Clarification / Reformatting of current TS.

In July of 1985, the NRC approved KPS License Amendment 63. This amendment added the control room post-accident recirculation system to the TS. The approval of this amendment was based on its consistency with STS 3/4.7.7 and KPS TS for the shield building ventilation system, auxiliary building ventilation system, and the spent fuel pool ventilation system (Reference 19). The KPS TS for the shield building ventilation system and the auxiliary building ventilation system (KPS TS 3.6.c) are written in paragraph format. Incorporating TSTF-448-A into KPS TS adds TS to the control room post-accident recirculation system. Reformatting the specifications provides consistency with the other parts of the KPS TS.

The changes proposed to TS 4.17.a.2 and TS Table TS 3.5-4 would clarify the availability of R-23 and its affect on the operability of the control room post-accident recirculation system by incorporating wording consistent with NUREG-1431, Revision 3, item numbers SR 3.7.10.3 and LCO 3.3.7.

In addition, DEK is proposing to relocate the requirements contained in KPS TS 3.12.c, which are associated with surveillance acceptance criteria, to the KPS TS surveillance section within TS 4.17. KPS TS 4.17 contains the surveillance requirements for the

control room post-accident recirculation system. This is considered reformatting because the requirements are unchanged and are simply being relocated.

As described in Kewaunee's supplemental response to GL 2003-01 (Reference 31), the results of the hazardous chemical assessment determined the maximum concentration at the outdoor air intake for the control room is less than the toxicity levels used in the regulatory guide. Additionally, the supplemental response described the smoke assessment and concluded that from the external and internal smoke assessment that during a postulated smoke event, either the control room or the dedicated shutdown panel room will be available for continued occupancy such that reactor control capability is maintained. The postulated smoke event will not prevent the safe shutdown of the plant.

4.0 TECHNICAL ANALYSIS

4.1 General

Following a loss of coolant accident (LOCA), the control room air conditioning system will begin a 100 percent emergency recirculation mode of operation. In the recirculation mode, approximately 20 percent of the recirculation flow will pass through one of the two control room post-accident recirculation filters and fans. Each filter assembly consists of a pre-filter, HEPA filter, charcoal filter and deluge protection for the charcoal filters. The filters assure that any minute amounts of in-leakage either prior to or following system actuation will be removed, and allow the operators to continuously occupy the control room. The KPS control room air conditioning system is designed to produce a neutral-pressure control room envelope in the emergency recirculation mode of operation. The neutral-pressure control room envelope does not intentionally pressurize the control room envelope, but limits in-leakage of contaminants by isolating controlled flow paths into the control room envelope. (The term "neutral-pressure" means only that the control room envelope is not intentionally pressurized. The actual pressure of the control room envelope may be positive, neutral, or negative relative to adjacent areas.)

The radiological accident analyses of record for the KPS license were previously docketed in Amendment No. 166, issued March 17, 2003 (Reference 3), which implemented an alternate source term; and Amendment No. 172, issued February 27, 2004 (Reference 20), which implemented a stretch power uprate to 1772 megawatt thermal (MWt). These previously approved radiological accident analyses used the analytical methods and assumptions outlined in RG 1.183.

By letter dated January 30, 2006 (Reference 21), as supplemented by letter dated January 23, 2007 (Reference 22), DEK requested an amendment to modify the currently approved radiological accident analyses and associated TS (TSs). This amendment incorporated TS changes to compensate for the higher control room emergency zone (CREZ) unfiltered in-leakage measured during the American Society for Testing and Materials (ASTM) E741 (tracer gas) leakage test conducted in

December 2004. The NRC approved this proposed amendment as KPS License Amendment 190 on March 8, 2007 (Reference 23).

DEK submitted Revision 20 to the KPS USAR on April 19, 2007 (Reference 24). Because License Amendment 190 was approved just before USAR Revision 20 was submitted, KPS USAR Revision 20 does not contain the revised Radiological Accident Analysis results approved in License Amendment 190. DEK, as required by 10CFR50.71(e), will incorporate these results into the next scheduled revision to the KPS USAR.

As described in DEK's submittal dated January 30, 2006, and in the KPS USAR Chapter 14, the following radiological accidents are the design basis accidents (DBAs) for KPS:

- Main steam line break (MSLB)
- Locked reactor coolant pump (RCP) rotor (LRA)
- Rod ejection (RE)
- Steam generator tube rupture (SGTR)
- Large-break loss-of-coolant accident (LBLOCA)
- Waste gas decay tank (GDT) rupture
- Volume control tank (VCT) rupture
- Fuel-handling accident (FHA)

For each accident, the total effective dose equivalent (TEDE) doses are determined at the site boundary (SB) for the limiting 0- to 2-hour period, at the low-population zone (LPZ) boundary for the duration of the accident, and in the control room for 30 days. The offsite dose acceptance limits are based on 10 CFR 50.67 criteria, as modified by Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." The control room doses are based on Regulatory Guide 1.183 for all accidents except for the GDT rupture and the VCT ruptures. The control room dose limits for the GDT rupture and the VCT rupture are based on GDC 19, "Control Room," as modified by SRP 6.4, Revision 2, "Control Room Habitability System." Therefore, depending on the event, the acceptance limit is 100 percent of the 10 CFR 50.67 acceptance limits or a fraction of these acceptance limits, or GDC 19. The control room dose acceptance limit from 10 CFR 50.67 is 5.0 rem TEDE. The control room dose acceptance limit from GDC 19, as modified by SRP 6.4, is 5 rem whole body, 30 rem thyroid, and 30 rem skin.

The control room isolation and recirculation initiation functions are automatically actuated by either a safety injection actuation signal or an R-23 high radiation signal. The safety injection signal is credited for mitigating the radiological consequences to control room occupants for the LBLOCA, RE, MSLB, and SGTR accidents. The R-23

high radiation signal is credited for mitigating the radiological consequences to control room occupants for the LRA, GDT rupture, VCT rupture, and FHA.

Therefore, incorporating the control room envelope operability and surveillance requirements, R-23 operability requirements, and the control room post-accident recirculation (CRPAR) system requirements into the KPS TS ensures the systems, structures, or components (SSCs) credited for mitigating the consequences of an accident for control room occupants are included in TS. This action complies with 10 CFR 50.36(c)(2)(ii)(C), Criterion 3 which states:

> *"(ii) A technical specification limiting condition for operation of a nuclear reactor must be established for each item meeting one or more of the following criteria:*
>
> > *(C) Criterion 3. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier."*

Although DEK proposes to include R-23 in the KPS TS, this radiation monitor is not a safety related (QA-1) item. The issue of R-23 not being a QA-1 item was reviewed by the NRC and approved as a part of the NRC review of NUREG-0737 items for KPS (Reference 25).

DEK is proposing to remove crediting R-23 and the control room envelope boundary from the KPS GDT and VCT rupture accident analysis. KPS radiological accident analysis for a GDT or VCT rupture, referenced in license amendment 190 and approved under license amendment 172, credits the control room envelope boundary and the CRPAR system to achieve acceptable post-accident dose consequences. DEK has performed analyses of these two accidents consistent with RG 1.24 and standard review plan Branch Technical Position (BTP) 11-5 and determined that acceptable occupant dose consequences are achieved without crediting the control room envelope boundary or the CRPAR system. The results of these analyses are presented in Attachment 7. Because it is not necessary to credit the KPS control room envelope boundary or the CRPAR system for these two accidents, no operability requirements for the control room envelope boundary, CRPAR system, or R-23 are necessary for the COLD SHUTDOWN and REFUELING SHUTDOWN MODES. Although there will be no operability requirements in the COLD SHUTDOWN and REFUELING SHUTDOWN MODES, during movement of recently irradiated fuel, operability will still be required.

Because of the complexity of this proposed amendment, DEK has included annotated marked-up TS pages in Attachment 6. These annotations reference the initiatives and initiative sub-items by using the following annotation scheme.

- The first number references the initiative number. (e.g., x.0)
- The second number references the initiative sub-item. (e.g., 1.x)

4.2 Technical Analysis – Initiative 1, adopt TSTF-448-A, Revision 3, "Control Room Habitability."

To adopt TSTF-448-A, DEK is proposing to add the following items to the KPS TS.

- Addition of "envelope (CRE)" between "room" and "boundary" in TS 3.12 Note.
- Addition of TS 3.12.b.2.
- Addition of TS 3.12.f remedial action if CRPAR system inoperability is due to an inoperable control room envelope boundary.
- Addition of TS 4.17.c.
- Addition of TS 6.23, "Control Room Envelope Habitability Program."

DEK has reviewed the NRC safety evaluation dated January 17, 2007 as part of the consolidated line item improvement process (CLIIP). This review included a review of the NRC staff's evaluation, as well as the supporting information provided to support TSTF-448-A. DEK has concluded that the justifications presented in the TSTF proposal and the safety evaluation prepared by the NRC staff are applicable to KPS and justify incorporation of the above changes into the KPS TS.

DEK proposes the following as a license condition to support implementation of the proposed TS changes:

> *Upon implementation of Amendment No. xxx, adopting TSTF-448, Revision 3, the determination of control room envelope (CRE) unfiltered air in-leakage as required by TS 4.17.c, in accordance with TS 6.23.c.(i), and the assessment of CRE habitability as required by TS 6.23.c.(ii), shall be considered met.*
>
> *Following implementation:*
>
> *(a) The first performance of TS 4.17.c, in accordance with TS 6.23.c.(i), shall be within the specified Frequency of 6 years, plus the 15-month allowance of TS 4.0.b, as measured from December 15, 2004, the date of the most recent successful tracer gas test, as stated in the April 1, 2005 letter response to Generic Letter 2003-01, or within the next 15 months if the time period since the most recent successful tracer gas test is greater than 6 years.*
>
> *(b) The first performance of the periodic assessment of CRE habitability, TS 6.23.c.(ii), shall be within 3 years, plus the 9-month allowance of TS 4.0.b, as measured from December 15, 2004, the date of the most recent successful tracer gas test, as stated in the April 1, 2005 letter response to Generic Letter 2003-01, or within the next 9 months if the time period since the most recent successful tracer gas test is greater than 3 years.*

Please note that the KPS control room ventilation system operates at a neutral (non-pressurized) mode in its emergency mode. Therefore, item "d", and the associated license condition of TSTF-448-A Technical Specification 5.5.18, does not apply to KPS because it addresses control room envelope pressure testing. The remaining elements apply and are adopted as shown on the marked-up TS pages contained in Attachment 2.

4.3 Technical Analysis - Initiative 2, consistency with NUREG-1431, Revision 3, "Standard Technical Specifications, Westinghouse Plants."

Item 2.1

DEK is proposing the addition of a note to KPS TS that states the control room envelope boundary may be opened intermittently under administrative control. This note is contained in NUREG-1431 ISTS, TS 3.7.10, and was approved by the NRC for adoption under TSTF-287-A. The NRC approved TSTF-287-A, "Ventilation System Envelope Allowed Outage Time," Revision 5 in March of 2000 (Reference 26), which added allowed outage times for ventilation system boundaries to ISTSs. For entry and exit through doors, the person(s) entering or exiting the area will maintain administrative control of the opening. For other cases, these administrative controls will consist of stationing a dedicated individual at the opening who is in continuous communication with the control room. This individual will have a method to rapidly close the opening when a need for control room isolation is indicated. Although allowing this action negates the accident analysis assumption of unfiltered in-leakage, the actual affect on the dose consequences to the control room occupants would be minimal. This note addition is reasonable because:

1. There is a finite period between when an accident occurs and when accident induced radioactivity reaches the breached boundary location. With the continuous communications and a method to rapidly close the boundary available, the boundary should be intact before the radioactivity reaches the breached boundary location.
2. The accident analysis assumes a constant in-leakage for 30 days. The period the boundary would be breached is insignificant compared to the total event time.
3. During the opening and closing of a door for egress or ingress, the boundary is breached for a short period. However, the door can be quickly closed if an accident were to occur while the door is open.

NUREG-1431 contains a bracketed mode of applicability [MODE 5 or 6] for operability of the control room envelope and control room emergency filtration system. The TSTF-448-A basis modified the bracketed mode of applicability to [MODES 5 or 6] stating that the control room emergency filtration system is required to cope with the release from a rupture of an outside waste gas tank. Kewaunee is proposing to not adopt these modes of applicability.

KPS does not have outside waste gas tanks; KPS does have gas decay tanks (Reference 27) and a volume control tank (Reference 28) located inside the auxiliary building where radioactive gases are collected. DEK has performed an analysis, summarized in Attachment 7, that demonstrates acceptable control room occupant radiological consequences without crediting the control room post-accident recirculation system or the control room envelope boundary. Therefore, it is unnecessary to require operability of the control room post-accident recirculation system or the control room envelope boundary in ISTS MODES 5 or 6 (KPS MODES COLD SHUTDOWN or REFUELING SHUTDOWN).

Item 2.2

In proposed TS 3.12.a, 3.12.b, and 3.12.c, DEK is proposing to change the modes of applicability for control room post-accident recirculation system operability from "reactor critical" (corresponding to ISTS MODES 1 and 2) to "reactor coolant system heated above 200°F" (corresponding to ISTS MODES 1, 2, 3, and 4). This change is more restrictive, requiring control room post-accident recirculation system operability beyond what is currently required by KPS TS and is consistent with ISTS modes of operability for a similar system. Therefore, this proposed change is considered to be acceptable.

Because DEK is proposing to change the modes of applicability to any time the reactor coolant system is above 200°F, DEK is also proposing to change the end-state when the control room envelope boundary or CRPAR system is inoperable. KPS TS 3.12.c provides the final remedial actions if the interim remedial actions or associated completion times of the preceding control room envelope boundary or CRPAR system TS can not be met. Additionally, DEK proposes to change the associated final end-state to COLD SHUTDOWN (i.e., RCS average temperature ≤ 200°F). The completion time of "within an additional 36 hours" is consistent with KPS TS 3.0.c, "Standard Shutdown Sequence," and other KPS TS completion times for reaching the COLD SHUTDOWN condition using normal operating procedures.

Item 2.3

DEK is proposing to add restrictions on the movement of recently irradiated fuel based on the operability of the control room post-accident recirculation system and the control room envelope boundary. This proposed change adds "or recently irradiated fuel moved" to KPS proposed TS 3.12.a, and proposes to add specifications 3.12.d, 3.12.e, and 3.12.f to cover postulated conditions of CRPAR system inoperability and corresponding remedial actions with completion times. This change is consistent, to the extent necessary, with the NRC approved TSTF-51-A, "Revised Containment Requirements During Handling of Irradiated Fuel and Core Alterations."

The term "recently irradiated fuel" is defined in ISTS as fuel that has occupied part of a critical reactor core within the previous [x] days (Reference 29). The number of days is determined by analysis demonstrating that after sufficient radioactive decay has occurred (x days), doses resulting from the associated accident remain below the

allowable limits without crediting the associated TS SSC. KPS accident analysis has demonstrated that after 100 days of decay, acceptable Site Boundary (SB) and Low Population Zone (LPZ) results are obtained for a fuel handling accident. DEK has not performed a similar analysis where the control room envelope boundary and CRPAR system are not credited to determine a value for "x days" used to define "recently" in ISTS. Therefore, DEK is proposing to define recently irradiated fuel as all fuel that has occupied part of a critical reactor until analysis determines an appropriate value for "x days".

KPS first credited the control room post-accident recirculation system for mitigating the consequences of a fuel handling accident in its submittal to change the radiological accident analysis methodology from the Technical Information Document (TID) 14844, "Calculation of Distance Factors for Power and Test Reactor Sites," to the methodology allowed by 10 CFR 50.67, "Accident Source Term." In KPS License Amendment 166, dated March 17, 2003, NRC approved this change in methodology. Subsequently by License Amendments 172, dated February 27, 2004, and 190, dated March 8, 2007, NRC approved additional changes to the KPS radiological accident analysis.

In January of 2004, KPS staff submitted KPS License Amendment Request 201, "Equipment Hatch and Control Room Post Accident Recirculation System" (Reference 30). This license amendment request proposed changes to the control room post-accident recirculation system based on the NRC approval of license amendment 166 (Reference 2). When this LAR was submitted, KPS planned to perform a tracer gas test in June of 2004 to confirm control room unfiltered in-leakage, as requested by GL 2003-01. The tracer gas test date was subsequently rescheduled for December of 2004. Because the results of the tracer gas test were not available until the first quarter of 2005, this LAR was withdrawn stating that the LAR would be resubmitted with the test results incorporated.

The KPS staff stated that because administrative controls were in place to ensure similar restrictions are placed on the CRPAR system, and equipment credited in the superceded radiological analysis are still contained in KPS TS, the submittal of the TS changes associated with the CRPAR system would be resubmitted with the Equipment Hatch TS changes. Because GL 2003-01 requested that the industry confirm their TS verify the integrity of the CRE and the assumed in-leakage rates of potentially contaminated air, the KPS staff committed to submit proposed changes based upon the final, approved version of TSTF-448. This submittal was to be modified, as needed, to account for plant-specific KPS CRE design and licensing bases, and submitted within 180 days following NRC approval of TSTF-448 (Reference 31), which was later modified to be submitted by September 14, 2007. Accordingly, DEK is providing this submittal to fulfill this commitment.

Radiological accident analysis has demonstrated that the control room occupant's dose consequences will be below the limits provided in 10 CFR 50.67, provided one train of the CRPAR system is operable and the CRE is isolated.

DEK is also proposing remedial actions to be performed if the control room envelope boundary or the CRPAR system is not fully operable while moving recently irradiated fuel (proposed KPS TS 3.12.d, 3.12.e, and 3.12.f). These remedial actions are reasonable because:

- Only one CRPAR train is credited in the accident analysis. The 7-day completion time is consistent with the KPS current licensing basis and is consistent with ISTS completion time.
- Placing one train of the CRPAR system in emergency mode ensures that this train is operable, that no failures preventing automatic actuation will occur, and that any active failure would be readily detected.
- Suspending movement of recently irradiated fuel assemblies immediately suspends activities that could result in a release of radioactivity that might require isolation of the control room. This places the unit in a condition that minimizes risk. This does not preclude the movement of fuel to a safe position.

Item 2.4

DEK is proposing to modify KPS surveillance TS 4.17.a.2 to replace the phrase "the system" with "each train" and replace the phrase "a high radiation signal and a safety injection" with the phrase "an actual or simulated actuation". These modifications provide clarification that the signal required to actuate the CRPAR system need not be an actual high radiation signal but can be simulated by the radiation monitor or by other means. The modified SR would require verification that each CRPAR train starts and operates on an actual or simulated actuation signal.

4.4 Technical Analysis - Initiative 3, Control Room Radiation Monitor (R-23).

DEK is proposing to add Item 5, "Control Room Isolation," to TS Table TS 3.5-4, "Instrument Operating Conditions for Isolation Functions." This addition will provide operability requirements for the control room envelope boundary isolation signals, i.e., safety injection and control room ventilation radiation monitor R-23 (R-23).

The radiological safety analysis, approved by the NRC in License Amendment 190, dated March 8, 2007 (Reference 4), credits the safety injection signal or R-23 for control room isolation and CRPAR system actuation for certain accident scenarios. The safety injection signal is credited for the LOCA, MSLB, SGTR, and RE accidents. The safety injection signal operability requirements are currently contained in TS Table TS 3.5-3, Item 1. The LR and FH accidents credit R-23. Other protective features can reduce the effect of the postulated accident such as other radiation monitors, the spent fuel pool sweep system, and readily accessible communication systems which can link the personnel in the plant (e.g., personnel handling fuel) to the control room.

The required actions determined from the initiation signals operability are based on redundancy, available backup signals, and ability to withstand a single failure.

Backup means are available to provide for manual control room isolation and CRPAR actuation, thus a 7-day completion time (similar to one train of CRPAR inoperable) for control room isolation and starting of one train of CRPAR is provided.

Surveillance requirements for R-23 are currently contained in KPS TS Table TS 4.1-1, "Minimum Frequencies for Checks, Calibrations and Test of Instrument Channels," Item 19, "Radiation Monitoring System."

4.5 Technical Analysis - Initiative 4, Clarification / Reformatting of current TS.

DEK is proposing the following changes for clarification or reformatting to align with the proposed KPS TS change:

- Current KPS TS 3.12.b allows one train of the CRPAR system to be inoperable for 7-days. This current specification has been reformatted and moved to proposed TS 3.12.b.1. This is acceptable because it is consistent with the KPS current licensing basis.
- Current KPS TS 3.12.b states that if two trains of the CRPAR system are inoperable, the reactor shall be shutdown within 12 hours. This current specification has been reformatted and moved to proposed TS 3.12.c. The addition of the requirements for initiating action within one hour provides clarification to the intent that a normal reactor shutdown be performed. This is acceptable because it is consistent with the current KPS TS 3.12.b and TS 3.0.c.
- Current KPS TS 3.12.c contains performance requirements that the control room post-accident recirculation system must meet during testing. The proposed TS changes relocate these performance requirements to TS 4.17.d.

5.0 REGULATORY SAFETY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

The US Atomic Energy Commission (AEC) issued their Safety Evaluation (SE) of the Kewaunee Power Station (KPS) on July 24, 1972 with supplements dated December 18, 1972 and May 10, 1973. In the AEC's SE, section 3.1, "Conformance with AEC General Design Criteria," described the conclusions the AEC reached associated with the General Design Criteria in effect at the time. The AEC stated:

> *The Kewaunee plant was designed and constructed to meet the intent of the AEC's General Design Criteria, as originally proposed in July 1967. Construction of the plant was about 50% complete and the Final Safety Analysis Report (Amendment No. 7) had been filed with the Commission before publication of the revised General Design Criteria in February 1971 and the present version of the criteria in July 1971. As a result, we did not*

> *require the applicant to reanalyze the plant or resubmit the FSAR. However, our technical review did assess the plant against the General Design Criteria now in effect and we are satisfied that the plant design generally conforms to the intent of these criteria.*

As such, the appropriate KPS General Design Criteria are listed below:

Criterion 11 - Control Room

The facility shall be provided with a control room from which actions to maintain safe operational status of the plant can be controlled. Adequate radiation protection shall be provided to permit continuous occupancy of the control room under any credible post-accident condition or as an alternative, access to other areas of the facility as necessary to shut down and maintain safe control of the facility without excessive radiation exposures of personnel (GDC 11).

Response

KPS is provided with a control room, which contains those controls and instrumentation necessary for safe operation of the plant, including the reactor and the turbine-generator, under normal and accident conditions.

Sufficient design features (shielding, distances, containment integrity and filtration systems) are provided to assure that control room personnel shall not be subjected to doses under postulated accident conditions during occupancy of the control room which would exceed 5 rem TEDE (total effective dose equivalent) for the 30 days following the accident. In response to Item III.D.3.4 of NUREG-0737, a review of post-accident control room habitability was performed. The NRC has determined that the control room habitability systems are acceptable and will provide a safe, habitable environment within the control room under design basis accident radiation and toxic gas conditions, including LOCAs.

The KPS dose analysis has been revised to show that the doses remain below the appropriate limit based on the 10 CFR 50.67 requirements for implementation of alternate source term (Reference 3). The results are presented in KPS USAR Chapter 14.

The control room air conditioning system provides a large percentage of recirculated air. Process Monitor Channel R-23 monitors control room ventilation air for radiation. If a high radiation condition exists, the monitor initiates closure of the outside air intake. In addition, Area Monitor Channel R-1 monitors control room air for radiation.

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Control room. A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a

safe condition under accident conditions, including loss-of-coolant accidents. Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident. Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures.

Applicants for and holders of construction permits and operating licenses under this part who apply on or after January 10, 1997, applicants for design certifications under part 52 of this chapter who apply on or after January 10, 1997, applicants for and holders of combined licenses under part 52 of this chapter who do not reference a standard design certification, or holders of operating licenses using an alternative source term under § 50.67, shall meet the requirements of this criterion, except that with regard to control room access and occupancy, adequate radiation protection shall be provided to ensure that radiation exposures shall not exceed 0.05 Sv (5 rem) total effective dose equivalent (TEDE) as defined in § 50.2 for the duration of the accident.

Response

In response to Item III.D.3.4 of NUREG-0737, a review of post-accident control room habitability was performed. The NRC determined that the control room habitability systems are acceptable and will provide a safe, habitable environment within the control room under design basis accident radiation and toxic gas conditions, including loss of coolant accidents.

Due to tracer gas test results exceeding radiological accident analysis assumptions for control room unfiltered in-leakage, the KPS radiological accidents were re-analyzed assuming higher unfiltered inleakage. These revised radiological accident analyses were submitted to NRC with the associated revised TS and were approved by the NRC in KPS License Amendment 190.

The NRC previously approved three exceptions to NUREG-0737 item III.D.3.4 (Reference 14), with a fourth exception being requested with this submittal.

1. Unnecessary to require a stock of food for five people for five days.
2. Do not maintain a stock of potassium iodide on-site.
3. KPS has a single radioactivity monitor installed in the control room HVAC system air supply.
4. Control Room dose limits for the GDT and VCT rupture accidents are 5 rem whole body, 30 rem thyroid, and 30 rem skin (Reference 19).

5.2 Precedent

In a safety evaluation for Millstone Power Station, Unit 2 (Reference 32), the NRC previously approved relocation of the gas decay tanks and volume control tank rupture analysis. This approval was based on the licensee continuing to express the doses as whole body and thyroid and not in TEDE. The KPS doses for the GDT rupture and the VCT rupture will be expressed in whole body, thyroid, and skin.

5.3 No Significant Hazards Consideration

Dominion Energy Kewaunee, Inc. (DEK) is proposing to modify the Kewaunee Power Station (KPS) Technical Specifications (TS). The proposed amendment would modify KPS TS requirements related to control room envelope habitability by proposing changes to TS related to the control room post-accident recirculation (CRPAR) system, instrument operating conditions for isolation functions, and a control room envelope habitability program. The changes are consistent with Nuclear Regulatory Commission (NRC) approved Industry/Technical Specification Task Force (TSTF) Improved Standard Technical Specifications (ISTS) change TSTF-448-A, Revision 3, except for the differential pressure surveillance (TSTF-448-A SR 5.5.18.d). The availability of this TS improvement was published in the Federal Register on January 17, 2007, as part of the consolidated line item improvement process (CLIIP).

DEK has reviewed the proposed no significant hazards consideration determination (NSHCD) published in the Federal Register as part of the CLIIP associated with TSTF-448-A. DEK has concluded that the proposed NSHCD presented in the Federal Register notice is applicable to KPS and is hereby incorporated by reference to satisfy the requirements of 10 CFR 50.91(a).

Additional changes, beyond those included in TSTF-448-A, are proposed which are to:

1. Align KPS TS with ISTS as delineated in NUREG-1431, Revision 3, "Standard Technical Specifications, Westinghouse Plants," to the extent necessary to adopt TSTF-448-A,

2. Add TS for control room radiation monitor R-23 (ventilation system air monitor), and

3. Reformat or clarify current TS.

DEK has evaluated whether a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

No.

The proposed changes do not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, or configuration of the facility. The proposed changes do not prevent the ability of structures, systems, and components (SSCs) to perform their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. This is a revision to the TS for the control room post-accident recirculation system and control room isolation function, which are mitigation systems designed to minimize unfiltered air in-leakage into the control room envelope and to filter the control room envelope atmosphere to protect the control room envelope occupants following accidents previously analyzed. An important part of the system is the control room envelope boundary. The control room envelope post-accident recirculation system is not an initiator or precursor to any accident previously evaluated. Therefore, the probability of any accident previously evaluated is not significantly increased.

Establishing operability requirements for SSCs, performing tests and implementing programs that verify the integrity of the control room envelope boundary and control room envelope habitability ensure that the mitigation features are capable of performing their assumed functions. Therefore, the consequences of any accident previously evaluated are not significantly increased.

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

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

No.

The proposed changes will not significantly change the requirements of the control room envelope ventilation system or its function during accident conditions. No new or different accidents result from performing the new surveillance or following the new program. The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a significant change in the methods governing normal plant operation. The proposed changes are consistent with the safety analysis assumptions including the revised gas decay tank and volume control tank rupture analysis and current plant operating practice.

Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

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

   No.

   The proposed changes do not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not affected by these changes. The proposed changes will not result in plant operation in a configuration outside the design basis for an unacceptable period without compensatory measures. The proposed changes do not significantly affect systems that respond to safely shut down the plant and to maintain the plant in a safe shutdown condition.

   Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, DEK concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

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

6.0 ENVIRONMENTAL CONSIDERATION

DEK has reviewed the environmental evaluation included in the model safety evaluation dated January 17, 2007, as part of the CLIIP associated with TSTF-448-A. DEK has concluded that the staff's findings presented in that evaluation are applicable to KPS and the evaluation is hereby incorporated by reference for this application.

Additionally, for the changes not included in the CLIIP for TSTF-448-A, a review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. NRC Generic Letter 2003-01, "Control Room Habitability," dated June 12, 2003.

2. Letter from Steven A. Varga (NRC) to C.W. Giesler (WPSC) regarding NUREG 0737, Item III.D.3.4, "Control Room Habitability," dated July 7, 1983.

3. Letter from John Lamb (NRC) to Tom Coutu (NMC) transmitting the NRC SER for Amendment No. 166 to the Operating License approving implementation of Alternate Source Term, Letter No. K-03-040, March 17, 2003.

4. Letter from Robert F. Kuntz (NRC) to David A. Christian (DEK), "Kewaunee Power Station – Issuance of Amendment RE: Radiological Accident Analysis and Associated Technical Specifications Change (TAC NO. MC9715)," dated March 8, 2007. (ADAMS Accession No. ML070430020)

5. Letter from Thomas Coutu (NMC) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability 60-Day Response," dated August 7, 2003.

6 Letter from Edward J. Weinkam (NMC) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability – Response to Commitments," dated November 25, 2003.

7. Letter from Craig W. Lambert (NMC) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability - Supplemental Response," dated April 1, 2005.

8. Letter from David H. Jaffe (NRC) to David A. Christian (DEK), "Kewaunee Power Station - Status of NRC Review of Response to Generic Letter 2003-01, 'Control Room Habitability' (TAC NO. MB9815)," dated September 28, 2006.

9. Federal Register Notice, Vol. 72, No. 10, page 2022, dated Wednesday, January 17, 2007.

10. Letter from Eugene S. Grecheck (DEK) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability – Change in Schedule for Submitting Technical Specification," dated July 20, 2007. (ADAMS Accession No. ML072040347)

11. Letter from E.R. Mathews (WPSC) to D.G. Eisenhut (NRC) dated April 24, 1981 (NRC-81-62).

12. Letter from E.R. Mathews (WPSC) to S.A. Varga (NRC), "TMI Action Plan (NUREG 0737) Items," dated September 10, 1981 (NRC-81-150).

13. Letter from C. W. Giesler (WPSC) to D.G. Eisenhut (NRC), "NUREG 0737: Update Information," dated November 23, 1982 (NRC-82-203).

14. Letter from S.A. Varga (NRC) to C.W. Giesler (WPSC), "Request for Additional Information," dated April 1, 1983 (K-83-075).

15. Letter from C.W. Giesler (WPSC) to S.A. Varga (NRC), "NUREG 0737 Item III.D.3.4 Control Room Habitability," dated June 6, 1983 (NRC-83-116).

16. Letter from S.A. Varga (NRC) to C.W. Giesler (WPSC) dated July 7, 1983 (K-83-141).

17. Letter from Morton B. Fairtile (NRC) to D.C. Hintz (WPSC), "Report of NRC Finding on Control Room Ventilation System," dated January 29, 1987 (K-87-016)

18. Letter from Michael J. Davis (NRC) to Ken H. Evers (WPSC), "Kewaunee Updated Control Room Habitability Evaluation (TAC No. 73583)," dated March 7, 1990 (K-90-055).

19. Letter from Morton B. Fairtile (NRC) to D.C. Hintz (WPSC), "Issuance of Amendment 63 to KNPP TS," dated July 5, 1985 (K-85-140).

20. Letter from John G. Lamb (NRC) to Thomas Coutu (NMC), "Kewaunee Nuclear Power Plant - Issuance of Amendment Regarding Stretch Power Uprate (TAC No. MB9031)," dated February 27, 2004 (ADAMS Accession No. ML040430633)

21. Letter from Leslie N. Hartz (DEK) to Document Control Desk (NRC), "License Amendment Request 211, Radiological Accident Analysis and Associated Technical Specifications Change," dated January 30, 2006 (ADAMS Accession No. ML060540217).

22. Letter from Gerald T. Bischof (DEK) to Document Control Desk (NRC), "Response to Request for Additional Information Regarding License Amendment Request 211, Radiological Accident Analysis and Associated Technical Specifications Change," dated January 23, 2007 (ADAM Accession No. ML070240543)

23. Letter from Robert F. Kuntz (NRC) to David A. Christian (DEK), "Kewaunee Power Station - Issuance of Amendment Re: Radiological Accident Analysis and Associated Technical Specifications Change (TAC NO. MC9715)," dated March 8, 2007 (ADAMS Accession No. ML070430020).

24. Letter from Gerald Bischof (DEK) to Document Control Desk (NRC), "KPS USAR Revision 20," dated April 19, 2007 (NRC-07-047).

25. Letter from Michael J. Davis (NRC) to Ken H. Evers (WPSC), "Approval of Amendment No. 88 to Kewaunee Operating License," dated October 16, 1990 (K-90-215).

26. Letter from William D. Beckner (NRC) to James Davis (NEI), "Decisions on changes to the Standard Technical Specification (STS) NUREGs proposed by the NEI Technical Specification Task Force (TSTF)," dated March 16, 2000 (ADAM Accession No. ML003694199).

27 Kewaunee Power Station Updated Safety Analysis Report Chapter 11, "Waste Disposal and Radiation Protection System."

28 Kewaunee Power Station Updated Safety Analysis Report Section 9.2, "Chemical and Volume Control System."

29. NUREG 1431, "Standard Technical Specifications – Westinghouse Plants," Revision 3, Volume 2.

30. Letter from Thomas Coutu (NMC) to the Document Control Desk (NRC), "License Amendment Request 201 to the Kewaunee Nuclear Power Plant Technical Specifications, Equipment Hatch and Control Room Post Accident Recirculation System," dated January 16, 2004. (ADAMS Accession No. ML040290120)

31. Letter from Craig Lambert (NMC) to the Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability - Supplemental Response," dated April 1, 2005. (ADAMS Accession No. ML050970303)

32. Letter from John Hughey (NRC) to David A. Christian (DNC), "Millstone Power Station, Unit No. 2 – Issuance of Amendment Regarding Alternate Source Term (TAC NO. MD2346)," dated May 31, 2007 (ADAMS Accession No. ML071450053).

Table 1
Summary of Changes and Associated Initiative(s)

Initiative 1	Initiative 2	Initiative 3	Initiative 4	TS Item	Proposed Change Description
•	•			3.12 Note	Adds a note to TS 3.12 allowing intermittent opening of the control room envelope boundary.
	•			3.12.a	Adds a condition of applicability for movement of recently irradiated fuel.
•	•		•	3.12.b	Reformats the current limiting condition for operation when one train of post-accident recirculation is inoperable and adds a limiting condition for operation with associated required actions and completion times for the post-accident recirculation system when the control room envelope boundary is inoperable.
•	•		•	3.12.c	Reformats the current required action and completion time when one or two control room post-accident recirculation system trains are inoperable. Adds a new allowance for inoperability of the control room post-accident recirculation system train when the control room envelope boundary is inoperable.
	•			3.12.d	Adds a new limiting condition for operation with an associated completion time for the control room post-accident recirculation system during the movement of recently irradiated fuel.
	•			3.12.e	Adds new required actions and associated completion times when the limiting condition for operation specified in the new TS 3.12.d is not met.
	•			3.12.f	Adds a new required action and associated completion time when two trains of the control room post-accident recirculation system are inoperable during movement of recently irradiated fuel.
		•		TS Table 3.5-4 Item 5	Adds a technical specification requiring R-23 operability.

Table 1 Summary of Changes and Associated Initiative(s)					
Initiative				TS Item	Proposed Change Description
1	2	3	4		
	•		•	4.17.a.2	Clarifies the specification to test the automatic actuation of the control room post-accident recirculation system by use of an actual or simulated actuation signal.
•				4.17.c	Adds a new specification requiring control room envelope unfiltered in-leakage testing in accordance with the control room envelope habitability program.
			•	4.17.d	Relocates current TS 3.12.c testing performance requirements to TS 4.17.d
•				6.23	Adds a new specification delineating the requirements for a control room envelope habitability program.

ATTACHMENT 2

LICENSE AMENDMENT 210
TECHNICAL SPECIFICATION MODIFICATIONS REGARDING CONTROL ROOM ENVELOPE HABITABILITY

MARKED-UP OPERATING LICENSE AND TS PAGES:

Operating License page 5
TS iv
TS 3.12-1
TS 3.12-2
Table TS 3.5-4, Page 1 of 3
Table TS 3.5-4, Page 2 of 3
Table TS 3.5-4, Page 3 of 3
TS 4.17-1
TS 6.23-1

KEWAUNEE POWER STATION

DOMINION ENERGY KEWAUNEE, INC.

(11) Upon implementation of Amendment No. xxx, adopting TSTF-448, Revision 3, the determination of control room envelope (CRE) unfiltered air in-leakage as required by TS 4.17.c, in accordance with TS 6.23.c.(i), and the assessment of CRE habitability as required by TS 6.23.c.(ii), shall be considered met.

Following implementation:

(a) The first performance of TS 4.17.c, in accordance with TS 6.23.c.(i), shall be within the specified Frequency of 6 years, plus the 15-month allowance of TS 4.0.b, as measured from December 15, 2004, the date of the most recent successful tracer gas test, as stated in the April 1, 2005 letter response to Generic Letter 2003-01, or within the next 15 months if the time period since the most recent successful tracer gas test is greater than 6 years.

(b) The first performance of the periodic assessment of CRE habitability, TS 6.23.c.(ii), shall be within 3 years, plus the 9-month allowance of TS 4.0.b, as measured from December 15, 2004, the date of the most recent successful tracer gas test, as stated in the April 1, 2005 letter response to Generic Letter 2003-01, or within the next 9 months if the time period since the most recent successful tracer gas test is greater than 3 years.

D. The licensee shall comply with applicable effluent limitations and other limitations and monitoring requirements, if any, specified pursuant to Section 401(d) of the Federal Water Pollution Control Act Amendments of 1972.

E. This license is effective as of the date of issuance, and shall expire at midnight on December 21, 2013.

FOR THE ATOMIC ENERGY COMMISSION

Original Signed by

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachment:

Appendices A and B - Technical Specifications

Date of Issuance: December 21, 1973

3.12 CONTROL ROOM POST-ACCIDENT RECIRCULATION SYSTEM

APPLICABILITY

Applies to the OPERABILITY of the Control Room Post-Accident Recirculation System.

OBJECTIVE

To specify OPERABILITY requirements for the Control Room Post-Accident Recirculation System.

SPECIFICATION

Note: The control room envelope (CRE) boundary may be opened intermittently under administrative control.

a. The reactor coolant system shall not be heated above 200°F~~made critical~~, or recently irradiated fuel assemblies moved, unless both trains of the Control Room Post-Accident Recirculation System are OPERABLE, except as allowed by TS 3.12.b, TS 3.12.d, TS 3.12.e, and TS 3.12.f.

b. When the reactor coolant system is > 200°F, the following conditions of inoperability may exist during the time intervals specified:

1. One control room post-accident recirculation train may be inoperable for 7 days, except as provided by TS 3.12.b.2.

2. One or more control room post-accident recirculation train(s) may be inoperable, due to an inoperable control room envelope boundary, for 90 days provided:

   A. Actions are immediately initiated to implement mitigating actions, and

   B. Within 24 hours, implemented mitigative actions are verified as ensuring control room envelope occupant exposures to radiological, chemical, and smoke hazards will not exceed limits.

c. When the reactor coolant system is > 200°F, if the requirements of TS 3.12.b cannot be met within the times specified or if two control room post-accident recirculation trains are inoperable for any reason other than an inoperable control room envelope boundary, then within 1 hour action shall be initiated to:

- Achieve HOT SHUTDOWN within 12 hours, and
- Achieve COLD SHUTDOWN within an additional 36 hours.

d. During movement of recently irradiated fuel assemblies, one control room post-accident recirculation train may be inoperable for 7 days.

e. If, during movement of recently irradiated fuel assemblies, the requirements of TS 3.12.d cannot be met within the times specified, then immediately either:

1. Place the OPERABLE control room post-accident recirculation train in the emergency mode of operation, or

2. Suspend movement of recently irradiated fuel assemblies.

f. If, during movement of recently irradiated fuel assemblies, two control room post-accident recirculation trains are inoperable or the inoperability is due to an inoperable CRE boundary, immediately:

1. Place any suspended recently irradiated fuel assembly in a safe condition, then

2. Cease any further movement of recently irradiated fuel assemblies.

1. Both trains of the Control Room Post-Accident Recirculation System, including filters, shall be OPERABLE or the reactor shall be shut down within 12 hours, except that when one of the two trains of the Control Room Post-Accident Recirculation System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 7 days.

c. During testing the system shall meet the following performance requirements:

1. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filter and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal.

2. The results of the laboratory carbon sample analysis from the Control Room Post-Accident Recirculation System carbon shall show ≥ 95% radioactive methyl iodide removal when tested in accordance with ASTM D3803-89 at conditions of 30°C, and 95% RH.

3. Fans shall operate within ±10% of design flow when tested.

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	**FUNCTIONAL UNIT**	**NO. OF CHANNELS**	**NO. OF CHANNELS TO TRIP**	**MINIMUM OPERABLE CHANNELS**	**MINIMUM DEGREE OF REDUNDANCY**	**PERMISSIBLE BYPASS CONDITIONS**	**OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET**
1	Containment Isolation						
	a. Safety Injection	Refer to Item No. 1 of Table TS 3.5-3					HOT SHUTDOWN(1)
	b. Manual	2	1	1	-		HOT SHUTDOWN
2	Steam Line Isolation						
	a. Hi-Hi Steam Flow with Safety Injection	2/loop	1	1	-		HOT SHUTDOWN(1)
	b. Hi Steam Flow and 2 of 4 Lo-Lo T_{avg} with Safety Injection	2/loop	1	1	-		HOT SHUTDOWN(1)
	c. Hi-Hi Containment Pressure	3	2	2	-		HOT SHUTDOWN(1)
	d. Manual	1/loop	1/loop	1/loop	-		HOT SHUTDOWN

(1) If minimum conditions are not met within 24 hours, steps shall be taken to place the plant in a COLD SHUTDOWN condition.

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	**FUNCTIONAL UNIT**	**NO. OF CHANNELS**	**NO. OF CHANNELS TO TRIP**	**MINIMUM OPERABLE CHANNELS**	**MINIMUM DEGREE OF REDUNDANCY**	**PERMISSIBLE BYPASS CONDITIONS**	**OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET**
3	Containment Ventilation Isolation						
	a. High Containment Radiation	2	1	1	-	-	These channels are not required to activate containment ventilation isolation when the containment purge and ventilation system isolation valves are maintained closed.[2]
	b. Safety Injection	Refer to Item 1 of Table TS 3.5-3					
	c. Containment Spray	Refer to Item 3 of Table TS 3.5-3					
4	Main Feedwater Isolation						
	a. Hi-Hi Steam Generator Level	3	2	2	1		HOT SHUTDOWN

(2) The detectors are required for Reactor Coolant System leak detection as referenced in TS 3.1.d.5.

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	FUNCTIONAL UNIT	NO. OF CHANNELS	NO. OF CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	MINIMUM DEGREE OF REDUNDANCY	PERMISSIBLE BYPASS CONDITIONS	OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
5	Control Room Isolation						
	a. Safety Injection	Refer to Item 1 of Table TS 3.5-3					
	b. R-23	1	1	1			If the Reactor Coolant System is ≥ 200°F (a) If handling recently irradiated fuel (b)

(a) Either 1) within 7 days close the control room air conditioning isolation dampers and place one train of control room post-accident recirculation in operation, or 2) follow the actions of TS 3.12.c for one train of CPRAR inoperable for greater than 7 days.

(b) Immediately suspend handling of recently irradiated fuel assemblies, or close the control room air conditioning isolation dampers and place one train of control room post-accident recirculation in operation.

~~Amendment No. 102~~LAR 210
~~10/18/93~~

4.17 CONTROL ROOM POST-ACCIDENT RECIRCULATION SYSTEM

APPLICABILITY

Applies to testing and surveillance requirements for the Control Room Post-accident Recirculation System in TS 3.12.

OBJECTIVE

To verify the performance capability of the Control Room Post-accident Recirculation System.

SPECIFICATION

a. At least once per operating cycle or once every 18 months, whichever occurs first, the following conditions shall be demonstrated:

1. Pressure drop across the combined HEPA filters and charcoal adsorber banks is < 6 inches of water and the pressure drop across any HEPA bank is < 4 inches of water at the system design flow rate (± 10%).

2. Automatic initiation of each trainthe system on an actual or simulated high radiation signal and a safety injectionactuation signal.

b. 1. The in-place DOP test for HEPA filters shall be performed (1) at least once per 18 months and (2) after each complete or partial replacement of a HEPA filter bank or after any maintenance on the system that could affect the HEPA bank bypass leakage.

2. The laboratory tests for activated carbon in the charcoal filters shall be performed (1) at least once per 18 months for filters in a standby status or after 720 hours of filter operation, and (2) following painting, fire, or chemical release in any ventilation zone communicating with the system.

3. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of a charcoal adsorber bank or after any maintenance on the system that could affect the charcoal adsorber bank bypass leakage.

4. Each train shall be operated at least 10 hours each month.

c. Perform required control room envelope unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program (TS 6.23).

d. During testing the system shall meet the following performance requirements:

1. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filter and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal.

2. The results of the laboratory carbon sample analysis from the Control Room Post-Accident Recirculation System carbon shall show ≥ 95% radioactive methyl iodide removal when tested in accordance with ASTM D3803-89 at conditions of 30°C, and 95% RH.

3. Fans shall operate within ±10% of design flow when tested.

6.23 CONTROL ROOM ENVELOPE HABITABILITY PROGRAM

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE Control Room Post-Accident Recirculation System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of 5 rem total effective dose equivalent (TEDE) for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for:

   (i) determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and

   (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

d. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

e. The provisions of TS 4.0.b are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and assessing the CRE boundary as required by paragraph c.

ATTACHMENT 3

LICENSE AMENDMENT 210
TECHNICAL SPECIFICATION MODIFICATIONS REGARDING CONTROL ROOM ENVELOPE HABITABILITY

AFFECTED TS PAGES

Operating License page 5
TS iv
TS 3.12-1
TS 3.12-2
Table TS 3.5-4, Page 1 of 3
Table TS 3.5-4, Page 2 of 3
Table TS 3.5-4, Page 3 of 3
TS 4.17-1
TS 6.23-1

KEWAUNEE POWER STATION

DOMINION ENERGY KEWAUNEE, INC.

(11) Upon implementation of Amendment No. xxx, adopting TSTF-448, Revision 3, the determination of control room envelope (CRE) unfiltered air in-leakage as required by TS 4.17.c, in accordance with TS 6.23.c.(i), and the assessment of CRE habitability as required by TS 6.23.c.(ii), shall be considered met.

Following implementation:

(a) The first performance of TS 4.17.c, in accordance with TS 6.23.c.(i), shall be within the specified Frequency of 6 years, plus the 15-month allowance of TS 4.0.b, as measured from December 15, 2004, the date of the most recent successful tracer gas test, as stated in the April 1, 2005 letter response to Generic Letter 2003-01, or within the next 15 months if the time period since the most recent successful tracer gas test is greater than 6 years.

(b) The first performance of the periodic assessment of CRE habitability, TS 6.23.c.(ii), shall be within 3 years, plus the 9-month allowance of TS 4.0.b, as measured from December 15, 2004, the date of the most recent successful tracer gas test, as stated in the April 1, 2005 letter response to Generic Letter 2003-01, or within the next 9 months if the time period since the most recent successful tracer gas test is greater than 3 years.

D. The licensee shall comply with applicable effluent limitations and other limitations and monitoring requirements, if any, specified pursuant to Section 401(d) of the Federal Water Pollution Control Act Amendments of 1972.

E. This license is effective as of the date of issuance, and shall expire at midnight on December 21, 2013.

FOR THE ATOMIC ENERGY COMMISSION

Original Signed by

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachment:

Appendices A and B - Technical Specifications

Date of Issuance: December 21, 1973

3.12 CONTROL ROOM POST-ACCIDENT RECIRCULATION SYSTEM

APPLICABILITY

Applies to the OPERABILITY of the Control Room Post-Accident Recirculation System.

OBJECTIVE

To specify OPERABILITY requirements for the Control Room Post-Accident Recirculation System.

SPECIFICATION

Note: The control room envelope (CRE) boundary may be opened intermittently under administrative control.

a~~a~~. The reactor coolant system shall not be heated above 200°F, or recently irradiated fuel assemblies moved, unless both trains of the Control Room Post-Accident Recirculation System are OPERABLE, except as allowed by TS 3.12.b, TS 3.12.d, TS 3.12.e, and TS 3.12.f.

b~~b~~. When the reactor coolant system is > 200°F, the following conditions of inoperability may exist during the time intervals specified:

1. One control room post-accident recirculation train may be inoperable for 7 days, except as provided by TS 3.12.b.2.

2. One or more control room post-accident recirculation train(s) may be inoperable, due to an inoperable control room envelope boundary, for 90 days provided:

   A. Actions are immediately initiated to implement mitigating actions, and

   B. Within 24 hours, implemented mitigative actions are verified as ensuring control room envelope occupant exposures to radiological, chemical, and smoke hazards will not exceed limits.

c. When the reactor coolant system is > 200°F, if the requirements of TS 3.12.b cannot be met within the times specified or if two control room post-accident recirculation trains are inoperable for any reason other than an inoperable control room envelope boundary, then within 1 hour action shall be initiated to:

- Achieve HOT SHUTDOWN within 12 hours, and
- Achieve COLD SHUTDOWN within an additional 36 hours.

d. During movement of recently irradiated fuel assemblies, one control room post-accident recirculation train may be inoperable for 7 days.

e. If, during movement of recently irradiated fuel assemblies, the requirements of TS 3.12.d cannot be met within the times specified, then immediately either:

1. Place the OPERABLE control room post-accident recirculation train in the emergency mode of operation, or

2. Suspend movement of recently irradiated fuel assemblies.

f. If, during movement of recently irradiated fuel assemblies, two control room post-accident recirculation trains are inoperable or the inoperability is due to an inoperable CRE boundary, immediately:

   1. Place any suspended recently irradiated fuel assembly in a safe condition, then

   2. Cease any further movement of recently irradiated fuel assemblies.

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	**FUNCTIONAL UNIT**	**NO. OF CHANNELS**	**NO. OF CHANNELS TO TRIP**	**MINIMUM OPERABLE CHANNELS**	**MINIMUM DEGREE OF REDUNDANCY**	**PERMISSIBLE BYPASS CONDITIONS**	**OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET**
1	Containment Isolation						
	a. Safety Injection	Refer to Item No. 1 of Table TS 3.5-3					HOT SHUTDOWN[(1)]
	b. Manual	2	1	1	-		HOT SHUTDOWN
2	Steam Line Isolation						
	a. Hi-Hi Steam Flow with Safety Injection	2/loop	1	1	-		HOT SHUTDOWN[(1)]
	b. Hi Steam Flow and 2 of 4 Lo-Lo T_{avg} with Safety Injection	2/loop	1	1	-		HOT SHUTDOWN[(1)]
	c. Hi-Hi Containment Pressure	3	2	2	-		HOT SHUTDOWN[(1)]
	d. Manual	1/loop	1/loop	1/loop	-		HOT SHUTDOWN

[(1)] If minimum conditions are not met within 24 hours, steps shall be taken to place the plant in a COLD SHUTDOWN condition.

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	**FUNCTIONAL UNIT**	**NO. OF CHANNELS**	**NO. OF CHANNELS TO TRIP**	**MINIMUM OPERABLE CHANNELS**	**MINIMUM DEGREE OF REDUNDANCY**	**PERMISSIBLE BYPASS CONDITIONS**	**OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET**
3	Containment Ventilation Isolation						
	a. High Containment Radiation	2	1	1	-	-	These channels are not required to activate containment ventilation isolation when the containment purge and ventilation system isolation valves are maintained closed.[2]
	b. Safety Injection	Refer to Item 1 of Table TS 3.5-3					
	c. Containment Spray	Refer to Item 3 of Table TS 3.5-3					
4	Main Feedwater Isolation						
	a. Hi-Hi Steam Generator Level	3	2	2	1		HOT SHUTDOWN

[2] The detectors are required for Reactor Coolant System leak detection as referenced in TS 3.1.d.5.

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	**FUNCTIONAL UNIT**	**NO. OF CHANNELS**	**NO. OF CHANNELS TO TRIP**	**MINIMUM OPERABLE CHANNELS**	**MINIMUM DEGREE OF REDUNDANCY**	**PERMISSIBLE BYPASS CONDITIONS**	**OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET**
5	Control Room Isolation						
	a. Safety Injection	Refer to Item 1 of Table TS 3.5-3					
	b. R-23	1	1	1			If the Reactor Coolant System is > 200°F (a) If handling recently irradiated fuel (b)

(a) Either 1) within 7 days close the control room air conditioning isolation dampers and place one train of control room post-accident recirculation in operation, or 2) follow the actions of TS 3.12.c for one train of CPRAR inoperable for greater than 7 days.

(b) Immediately suspend handling of recently irradiated fuel assemblies, or close the control room air conditioning isolation dampers and place one train of control room post-accident recirculation in operation.

4.17 CONTROL ROOM POST-ACCIDENT RECIRCULATION SYSTEM

APPLICABILITY

Applies to testing and surveillance requirements for the Control Room Post-accident Recirculation System in TS 3.12.

OBJECTIVE

To verify the performance capability of the Control Room Post-accident Recirculation System.

SPECIFICATION

a. At least once per operating cycle or once every 18 months, whichever occurs first, the following conditions shall be demonstrated:

   1. Pressure drop across the combined HEPA filters and charcoal adsorber banks is < 6 inches of water and the pressure drop across any HEPA bank is < 4 inches of water at the system design flow rate (± 10%).

   2. Automatic initiation of each train on an actual or simulated actuation signal.

b. 1. The in-place DOP test for HEPA filters shall be performed (1) at least once per 18 months and (2) after each complete or partial replacement of a HEPA filter bank or after any maintenance on the system that could affect the HEPA bank bypass leakage.

   2. The laboratory tests for activated carbon in the charcoal filters shall be performed (1) at least once per 18 months for filters in a standby status or after 720 hours of filter operation, and (2) following painting, fire, or chemical release in any ventilation zone communicating with the system.

   3. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of a charcoal adsorber bank or after any maintenance on the system that could affect the charcoal adsorber bank bypass leakage.

   4. Each train shall be operated at least 10 hours each month.

c. Perform required control room envelope unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program (TS 6.23).

d. During testing the system shall meet the following performance requirements:

   1. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filter and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal.

   2. The results of the laboratory carbon sample analysis from the Control Room Post-Accident Recirculation System carbon shall show ≥ 95% radioactive methyl iodide removal when tested in accordance with ASTM D3803-89 at conditions of 30°C, and 95% RH.

   3. Fans shall operate within ±10% of design flow when tested.

6.23 CONTROL ROOM ENVELOPE HABITABILITY PROGRAM

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE Control Room Post-Accident Recirculation System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of 5 rem total effective dose equivalent (TEDE) for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for:

   (i) determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and

   (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

d. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

e. The provisions of TS 4.0.b are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and assessing the CRE boundary as required by paragraph c.

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ATTACHMENT 4

LICENSE AMENDMENT 210
TECHNICAL SPECIFICATION MODIFICATIONS REGARDING CONTROL ROOM ENVELOPE HABITABILITY

MARKED-UP TS BASES PAGES

TS B3.5-4
TS B3.5-5
TS B3.5-6
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capability for CHANNEL CALIBRATION and test at power. Exceptions are backup channels such as reactor coolant pump breakers. The removal of one trip channel on process control equipment is accomplished by placing that channel bistable in a tripped mode; e.g., a two-out-of-three circuit becomes a one-out-of-two circuit. The source and intermediate range nuclear instrumentation system channels are not intentionally placed in a tripped mode since these are one-out-of-two trips, and the trips are therefore bypassed during testing. Testing does not trip the system unless a trip condition exists in another channel.

The OPERABILITY of the instrumentation noted in Table TS 3.5-6 assures that sufficient information is available on these selected plant parameters to aid the operator in identification of an accident and assessment of plant conditions during and following an accident. In the event the instrumentation noted in Table TS 3.5-6 is not OPERABLE, the operator is given instruction on compensatory actions.

TABLE 3.5-4, "INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

Item 5, Control Room Isolation Instrumentation

BACKGROUND

The Control Room Air Conditioning (CRAC) System and Control Room Post-Accident Recirculation CRPAR System provides an enclosed control room environment from which the unit can be operated following an uncontrolled release of radioactivity. During normal operation, the Control Room Air Conditioning System provides control room ventilation. Upon receipt of an actuation signal, the Control Room Air Conditioning System isolates the control room envelope changing to a recirculation mode while the CRPAR System starts filtering a portion of the recirculated control room air. The CRPAR system is described in the Bases for TS 3.12, "Control Room Post-Accident Recirculation System."

The actuation instrumentation consists of a single radiation monitor in the air intake to the control room area. A high radiation signal from this detector will initiate both trains of the CRPAR System. The control room operator can also initiate CRPAR System trains by manual switches in the control room, as may be the case if R-1 alarms. The CRPAR System is also actuated by a safety injection (SI) signal. The SI Function is discussed in TS Table 3.5-3, "Emergency Cooling."

APPLICABLE SAFETY ANALYSIS

The control room must be kept habitable for the operators stationed there during accident recovery and post accident operations.

The CRAC System acts to terminate the supply of unfiltered outside air to the control room. The CRPAR system initiates filtration of the control room air. These actions are necessary to ensure the control room is kept habitable for the operators stationed there during accident recovery and post accident operations by minimizing the radiation exposure of control room personnel.

The radiation monitor actuations of the CRAC System isolation and CRPAR System during movement of recently irradiated fuel assemblies are the primary means to ensure control room habitability in the event of a fuel handling accident.

The CRPAR System actuation instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

The TS requirements ensure that instrumentation necessary to isolate the Control Room and initiate the CRPAR System is OPERABLE.

Control Room Radiation

The TS specifies one required CRAC radiation monitor (R-23) to ensure that the radiation monitoring instrumentation necessary to initiate CR isolation and the CRPAR System actuation remains OPERABLE.

Safety Injection

Refer to TS Table 3.5-3, Functional Unit 1, for all initiating functions and requirements.

APPLICABILITY

The CRPAR System Functions must be OPERABLE in the OPERATING, HOT STANDBY, HOT SHUTDOWN, and INTERMEDIATE SHUTDOWN MODES (RCS > 200°F), and during movement of recently irradiated fuel assemblies.

The Applicability for the CRPAR System actuation on the Safety Injection function is specified in TS Table 3.5-3.

ACTIONS

When the reactor coolant system is greater than 200°F, if one radiation monitor channel is inoperablee 7 days are permitted to restore it to OPERABLE status. The 7-day completion time is the same as is allowed if one train of the mechanical portion of the CRPAR system is inoperable. The basis for this completion time is twofold, 1) the same as that provided in TS 3.12.b, and 2) there is additional protection against the applicable accidents. The first level of additional protection is provided by the manual actuation of the control room post-accident recirculation system in the recirculation mode. Credit can be reasonably taken for manual actuation as control room personnel can detect and confirm the presence of unusual levels of radiation, based on other plant radiation monitors, at the radiation monitoring panel located in the control room. The panel has both alarm and recording functions. Radiation elements, which input to this panel, are installed to monitor areas and processes including the reactor coolant system, the containment, the fuel handling area, and the control room area, as well as other areas where the potential exists for significant dose rates. The second additional protection is the spent fuel pool sweep system. The spent fuel pool sweep system will entrain the fuel handling accident effluents in an air stream that is HEPA filtered and then directed to the auxiliary, building vent header. Upon a high radiation signal at the auxiliary building vent header, the spent fuel pool sweep system aligns itself to charcoal filters as well as the HEPA filters, thus reducing the effects of the postulated accident.

If the channel cannot be restored to OPERABLE status, one CRPAR system train must be placed in the emergency radiation protection mode of operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation.

When recently irradiated fuel assemblies are being moved and R-23 becomes inoperable then movement of recently irradiated fuel assemblies must be suspended immediately to reduce the risk of accidents that would require CR isolation and CRPAR system actuation. Alternatively, the

control room may be isolated and one train of the CRPAR system may be placed in the emergency mode. This ensures the control room isolation and CRPAR functions are performed.

Depending on plant conditions and evolutions in progress when R-23 is made or found inoperable one or both of the action requirements may be entered. If the reactor coolant system is greater than 200°F then action 'a' is entered. If recently irradiated fuel is being moved then action 'b' is entered. If the reactor coolant system is greater than 200°F and recently irradiated fuel is being moved then both actions 'a' and 'b' are entered.

BASIS - Control Room Post-Accident Recirculation System (TS 3.12)

The Control Room Post-Accident Recirculation System is designed to filter the Control Room atmosphere during Control Room isolation conditions. The Control Room Post-Accident Recirculation (CRPAR) System is designed to automatically start upon SIS or high radiation signal. The high radiation signal may be actuated by actual radiation levels or may be a simulated signal.

~~If the system is found to be inoperable, there is no immediate threat to the Control Room and reactor operation may continue for a limited period of time while repairs are being made. If the system cannot be repaired within 7 days, the reactor is placed in HOT STANDBY until the repairs are made.~~

BACKGROUND

The control room envelope (CRE) provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke.

The CRE protected environment is provided by a control room envelope boundary and a control room post-accident recirculation system. These features consist of two redundant post-accident recirculation trains that re-circulate and filter the air in the CRE and a CRE boundary that limits the inleakage of unfiltered air. Each control room post-accident recirculation train consists of a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, dampers, doors, barriers, and instrumentation also form part of the system.

The CRE is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. This area encompasses the control room, relay room, and control room equipment room. The CRE is protected during normal operation, natural events, and accident conditions. The CRE boundary is the combination of walls, floor, roof, ducting, doors, penetrations, and equipment that physically form the CRE. The OPERABILITY of the CRE boundary must be maintained to ensure that the inleakage of unfiltered air into the CRE will not exceed the inleakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to CRE occupants. The CRE and its boundary are defined in the Control Room Envelope Habitability Program.

The CRPAR system is an emergency system, parts of which may also operate during normal unit operation. Upon receipt of an actuating signal(s), normal air supply to the CRE is isolated, the control room ventilation system goes to full recirculation, and a portion of the stream of ventilation air is recirculated through the CRPAR system filter trains. The prefilters remove any large particles in the air, to prevent excessive loading of the HEPA filters and charcoal adsorbers.

Actuation of the CRPAR system places the control room ventilation system in the isolation and recirculation state, the emergency mode of operation. Control room ventilation isolation actuation closes the unfiltered outside air intake and unfiltered exhaust dampers, and aligns the system for recirculation of the air within the CRE passing a portion of the recirculated air through the redundant trains of HEPA and the charcoal filters.

A radiation detector continuously monitors the air entering the control room. Radiation detector output above the setpoint will cause actuation of the emergency isolation and re-circulation function.

Normally open isolation dampers are arranged in series pairs so that the failure of one damper to

shut will not result in a breach of isolation. The CRPAR system is designed in accordance with Seismic Category I requirements.

APPLICABLE SAFETY ANALYSES

The CRPAR system components are arranged in redundant, safety related ventilation trains. The location of components and ducting within the CRE ensures an adequate supply of filtered air to all areas requiring access. The CRPAR system provides airborne radiological protection for the CRE occupants, as demonstrated by the CRE occupant dose analyses for the most limiting design basis accident fission product release presented in the USAR, Chapter 14. (1)

The CR ventilation system provides protection, if necessary, from smoke and hazardous chemicals to the CRE occupants. The analysis of hazardous chemical releases determined that the toxicity limits for the chemicals of concern (hydrazine, dimethylamine, morpholine, and isopropyl alcohol) are not exceeded at the control room air intake and therefore in the CRE following a hazardous chemical release (2). The evaluation of a smoke challenge demonstrates that it will not result in the inability of the CRE occupants to control the reactor either from the control room or from the remote shutdown panels (3).

The worst-case single active failure of a component in the CRPAR system, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

The CRPAR system satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) because it is a system that is part of the primary success path which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

LCO

Two independent and redundant CRPAR system trains are required to be OPERABLE to ensure that at least one is available if a single active failure disables the other train. Total system failure, such as from a loss of both ventilation trains or from an inoperable CRE boundary could result in exceeding a dose of 5 rem whole body or its equivalent to any part of the body, or 5 rem TEDE to the CRE occupants in the event of a large radioactive release.

Each CRPAR train is considered OPERABLE when the individual components necessary to limit CRE occupant exposure are OPERABLE. A CRPAR train is OPERABLE when the associated:

a. Fan is OPERABLE,

b. HEPA filters and charcoal adsorbers are not excessively restricting flow, and are capable of performing their filtration functions, and

c. Prefilter, ductwork, and dampers are OPERABLE, and air circulation can be maintained.

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(1) USAR Chapter 14, Safety Analysis
(2) Letter from Craig W. Lambert (NMC) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability - Supplemental Response, dated April 1, 2005 (NRC-05-040)
(3) Letter from Craig W. Lambert (NMC) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability - Supplemental Response, dated April 1, 2005 (NRC-05-040)

In order for the CRPAR trains to be considered OPERABLE, the CRE boundary must be maintained such that the CRE occupant dose from a large radioactive release does not exceed the calculated dose in the licensing basis consequence analyses for DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

A Note allowing the CRE boundary to be opened intermittently under administrative controls modifies the specification. This Note only applies to openings in the CRE boundary that can be rapidly restored to the design condition, such as doors, hatches, floor plugs, and access panels. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

APPLICABILITY

TS 3.12.a

If the reactor coolant system is > 200°F, and during movement of recently irradiated fuel assemblies, the CRPAR system and control room envelope boundary must be OPERABLE to ensure that the CRE will remain habitable during and following a DBA.

During movement of recently irradiated fuel assemblies, the CRPAR system must be OPERABLE to cope with the release should a fuel handling accident occur involving recently irradiated fuel. The CRPAR system is only required to be OPERABLE during fuel handling involving recently irradiated fuel assemblies (i.e., fuel assemblies that have occupied part of a critical reactor core within the previous [X] days), due to radioactive decay. The determination of the number of days, [x], is based on radiological accident analyses using fuel that has occupied part of a critical reactor core, allowed to decay for specific number of days. Using the radioactive source term from these assemblies, after decaying [x] days, if the dose consequence results are well within the guideline values specified in 10 CFR 50.67, as modified by Regulatory Guide 1.183 (4), without crediting containment closure capability, CRPAR system operability, or control room envelope boundary capability, recently would be defined as those irradiated assembles decaying less than [x] days. Until analysis is performed to determine a specific time, the term recently is defined as all irradiated fuel assemblies.

ACTIONS

TS 3.12.b and TS 3.12.d

When one CRPAR train is inoperable, for reasons other than an inoperable CRE boundary, action must be taken to restore OPERABLE status within 7 days. In this condition, the remaining OPERABLE CRPAR train is adequate to perform the CRE occupant protection function. However, the overall reliability is reduced because a failure in the OPERABLE CRPAR train could result in loss of CRPAR system function. The 7 day completion time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

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(4) NRC Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors.

If the unfiltered inleakage of potentially contaminated air past the CRE boundary and into the CRE can result in CRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of DBA consequences (allowed to be up to 5 rem TEDE), or inadequate protection of CRE occupants from hazardous chemicals or smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 days.

During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on CRE occupants from the potential hazards of a radiological or chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24-hour completion time is reasonable based on the low probability of a DBA occurring during this period, and the use of mitigating actions. The 90-day completion time is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability that CRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 90-day completion time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

TS 3.12.c

When the reactor coolant system is > 200°F, if the inoperable CRPAR system train or the CRE boundary cannot be restored to OPERABLE status within the required completion time, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the subsequent 36 hours. The allowed completion times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

When the reactor coolant system is > 200°F, if both CRPAR system trains are inoperable, for reasons other than an inoperable CRE boundary, the CRPAR system may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, the unit must be shutdown immediately.

TS 3.12.e

During movement of recently irradiated fuel assemblies, if the inoperable CRPAR system train cannot be restored to OPERABLE status within the required completion time, action must be taken to immediately place the OPERABLE CRPAR train in the emergency mode. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure would be readily detected.

An alternative to placing the OPERABLE CRPAR train in the emergency mode is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

TS 3.12.f

During movement of recently irradiated fuel assemblies, with two CRPAR trains inoperable action must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

Accident analysis assumes a charcoal adsorber efficiency of 90%.(5) To ensure the charcoal adsorbers maintain that efficiency throughout the operating cycle, a safety factor of 2 is used. Therefore, if accident analysis assumes a charcoal adsorber efficiency of 90%, this equates to a methyl iodide penetration of 10%. If a safety factor of 2 is assumed, the methyl iodide penetration is reduced to 5%. Thus, the acceptance criteria of 95% efficient will be used for the charcoal adsorbers.

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.

(5) USAR TABLE 14.3-8, "Major Assumptions for Design Basis LOCA Analysis"

BASIS

Control Room Post-Accident Recirculation System

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."

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

SURVEILLANCE REQUIREMENTS (SR)

TS 4.17.a.1

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than 6 inches of water and 4 inches across any HEPA filter bank at the system design flow rate (± 10%) will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. A filter test frequency of once per operating cycle establishes system performance capability.

TS 4.17.a.2

Demonstration of the automatic initiation capability is necessary to assure system performance capability. This SR verifies that each CRPAR train starts and operates on an actual or simulated actuation signal. The frequency of once per operating cycle or once every 18 months is consistent with the typical refueling cycle.

TS 4.17.b.1

The frequency of once per operating cycle or once every 18 months is consistent with the typical refueling cycle.

TS 4.17.b.2

Any HEPA filters found defective should be 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 adsorber could become contaminated from the fumes, chemicals, or foreign materials, the same tests and sample analysis should be performed as required for operational use.

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 two 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.

TS 4.17.b.3

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 two 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.

TS 4.17.b.4

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. The monthly frequency is based on the reliability of the equipment and the two-train redundancy.

TS 4.17.c

This surveillance requirement verifies the OPERABILITY of the CRE boundary by testing for unfiltered air inleakage past the CRE boundary and into the CRE. The details of the testing are specified in the Control Room Envelope Habitability Program.

The CRE is considered habitable when the radiological dose to CRE occupants calculated in the licensing basis analyses of DBA consequences is no more than 5 rem TEDE and the CRE occupants are protected from hazardous chemicals and smoke. This surveillance requirement verifies that the unfiltered air inleakage into the CRE is no greater than the flow rate assumed in the licensing basis analyses of DBA consequences. When unfiltered air inleakage is greater than the assumed unfiltered inleakage flow rate, TS 3.12.b.2 must be entered. TS 3.12.b.2 allows time to restore the CRE boundary to OPERABLE status provided mitigating actions can ensure that the CRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3, which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F. These compensatory measures may also be used as mitigating actions as required by TS 3.12.b.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY. Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the CRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the CRE boundary has been restored to OPERABLE status.

TS 4.17.d

The accident analysis assumes a charcoal adsorber efficiency of 90%.[1] To ensure the charcoal adsorbers maintain that efficiency throughout the operating cycle, a safety factor of 2 is used. Therefore, if the accident analysis assumes a charcoal adsorber efficiency of 90%, this equates to a methyl iodide penetration of 10%. If a safety factor of 2 is assumed, the methyl iodide penetration is reduced to 5%. Thus, the acceptance criteria of 95% efficient will be used for the charcoal adsorbers.

Although committing to ASTM D3803-89, it was recognized that ASTM D3803-89 references Military

(1) USAR TABLE 14.3-8, "Major Assumptions for Design Basis LOCA Analysis"

Standards MIL-F-51068D, "Filter, Particulate High Efficiency, Fire Resistant," and MIL-F-51079A, "Filter, Medium Fire Resistant, High Efficiency." These standards 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.

ATTACHMENT 5

LICENSE AMENDMENT 210
TECHNICAL SPECIFICATION MODIFICATIONS REGARDING CONTROL ROOM ENVELOPE HABITABILITY

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TS B3.12-5
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capability for CHANNEL CALIBRATION and test at power. Exceptions are backup channels such as reactor coolant pump breakers. The removal of one trip channel on process control equipment is accomplished by placing that channel bistable in a tripped mode; e.g., a two-out-of-three circuit becomes a one-out-of-two circuit. The source and intermediate range nuclear instrumentation system channels are not intentionally placed in a tripped mode since these are one-out-of-two trips, and the trips are therefore bypassed during testing. Testing does not trip the system unless a trip condition exists in another channel.

The OPERABILITY of the instrumentation noted in Table TS 3.5-6 assures that sufficient information is available on these selected plant parameters to aid the operator in identification of an accident and assessment of plant conditions during and following an accident. In the event the instrumentation noted in Table TS 3.5-6 is not OPERABLE, the operator is given instruction on compensatory actions.

TABLE 3.5-4, "INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

Item 5, Control Room Isolation Instrumentation

BACKGROUND

The Control Room Air Conditioning (CRAC) System and Control Room Post-Accident Recirculation CRPAR System provides an enclosed control room environment from which the unit can be operated following an uncontrolled release of radioactivity. During normal operation, the Control Room Air Conditioning System provides control room ventilation. Upon receipt of an actuation signal, the Control Room Air Conditioning System isolates the control room envelope changing to a recirculation mode while the CRPAR System starts filtering a portion of the recirculated control room air. The CRPAR system is described in the Bases for TS 3.12, "Control Room Post-Accident Recirculation System."

The actuation instrumentation consists of a single radiation monitor in the air intake to the control room area. A high radiation signal from this detector will initiate both trains of the CRPAR System. The control room operator can also initiate CRPAR System trains by manual switches in the control room, as may be the case if R-1 alarms. The CRPAR System is also actuated by a safety injection (SI) signal. The SI Function is discussed in TS Table 3.5-3, "Emergency Cooling."

APPLICABLE SAFETY ANALYSIS

The control room must be kept habitable for the operators stationed there during accident recovery and post accident operations.

The CRAC System acts to terminate the supply of unfiltered outside air to the control room. The CRPAR system initiates filtration of the control room air. These actions are necessary to ensure the control room is kept habitable for the operators stationed there during accident recovery and post accident operations by minimizing the radiation exposure of control room personnel.

The radiation monitor actuations of the CRAC System isolation and CRPAR System during movement of recently irradiated fuel assemblies are the primary means to ensure control room habitability in the event of a fuel handling accident.

The CRPAR System actuation instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

The TS requirements ensure that instrumentation necessary to isolate the Control Room and initiate the CRPAR System is OPERABLE.

Control Room Radiation

The TS specifies one required CRAC radiation monitor (R-23) to ensure that the radiation monitoring instrumentation necessary to initiate CR isolation and the CRPAR System actuation remains OPERABLE.

Safety Injection

Refer to TS Table 3.5-3, Functional Unit 1, for all initiating functions and requirements.

APPLICABILITY

The CRPAR System Functions must be OPERABLE in the OPERATING, HOT STANDBY, HOT SHUTDOWN, and INTERMEDIATE SHUTDOWN MODES (RCS > 200°F), and during movement of recently irradiated fuel assemblies.

The Applicability for the CRPAR System actuation on the Safety Injection function is specified in TS Table 3.5-3.

ACTIONS

When the reactor coolant system is greater than 200°F, if one radiation monitor channel is inoperable 7 days are permitted to restore it to OPERABLE status. The 7-day completion time is the same as is allowed if one train of the mechanical portion of the CRPAR system is inoperable. The basis for this completion time is twofold, 1) the same as that provided in TS 3.12.b, and 2) there is additional protection against the applicable accidents. The first level of additional protection is provided by the manual actuation of the control room post-accident recirculation system in the recirculation mode. Credit can be reasonably taken for manual actuation as control room personnel can detect and confirm the presence of unusual levels of radiation, based on other plant radiation monitors, at the radiation monitoring panel located in the control room. The panel has both alarm and recording functions. Radiation elements, which input to this panel, are installed to monitor areas and processes including the reactor coolant system, the containment, the fuel handling area, and the control room area, as well as other areas where the potential exists for significant dose rates. The second additional protection is the spent fuel pool sweep system. The spent fuel pool sweep system will entrain the fuel handling accident effluents in an air stream that is HEPA filtered and then directed to the auxiliary, building vent header. Upon a high radiation signal at the auxiliary building vent header, the spent fuel pool sweep system aligns itself to charcoal filters as well as the HEPA filters, thus reducing the effects of the postulated accident.

If the channel cannot be restored to OPERABLE status, one CRPAR system train must be placed in the emergency radiation protection mode of operation. This accomplishes the actuation instrumentation function and places the unit in a conservative mode of operation.

When recently irradiated fuel assemblies are being moved and R-23 becomes inoperable then movement of recently irradiated fuel assemblies must be suspended immediately to reduce the risk of accidents that would require CR isolation and CRPAR system actuation. Alternatively, the

control room may be isolated and one train of the CRPAR system may be placed in the emergency mode. This ensures the control room isolation and CRPAR functions are performed.

Depending on plant conditions and evolutions in progress when R-23 is made or found inoperable one or both of the action requirements may be entered. If the reactor coolant system is greater than 200°F then action 'a' is entered. If recently irradiated fuel is being moved then action 'b' is entered. If the reactor coolant system is greater than 200°F and recently irradiated fuel is being moved then both actions 'a' and 'b' are entered.

BASIS - Control Room Post-Accident Recirculation System (TS 3.12)

The Control Room Post-Accident Recirculation System is designed to filter the Control Room atmosphere during Control Room isolation conditions. The Control Room Post-Accident Recirculation (CRPAR) System is designed to automatically start upon SIS or high radiation signal. The high radiation signal may be actuated by actual radiation levels or may be a simulated signal.

BACKGROUND

The control room envelope (CRE) provides a protected environment from which occupants can control the unit following an uncontrolled release of radioactivity, hazardous chemicals, or smoke.

The CRE protected environment is provided by a control room envelope boundary and a control room post-accident recirculation system. These features consist of two redundant post-accident recirculation trains that re-circulate and filter the air in the CRE and a CRE boundary that limits the inleakage of unfiltered air. Each control room post-accident recirculation train consists of a prefilter, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, dampers, doors, barriers, and instrumentation also form part of the system.

The CRE is the area within the confines of the CRE boundary that contains the spaces that control room occupants inhabit to control the unit during normal and accident conditions. This area encompasses the control room, relay room, and control room equipment room. The CRE is protected during normal operation, natural events, and accident conditions. The CRE boundary is the combination of walls, floor, roof, ducting, doors, penetrations, and equipment that physically form the CRE. The OPERABILITY of the CRE boundary must be maintained to ensure that the inleakage of unfiltered air into the CRE will not exceed the inleakage assumed in the licensing basis analysis of design basis accident (DBA) consequences to CRE occupants. The CRE and its boundary are defined in the Control Room Envelope Habitability Program.

The CRPAR system is an emergency system, parts of which may also operate during normal unit operation. Upon receipt of an actuating signal(s), normal air supply to the CRE is isolated, the control room ventilation system goes to full recirculation, and a portion of the stream of ventilation air is recirculated through the CRPAR system filter trains. The prefilters remove any large particles in the air, to prevent excessive loading of the HEPA filters and charcoal adsorbers.

Actuation of the CRPAR system places the control room ventilation system in the isolation and recirculation state, the emergency mode of operation. Control room ventilation isolation actuation closes the unfiltered outside air intake and unfiltered exhaust dampers, and aligns the system for recirculation of the air within the CRE passing a portion of the recirculated air through the redundant trains of HEPA and the charcoal filters.

A radiation detector continuously monitors the air entering the control room. Radiation detector output above the setpoint will cause actuation of the emergency isolation and re-circulation function.

Normally open isolation dampers are arranged in series pairs so that the failure of one damper to shut will not result in a breach of isolation. The CRPAR system is designed in accordance with Seismic Category I requirements.

APPLICABLE SAFETY ANALYSES

The CRPAR system components are arranged in redundant, safety related ventilation trains. The location of components and ducting within the CRE ensures an adequate supply of filtered air to all areas requiring access. The CRPAR system provides airborne radiological protection for the CRE occupants, as demonstrated by the CRE occupant dose analyses for the most limiting design basis accident fission product release presented in the USAR, Chapter 14. [(1)]

The CR ventilation system provides protection, if necessary, from smoke and hazardous chemicals to the CRE occupants. The analysis of hazardous chemical releases determined that the toxicity limits for the chemicals of concern (hydrazine, dimethylamine, morpholine, and isopropyl alcohol) are not exceeded at the control room air intake and therefore in the CRE following a hazardous chemical release [(2)]. The evaluation of a smoke challenge demonstrates that it will not result in the inability of the CRE occupants to control the reactor either from the control room or from the remote shutdown panels [(3)].

The worst-case single active failure of a component in the CRPAR system, assuming a loss of offsite power, does not impair the ability of the system to perform its design function.

The CRPAR system satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) because it is a system that is part of the primary success path which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

LCO

Two independent and redundant CRPAR system trains are required to be OPERABLE to ensure that at least one is available if a single active failure disables the other train. Total system failure, such as from a loss of both ventilation trains or from an inoperable CRE boundary could result in exceeding a dose of 5 rem whole body or its equivalent to any part of the body, or 5 rem TEDE to the CRE occupants in the event of a large radioactive release.

Each CRPAR train is considered OPERABLE when the individual components necessary to limit CRE occupant exposure are OPERABLE. A CRPAR train is OPERABLE when the associated:

a. Fan is OPERABLE,

b. HEPA filters and charcoal adsorbers are not excessively restricting flow, and are capable of performing their filtration functions, and

c. Prefilter, ductwork, and dampers are OPERABLE, and air circulation can be maintained.

In order for the CRPAR trains to be considered OPERABLE, the CRE boundary must be maintained such that the CRE occupant dose from a large radioactive release does not exceed the calculated

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(1) USAR Chapter 14, Safety Analysis

(2) Letter from Craig W. Lambert (NMC) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability - Supplemental Response, dated April 1, 2005 (NRC-05-040)

(3) Letter from Craig W. Lambert (NMC) to Document Control Desk (NRC), "Generic Letter 2003-01: Control Room Habitability - Supplemental Response, dated April 1, 2005 (NRC-05-040)

dose in the licensing basis consequence analyses for DBAs, and that CRE occupants are protected from hazardous chemicals and smoke.

A Note allowing the CRE boundary to be opened intermittently under administrative controls modifies the specification. This Note only applies to openings in the CRE boundary that can be rapidly restored to the design condition, such as doors, hatches, floor plugs, and access panels. For entry and exit through doors, the administrative control of the opening is performed by the person(s) entering or exiting the area. For other openings, these controls consist of stationing a dedicated individual at the opening who is in continuous communication with the operators in the CRE. This individual will have a method to rapidly close the opening and to restore the CRE boundary to a condition equivalent to the design condition when a need for CRE isolation is indicated.

APPLICABILITY

TS 3.12.a

If the reactor coolant system is > 200°F, and during movement of recently irradiated fuel assemblies, the CRPAR system and control room envelope boundary must be OPERABLE to ensure that the CRE will remain habitable during and following a DBA.

During movement of recently irradiated fuel assemblies, the CRPAR system must be OPERABLE to cope with the release should a fuel handling accident occur involving recently irradiated fuel. The CRPAR system is only required to be OPERABLE during fuel handling involving recently irradiated fuel assemblies (i.e., fuel assemblies that have occupied part of a critical reactor core within the previous [X] days), due to radioactive decay. The determination of the number of days, [x], is based on radiological accident analyses using fuel that has occupied part of a critical reactor core, allowed to decay for specific number of days. Using the radioactive source term from these assemblies, after decaying [x] days, if the dose consequence results are well within the guideline values specified in 10 CFR 50.67, as modified by Regulatory Guide 1.183 [(4)], without crediting containment closure capability, CRPAR system operability, or control room envelope boundary capability, recently would be defined as those irradiated assembles decaying less than [x] days. Until analysis is performed to determine a specific time, the term recently is defined as all irradiated fuel assemblies.

ACTIONS

TS 3.12.b and TS 3.12.d

When one CRPAR train is inoperable, for reasons other than an inoperable CRE boundary, action must be taken to restore OPERABLE status within 7 days. In this condition, the remaining OPERABLE CRPAR train is adequate to perform the CRE occupant protection function. However, the overall reliability is reduced because a failure in the OPERABLE CRPAR train could result in loss of CRPAR system function. The 7 day completion time is based on the low probability of a DBA occurring during this time period, and ability of the remaining train to provide the required capability.

If the unfiltered inleakage of potentially contaminated air past the CRE boundary and into the CRE can result in CRE occupant radiological dose greater than the calculated dose of the licensing basis analyses of DBA consequences (allowed to be up to 5 rem TEDE), or inadequate protection of CRE

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(4) NRC Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors.

occupants from hazardous chemicals or smoke, the CRE boundary is inoperable. Actions must be taken to restore an OPERABLE CRE boundary within 90 days.

During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on CRE occupants from the potential hazards of a radiological or chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24-hour completion time is reasonable based on the low probability of a DBA occurring during this period, and the use of mitigating actions. The 90-day completion time is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability that CRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 90-day completion time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary.

TS 3.12.c

When the reactor coolant system is > 200°F, if the inoperable CRPAR system train or the CRE boundary cannot be restored to OPERABLE status within the required completion time, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least HOT SHUTDOWN within 12 hours and COLD SHUTDOWN within the subsequent 36 hours. The allowed completion times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

When the reactor coolant system is > 200°F, if both CRPAR system trains are inoperable, for reasons other than an inoperable CRE boundary, the CRPAR system may not be capable of performing the intended function and the unit is in a condition outside the accident analyses. Therefore, the unit must be shutdown immediately.

TS 3.12.e

During movement of recently irradiated fuel assemblies, if the inoperable CRPAR system train cannot be restored to OPERABLE status within the required completion time, action must be taken to immediately place the OPERABLE CRPAR train in the emergency mode. This action ensures that the remaining train is OPERABLE, that no failures preventing automatic actuation will occur, and that any active failure would be readily detected.

An alternative to placing the OPERABLE CRPAR train in the emergency mode is to immediately suspend activities that could result in a release of radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

TS 3.12.f

During movement of recently irradiated fuel assemblies, with two CRPAR trains inoperable action

must be taken immediately to suspend activities that could result in a release of radioactivity that might require isolation of the CRE. This places the unit in a condition that minimizes the accident risk. This does not preclude the movement of fuel to a safe position.

BASIS

Control Room Post-Accident Recirculation System

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."

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

SURVEILLANCE REQUIREMENTS (SR)

TS 4.17.a.1

Pressure drop across the combined HEPA filters and charcoal adsorbers of less than 6 inches of water and 4 inches across any HEPA filter bank at the system design flow rate (± 10%) will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. A filter test frequency of once per operating cycle establishes system performance capability.

TS 4.17.a.2

Demonstration of the automatic initiation capability is necessary to assure system performance capability. This SR verifies that each CRPAR train starts and operates on an actual or simulated actuation signal. The frequency of once per operating cycle or once every 18 months is consistent with the typical refueling cycle.

TS 4.17.b.1

The frequency of once per operating cycle or once every 18 months is consistent with the typical refueling cycle.

TS 4.17.b.2

Any HEPA filters found defective should be 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 adsorber could become contaminated from the fumes, chemicals, or foreign materials, the same tests and sample analysis should be performed as required for operational use.

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 two 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.

TS 4.17.b.3

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 two 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.

TS 4.17.b.4

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. The monthly frequency is based on the reliability of the equipment and the two-train redundancy.

TS 4.17.c

This surveillance requirement verifies the OPERABILITY of the CRE boundary by testing for unfiltered air inleakage past the CRE boundary and into the CRE. The details of the testing are specified in the Control Room Envelope Habitability Program.

The CRE is considered habitable when the radiological dose to CRE occupants calculated in the licensing basis analyses of DBA consequences is no more than 5 rem TEDE and the CRE occupants are protected from hazardous chemicals and smoke. This surveillance requirement verifies that the unfiltered air inleakage into the CRE is no greater than the flow rate assumed in the licensing basis analyses of DBA consequences. When unfiltered air inleakage is greater than the assumed unfiltered inleakage flow rate, TS 3.12.b.2 must be entered. TS 3.12.b.2 allows time to restore the CRE boundary to OPERABLE status provided mitigating actions can ensure that the CRE remains within the licensing basis habitability limits for the occupants following an accident. Compensatory measures are discussed in Regulatory Guide 1.196, Section C.2.7.3, which endorses, with exceptions, NEI 99-03, Section 8.4 and Appendix F. These compensatory measures may also be used as mitigating actions as required by TS 3.12.b.2. Temporary analytical methods may also be used as compensatory measures to restore OPERABILITY. Options for restoring the CRE boundary to OPERABLE status include changing the licensing basis DBA consequence analysis, repairing the CRE boundary, or a combination of these actions. Depending upon the nature of the problem and the corrective action, a full scope inleakage test may not be necessary to establish that the CRE boundary has been restored to OPERABLE status.

TS 4.17.d

The accident analysis assumes a charcoal adsorber efficiency of 90%.[1] To ensure the charcoal adsorbers maintain that efficiency throughout the operating cycle, a safety factor of 2 is used. Therefore, if the accident analysis assumes a charcoal adsorber efficiency of 90%, this equates to a methyl iodide penetration of 10%. If a safety factor of 2 is assumed, the methyl iodide penetration is reduced to 5%. Thus, the acceptance criteria of 95% efficient will be used for the charcoal adsorbers.

Although committing to ASTM D3803-89, it was recognized that ASTM D3803-89 references Military

(1) USAR TABLE 14.3-8, "Major Assumptions for Design Basis LOCA Analysis"

Standards MIL-F-51068D, "Filter, Particulate High Efficiency, Fire Resistant," and MIL-F-51079A, "Filter, Medium Fire Resistant, High Efficiency." These standards 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.

ATTACHMENT 6

LICENSE AMENDMENT 210
TECHNICAL SPECIFICATION MODIFICATIONS REGARDING CONTROL ROOM ENVELOPE HABITABILITY

ANNOTATED MARKED-UP TS PAGES BY ITEM DESIGNATIONS

KEWAUNEE POWER STATION

DOMINION ENERGY KEWAUNEE, INC.

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	FUNCTIONAL UNIT	NO. OF CHANNELS	NO. OF CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	MINIMUM DEGREE OF REDUNDANCY	PERMISSIBLE BYPASS CONDITIONS	OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
1	Containment Isolation						
	a. Safety Injection	Refer to Item No. 1 of Table TS 3.5-3					HOT SHUTDOWN[1]
	b. Manual	2	1	1	-		HOT SHUTDOWN
2	Steam Line Isolation						
	a. Hi-Hi Steam Flow with Safety Injection	2/loop	1	1	-		HOT SHUTDOWN[1]
	b. Hi Steam Flow and 2 of 4 Lo-Lo T_{avg} with Safety Injection	2/loop	1	1	-		HOT SHUTDOWN[1]
	c. Hi-Hi Containment Pressure	3	2	2	-		HOT SHUTDOWN[1]
	d. Manual	1/loop	1/loop	1/loop	-		HOT SHUTDOWN

[1] If minimum conditions are not met within 24 hours, steps shall be taken to place the plant in a COLD SHUTDOWN condition.

Item 4.0

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	**FUNCTIONAL UNIT**	**NO. OF CHANNELS**	**NO. OF CHANNELS TO TRIP**	**MINIMUM OPERABLE CHANNELS**	**MINIMUM DEGREE OF REDUNDANCY**	**PERMISSIBLE BYPASS CONDITIONS**	**OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET**
3	Containment Ventilation Isolation						
	a. High Containment Radiation	2	1	1	-	-	These channels are not required to activate containment ventilation isolation when the containment purge and ventilation system isolation valves are maintained closed.[(2)]
	b. Safety Injection	Refer to Item 1 of Table TS 3.5-3					
	c. Containment Spray	Refer to Item 3 of Table TS 3.5-3					
4	Main Feedwater Isolation						
	a. Hi-Hi Steam Generator Level	3	2	2	1		HOT SHUTDOWN

[(2)] The detectors are required for Reactor Coolant System leak detection as referenced in TS 3.1.d.5.

Item 4.0

TABLE TS 3.5-4

INSTRUMENT OPERATING CONDITIONS FOR ISOLATION FUNCTIONS

		1	2	3	4	5	6
NO.	FUNCTIONAL UNIT	NO. OF CHANNELS	NO. OF CHANNELS TO TRIP	MINIMUM OPERABLE CHANNELS	MINIMUM DEGREE OF REDUNDANCY	PERMISSIBLE BYPASS CONDITIONS	OPERATOR ACTION IF CONDITIONS OF COLUMN 3 OR 4 CANNOT BE MET
5	Control Room Isolation						
	a. Safety Injection	Refer to Item 1 of Table TS 3.5-3					
	b. R-23	1	1	1			If the Reactor Coolant System is > 200°F (a) If handling recently irradiated fuel (b)

(a) Either 1) within 7 days close the control room air conditioning isolation dampers and place one train of control room post-accident recirculation in operation, or 2) follow the actions of TS 3.12.c for one train of CPRAR inoperable for greater than 7 days.

(b) Immediately suspend handling of recently irradiated fuel assemblies, or close the control room ventilation isolation dampers and place one train of control room post-accident recirculation in operation.

Item 3.0

~~Amendment No. 102~~LAR 210
~~10/18/93~~

3.12 CONTROL ROOM POST-ACCIDENT RECIRCULATION SYSTEM

APPLICABILITY

Applies to the OPERABILITY of the Control Room Post-Accident Recirculation System.

OBJECTIVE

To specify OPERABILITY requirements for the Control Room Post-Accident Recirculation System.

Item 1.0

Item 2.1

SPECIFICATION

Note: The control room envelope (CRE) boundary may be opened intermittently under administrative control.

a. The reactor coolant system shall not be heated above 200°F made critical or recently irradiated fuel moved, unless both trains of the Control Room Post-Accident Recirculation System are OPERABLE, except as allowed by TS 3.12.b, TS 3.12.d, TS 3.12.e, and TS 3.12.f.

Item 2.2

Item 2.3

b. When the reactor coolant system is > 200°F, the following conditions of inoperability may exist during the time intervals specified:

Current TS & Item 4.0

1. One control room post-accident recirculation train may be inoperable for 7 days, except as provided by TS 3.12.b.2.

2. One or more control room post-accident recirculation train(s) may be inoperable, due to an inoperable control room envelope boundary, for 90 days provided:

Item 1.0

A. Actions are immediately initiated to implement mitigating actions, and

B. Within 24 hours, implemented mitigative actions are verified as ensuring control room envelope occupant exposures to radiological, chemical, and smoke hazards will not exceed limits.

c. When the reactor coolant system is > 200°F, if the requirements of TS 3.12.b cannot be met within the times specified or if two control room post-accident recirculation trains are inoperable for any reason other than an inoperable control room envelope boundary then within 1 hour action shall be initiated to:

Current TS & Item 4.0

- Achieve HOT SHUTDOWN within 12 hours, and

- Achieve COLD SHUTDOWN within an additional 36 hours.

Item 2.2

d. During movement of recently irradiated fuel, one control room post-accident recirculation train may be inoperable for 7 days.

e. If, during movement of recently irradiated fuel, the requirements of TS 3.12.d cannot be met within the times specified then immediately either:

Item 2.3

1. Place the OPERABLE control room post-accident recirculation train in the emergency mode of operation, or

2. Suspend movement of recently irradiated fuel assemblies

f. If, during movement of recently irradiated fuel, two control room post-accident recirculation trains are inoperable or the inoperability is due to an inoperable CRE boundary, immediately:

1. Place any suspended recently irradiated fuel assembly in a safe condition, then

2. Cease any further movement of recently irradiated fuel assemblies.

Item 2.3

g. Both trains of the Control Room Post-Accident Recirculation System, including filters, shall be OPERABLE or the reactor shall be shut down within 12 hours, except that when one of the two trains of the Control Room Post-Accident Recirculation System is made or found to be inoperable for any reason, reactor operation is permissible only during the succeeding 7 days.

Item 1.0

c. During testing the system shall meet the following performance requirements:

1. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filter and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal.

2. The results of the laboratory carbon sample analysis from the Control Room Post-Accident Recirculation System carbon shall show ≥ 95% radioactive methyl iodide removal when tested in accordance with ASTM D3803-89 at conditions of 30°C, and 95% RH.

3. Fans shall operate within ±10% of design flow when tested.

4.17 CONTROL ROOM POSTACCIDENT RECIRCULATION SYSTEM

APPLICABILITY

Applies to testing and surveillance requirements for the Control Room Post-accident Recirculation System in TS 3.12.

OBJECTIVE

To verify the performance capability of the Control Room Post-accident Recirculation System.

SPECIFICATION

a. At least once per operating cycle or once every 18 months, whichever occurs first, the following conditions shall be demonstrated:

Item 2.4

1. Pressure drop across the combined HEPA filters and charcoal adsorber banks is < 6 inches of water and the pressure drop across any HEPA bank is < 4 inches of water at the system design flow rate (± 10%).

2. ~~Automatic~~ initiation of each train~~the system~~ on an actual or simulated ~~high radiation signal and a safety injection~~ actuation signal.

b. 1. The in-place DOP test for HEPA filters shall be performed (1) at least once per 18 months and (2) after each complete or partial replacement of a HEPA filter bank or after any maintenance on the system that could affect the HEPA bank bypass leakage.

2. The laboratory tests for activated carbon in the charcoal filters shall be performed (1) at least once per 18 months for filters in a standby status or after 720 hours of filter operation, and (2) following painting, fire, or chemical release in any ventilation zone communicating with the system.

Item 1.0

3. Halogenated hydrocarbon testing shall be performed after each complete or partial replacement of a charcoal adsorber bank or after any maintenance on the system that could affect the charcoal adsorber bank bypass leakage.

4. Each train shall be operated at least 10 hours each month.

c. Perform required control room envelope unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program (TS 6.23).

d. During testing the system shall meet the following performance requirements:

1. The results of the in-place cold DOP and halogenated hydrocarbon tests at design flows on HEPA filter and charcoal adsorber banks shall show ≥ 99% DOP removal and ≥ 99% halogenated hydrocarbon removal.

2. The results of the laboratory carbon sample analysis from the Control Room Post-Accident Recirculation System carbon shall show ≥ 95% radioactive methyl iodide removal when tested in accordance with ASTM D3803-89 at conditions of 30°C, and 95% RH.

3. Fans shall operate within ±10% of design flow when tested.

Item 4.0

6.23 CONTROL ROOM ENVELOPE HABITABILITY PROGRAM

A Control Room Envelope (CRE) Habitability Program shall be established and implemented to ensure that CRE habitability is maintained such that, with an OPERABLE Control Room Post Accident Recirculation System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. The program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of 5 rem total effective dose equivalent (TEDE) for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and the CRE boundary.

b. Requirements for maintaining the CRE boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for:

   (i) determining the unfiltered air inleakage past the CRE boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and

   (ii) assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

d. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

e. The provisions of TS 4.0.b are applicable to the Frequencies for assessing CRE habitability, determining CRE unfiltered inleakage, and assessing the CRE boundary as required by paragraph c.

Item 1.0

ATTACHMENT 7

LICENSE AMENDMENT 210
TECHNICAL SPECIFICATION MODIFICATIONS REGARDING CONTROL ROOM ENVELOPE HABITABILITY

GAS DECAY TANK AND VOLUME CONTROL TANK RADIOLOGICAL ACCIDENT ANALYSIS

KEWAUNEE POWER STATION

DOMINION ENERGY KEWAUNEE, INC

Kewaunee Control Room Radiological Analysis for the Gas Decay Tank (GDT) and Volume Control Tank (VCT) Rupture

Overview

Dominion Energy Kewaunee, Inc. (DEK) has revised the control room radiological analysis for the Gas Decay Tank (GDT) and Volume Control Tank (VCT) Rupture events. This analysis demonstrates that acceptable radiological dose consequences for the control room operators are achieved without crediting the control room envelope boundary (CREB), control room post-accident recirculation (CRPAR) system operation or control room isolation. The revised radiological accident analyses of a GDT or a VCT rupture reported in this attachment determined that the CREB, CRPAR systems and control room isolation are not required for the GDT or VCT rupture event mitigation and acceptable GDT and VCT analysis results. This calculation is applicable to the current plant design at its current rated power level of 1772 MWth.

Background

The following radiological accidents are the design basis accidents (DBAs) for the Kewaunee Power Station (KPS):

- Main steam line break (MSLB)
- Locked reactor coolant pump (RCP) rotor
- Rod ejection (RE)
- Steam generator tube rupture (SGTR)
- Large-break loss-of-coolant accident (LBLOCA)
- Waste gas decay tank (GDT) rupture
- Volume control tank (VCT) rupture
- Fuel-handling accident (FHA)

Alternate Source Term (AST) analytical methods and assumptions outlined in Regulatory Guide 1.183 were approved for KPS in license amendment #166 (Reference 1). The radiological accident analyses performed for the KPS stretch power uprate followed the approved methodology from the AST license amendment. The radiological accident analyses for the stretch power uprate were approved as part of the stretch power uprate license amendment # 172 (Reference 2).

Tracer gas in-leakage tests were performed in December 2004 by NUCON International Inc. The amount of air in-leakage into the control room emergency zone (CREZ) was evaluated using the concentration decay method under isolated conditions. This test was based on ASTM E 741 and conducted to ensure compliance with the US NRC Generic Letter 2003-01. KPS's response to Generic Letter 2003-01 (Reference 3) addressed the Generic Letter 2003-01 request to perform the ASTM E741 testing and, provided the requested response to Generic Letter Item 1(a). ASTM E741 baseline testing results were provided to the NRC in Enclosure 1 of Reference 3.

Two concentration decay tests were performed to determine total unfiltered in-leakage, one with control room post-accident recirculation (CRPAR) Train A operating, and one with CRPAR Train B operating. The following results were obtained for total unfiltered in-leakage (UFI) to the three rooms contained in the control room envelope.

Table 1

Control Room Emergency Zone Inleakage Test Results

Date of Test	Train Tested	Total Inleakage
14 December 2004	CRPAR Train A	409 ± 29 cfm
15 December 2004	CRPAR Train B	447 ± 51 cfm

The test results showed that the CREZ UFI was greater than that assumed in the radiological accident analysis (RAA) approved in license amendment 172. As an interim measure, administrative restrictions were placed on other RAA input assumptions to ensure the CREZ remained operable. The resolution to this non-conforming condition was to permanently incorporate the increase in assumed CREZ UFI into the RAA. The increase in the assumed control room unfiltered in-leakage was determined to be a facility change that caused an increase in the dose consequences of the approved RAA. Therefore, license amendment request (LAR) LAR 211 (Reference 4) was submitted for approval as required by 10 CFR 50.59 (c)(2) but did not include proposed modifications to the GDT or VCT rupture accident analysis. In March of 2007, the NRC approved KPS proposed LAR 211 as KPS License Amendment 190 (Reference 5).

Because the limiting unfiltered inleakage assumed in the GDT and VCT rupture analysis approved by License Amendment 172 was 0 cfm, the increase in unfiltered inleakage was bounded and the GDT and VCT rupture analysis approved under license amendment 172 remained bounding. Therefore, the current analysis of record for the GDT rupture and the VCT tank rupture is that approve under KPS license amendment 172.

During the development of the license amendment request (LAR) adopting TSTF-448-A, a question arose concerning the modes of applicability for CRPAR system operability and control room envelope boundary operability. NUREG-1431, "Standard Technical Specifications, Westinghouse Plants, Specification 3.7.10, "Control Room Emergency Filtration System (CREFS)," Applicability states MODES 1, 2, 3, 4, [5, and 6]. NUREG-1431 states that in [MODE 5 or 6], the CREFS (CREFS is a system similar to KPS CRPAR) is required to cope with the radiological release from the rupture of an outside waste gas tank. KPS does not have an outside waste gas decay tank. To limit the modes of applicability for the operability of the CRPAR system and control room envelope boundary to modes similar to NUREG-1431 MODES 1, 2, 3, and 4 (KPS MODES OPERATING, HOT STANDBY, HOT SHUTDOWN, and INTERMEDIATE SHUTDOWN) DEK performed an analysis of the KPS GDT or VCT rupture events without crediting the CRPAR system and the control room envelope boundary. This analysis demonstrates that the CRPAR system and the control room envelope boundary are not necessary to achieve acceptable results.

It should be noted that DEK has performed an analysis for the dose consequences to the control room occupants only. The analysis of the GDT rupture and VCT rupture verifying acceptable results of the dose consequences for the site boundary and the low population zone remain valid and unchanged and are the current analyses approved under KPS license amendment 172.

Computer Code

DEK used RADTRAD-NAI to perform the analysis. This computer code, "RADTRAD: Simplified Model for RADionuclide Transport and Removal And Dose Estimation," is the same code used by Dominion Energy Kewaunee to perform the radiological consequence calculations for the FHA AST radiological consequence analysis approved by the NRC in License Amendment 190 (Reference 6). RADTRAD-NAI also has been used and approved at other Dominion plants, such as Millstone 2 and 3 and North Anna.

Acceptance Criteria

In Amendment 172, "Issuance of Amendment Regarding Stretch Power Uprate," dated February 2004 (Reference 2), the NRC did not accept the dose acceptance criterion of 6.3 rem TEDE requested by KPS. Furthermore, Amendment 172 stated "the original licensing basis applies" for the dose acceptance criterion for the GDT and VCT rupture accident. Therefore the KPS licensing basis acceptance criteria for the radiological accident consequences of a GDT or VCT rupture to control room occupants is 5 rem whole body, 30 rem thyroid, and 30 rem beta skin in accordance with GDC 19 and SRP 6.4.

Inputs and Assumptions

The following inputs apply to both accidents:

1. Control room breathing rate is constant at 3.47E-04 m3/sec.
2. No reduction in occupancy factor for the control room is credited.
3. Control room emergency volume is 127,600 ft3.
4. Control room unfiltered makeup air is 2,500 cfm. This value is conservatively increased by 10% to 2,750 cfm for use in the analysis to maximize the activity entering the control room.
5. Control room atmospheric dispersion factor for the release duration is 2.93E-3 sec/m3
6. Minimum measured unfiltered inleakage air flow is 409 $\pm$ 29 cfm.
7. Maximum CREZ unfiltered inleakage air flow is 1500 cfm.
8. Initial radiological activities are unchanged from Amendment 172 and are given in Tables 2 and 3.

The following input applies only to the GDT rupture.

1. The release from the GDT rupture occurs at a rate such that the tank activity is released over a period of 2 hours in accordance with Safety Guide 1.24.

The following inputs apply only to the VCT rupture.

1. The VCT rupture release will consider the VCT activity plus the amount contained in 88 gpm of additional letdown flow before isolation.
2. The RCS mass is 1.192E+08 grams.
3. 1% of the iodines are released in the VCT rupture and letdown line leak analysis.
4. Although not required, the iodine concentration in the letdown flow is based on a pre-accident iodine spike of 60 uCi/gm dose equivalent I-131. See Table 3.
5. The letdown flow from the RCS to the atmosphere is through demineralizers. A demineralizer decontamination factor (DF) of 10 is used in the analysis.

The inventory of gases in the tank are based on operation of the plant with 1 percent fuel defects and with no purge of activity from the VCT to the GDT during the cycle, followed by shutdown of the plant and degassing of the primary coolant to the tank. The gas decay tank inventory resulting from this unit shutdown degassing process is provided in Table 2. The VCT nuclide inventory is also provided in Table 2. The

nuclide concentration in the RCS, including a 60 uCi/gm iodine spike, is provided in Table 3. Note that the KPS TS limit the iodine spike to 20 uCi/gm.

It is assumed that the control room HVAC system begins in normal-operation mode. Various control room isolation times and unfiltered inleakage amounts are assumed to determine the most limiting results. Control room filtered recirculation is not assumed to operate

Changes from Current Basis

The following changes have been made to the GDT rupture analysis.

1) The release duration is extended from 5 minutes to 2 hours in accordance with Safety Guide 1.24.
2) No credit for the control room envelope boundary (CREB), automatic operation of the control room post-accident recirculation (CRPAR) system operation or automatic control room isolation.
3) If control room isolation occurred, control room inleakage varied from 200 cfm to 1500 cfm to calculate limiting dose consequences. The minimum value was conservatively chosen based on tracer gas testing results.

The following changes have been made to the VCT rupture analysis.

1) The isolation of the letdown portion of the VCT rupture was conservatively extended to 30 minutes from 5 minutes.
2) No credit for the control room envelope boundary (CREB), automatic operation of the control room post-accident recirculation (CRPAR) system operation or automatic control room isolation.
3) If control room isolation occurred, control room inleakage varied from 200 cfm to 1500 cfm to calculate limiting dose consequences. The minimum value was conservatively chosen based on tracer gas testing results.

Various RADTRAD runs were made that vary the isolation time of the control room, including no isolation. The results show that R-23, or any radiation monitor, is not needed to isolate the control room in the event of a GDT or VCT rupture to ensure doses remain below 5 rem whole body, 30 rem thyroid and 30 rem beta skin. To account for manual action that may be taken to isolate the control room following a GDT or VCT rupture, the analysis varied control room isolation times to demonstrate doses will remain below regulatory limits. Additionally, the analysis shows that control room filtered recirculation is not required to ensure control room doses remain below 5 rem whole body or equivalent in accordance with GDC 19.

Results and Conclusions

Table 4 provides the limiting control room dose results for the GDT and VCT rupture accidents to the control room operators for the limiting case. The results show that the control room does not need to be isolated and the CRPAR ventilation system is not required to be available to meet the dose acceptance criteria in the KPS licensing basis.

The dose consequences listed in Table 4 for the limiting GDT and VCT rupture analyses also meet the dose acceptance criteria set forth in 10CFR50, Appendix A, GDC 19 (GDC-19) and SRP 6.4 for the control room assuming no automatic control room isolation and the unavailability of the CRPAR system. Therefore automatic control room isolation and post accident ventilation are not required for the GDT and VCT rupture analyses.

Table 2:
Assumptions Used for GDT and VCT Rupture Dose Analyses

Nuclide	GDT Activity (Ci)	VCT Activity (Ci)
Kr-85m	85.3	62.9
Kr-85	2390	735
Kr-87	15.8	16.4
Kr-88	108	88.5
Xe-131m	520	207
Xe-133m	476	221
Xe-133	38,500	16,200
Xe-135m	27.8	27.9
Xe-135	668	452
Xe-138	1.84	1.94
I-131	0.869	0.869
I-132	0.885	0.885
I-133	1.30	1.30
I-134	0.179	0.179
I-135	0.709	0.709

	Current [a]	New
Reactor coolant noble gas activity prior to accident (% fuel defect level)	1.0	1.0
Reactor coolant iodine activity prior to accident (μCi/gm of DEI - 131)	60.0	60.0

Release Modeling	Current [a]	New
Time to release all GDT activity	5 minutes	2 hours
Time to release all VCT activity (min) *5*	5 minutes	5 minutes
Letdown flowrate to VCT (gpm)	80 +10%	80 +10%
Letdown demineralizer decontamination factor	10	10
Time to isolate letdown flow (min)	5	30
Time to start crediting emergency control room HVAC (min)	0.5	N/A

[a] Note: current values taken from Reference (7)

Table 3 Letdown Flow Concentration		
Nuclide		Concentration (μCi/gm)
Kr-85m		1.73
Kr-85		8.60
Kr-87		1.13
Kr-88		3.28
Xe-131m		3.04
Xe-133m		3.44
Xe-133		242.0
Xe-135m		0.501
Xe-135		8.69
Xe-138		0.628
I-131		46.8 [a]
I-132		47.6 [a]
I-133		69.8 [a]
I-134		9.7 [a]
I-135		38.2 [a]

(a) Although not required, iodine concentration is based on a pre-accident iodine spike of 60 μCi/gm dose equivalent I-131.

Table 4 Control Room Dose Results (rem)			
Accident	Whole Body	Thyroid	Skin
GDT Rupture	2.6E-01	N/A	2.1E+01
VCT Rupture	2.2E-01	6.1E+00	1.6E+01

NRC Acceptance Criteria (rem)			
SRP 6.4, Rev 2 (Reference 8)	5.0	30.0	30.0

Attachment 7 References

1 Letter from John Lamb (NRC) to Tom Coutu (NMC), "Kewaunee Nuclear Power Plant - Issuance of Amendment Regarding Implementation of Alternate Source Term (TAC NO. MB4596)," dated March 17, 2003. (ADAMS Accession No. ML030210062)

2. Letter from John G. Lamb (NRC) to Thomas Coutu (NMC), "Kewaunee Nuclear Power Plant - Issuance of Amendment Regarding Stretch Power Uprate (TAC NO. MB9031), dated February 27, 2004. (ADAM Accession No. ML040430633)

3. Letter from Craig Lambert (NMC) to USNRC, "Generic Letter 2003-01, Control Room Habitability-Supplemental Response," dated April 1, 2005. (ADAMS Accession No. ML050970303)

4. Letter from Leslie N. Hartz (DEK) to Document Control Desk (NRC), "License Amendment Request 211, 'Radiological Accident Analysis and Associated Technical Specifications Change,'" dated January 30, 2006. (ADAMS Accession No. ML060540217)

5. Letter from Robert F. Kuntz (NRC) to David A. Christian (DEK), "Kewaunee Power Station - Issuance of Amendment Re: Radiological Accident Analysis and Associated Technical Specifications Change (TAC NO. MC9715)," dated March 8, 2007. (ADAMS Accession No. ML070430020)

6. Letter from Robert F. Kuntz (NRC) to David A. Christian (DEK), "Kewaunee Power Station - Issuance of Amendment Re: Radiological Accident Analysis and Associated Technical Specifications Change (TAC No. MC9715)," dated March 3, 2007. (ADAMS Accession No. ML070430020)

7. Letter from Thomas Coutu (NMC) to Document Control Desk (NRC), "License Amendment Request 195, Application for Stretch Power Uprate for Kewaunee Nuclear Power Plant," dated February 28, 2003, Topical Report WCAP-16040-NP, NSSS & BOP Licensing Report," Tables 6.67 through 8.0. (ADAMS Accession No. ML031530424)

8. US NRC NUREG 0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 6.4, "Control Room Habitability System," Revision 2.