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Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
IndianaMichiganPower.com

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AEP-NRC-2016-56
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Docket Nos. 50-315
50-316

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

Donald C. Cook Nuclear Plant Unit 1 and Unit 2
Response to Seventh Request for Additional Information Regarding the License Amendment
Request to Adopt TSTF-490 and Implement Alternative Source Term

References:

1. Letter from J. P. Gebbie, Indiana Michigan Power Company (I&M), to U. S. Nuclear Regulatory Commission (NRC), "Donald C. Cook Nuclear Plant, Units 1 and 2, License Amendment Request to Adopt TSTF-490, Revision 0, 'Deletion of E Bar Definition and Revision to Reactor Coolant System Specific Activity Technical Specification' and Implement Full-Scope Alternative Source Term," dated November 14, 2014, Agencywide Documents Access and Management System (ADAMS) Accession No. ML14324A209.
2. Letter from J. P. Gebbie, I&M, to NRC, "Donald C. Cook Nuclear Plant Unit 1 and Unit 2 - Supplemental Information for the License Amendment Request to Adopt TSTF-490, Revision 0, 'Deletion of E Bar Definition and Revision to Reactor Coolant System Specific Activity Technical Specification' and Implement Full-Scope Alternative Source Term," dated February 12, 2015, ADAMS Accession No. ML15050A247.
3. E-mail capture from A. W. Dietrich, NRC, to H. L. Kish, I&M, "D.C. Cook Units 1 and 2 – ARCB RAI Concerning LAR to Adopt TSTF-490 and Implement Full-Scope AST (CAC Nos. MF5184 and MF5185)," dated June 14, 2016.

This letter provides Indiana Michigan Power Company's (I&M), licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, response to the seventh Request for Additional Information (RAI) by the U. S. Nuclear Regulatory Commission (NRC) regarding a license amendment request (LAR) to adopt Technical Specification Task Force (TSTF)-490 and implement alternative source term (AST).

By Reference 1, as supplemented by Reference 2, I&M submitted a request to amend the Technical Specifications (TS) to CNP Units 1 and 2 Renewed Facility Operating Licenses DPR-58 and DPR-74. I&M proposes to adopt TSTF-490, Revision 0, and implement full scope AST radiological analysis methodology. By Reference 3, the NRC transmitted an RAI from the Radiation Protection

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and Consequence Branch (ARCB) regarding the LAR submitted by I&M in Reference 1. Telephone conferences were held between NRC staff and I&M on June 6, 2016, and June 13, 2016 to clarify the information requested.

Enclosure 1 to this letter provides an affirmation statement. Enclosure 2 to this letter provides I&M's response to the RAI contained in Reference 3, which resulted in changes to the marked up TS pages and TS Bases pages provided in Reference 1. The revised marked up TS and TS Bases pages are provided in the following additional enclosures to this letter:

- Enclosure 3, CNP Unit 1 TS Pages Marked to Show Proposed Changes
- Enclosure 4, CNP Unit 1 TS Bases Pages Marked to Show Proposed Changes (For Information Only)
- Enclosure 5, CNP Unit 2 TS Pages Marked to Show Proposed Changes.
- Enclosure 6, CNP Unit 2 TS Bases Pages Marked to Show Proposed Changes (For Information Only)

The revised marked up pages replace only the affected pages. All other marked up TS and TS Bases pages provided in Reference 1 remain valid. The No Significant Hazards Consideration determination provided in Reference 1 is not altered by this additional information.

Copies of this letter are being transmitted to the Michigan Public Service Commission and Michigan Department of Environmental Quality, in accordance with the requirements of 10 CFR 50.91.

There are no new regulatory commitments made in this letter. Should you have any questions, please contact Mr. Michael K. Scarpello, Regulatory Affairs Manager, at (269) 466-2649.

Sincerely,



Q. Shane Lies
Site Vice President

TLC/ml

Enclosures:

1. Affirmation
2. Response to Seventh Request for Additional Information Regarding the License Amendment Request to Adopt TSTF-490 and Implement Alternative Source Term
3. CNP Unit 1 TS Pages Marked to Show Proposed Changes
4. CNP Unit 1 TS Bases Pages Marked to Show Proposed Changes (For Information Only)
5. CNP Unit 2 TS Pages Marked to Show Proposed Changes
6. CNP Unit 2 TS Bases Pages Marked to Show Proposed Changes (For Information Only)

c: R. J. Ancona, MPSC
A. W. Dietrich, NRC, Washington, D.C.
MDEQ – RMD/RPS
NRC Resident Inspector
C. D. Pederson, NRC, Region III
A. J. Williamson, AEP Ft. Wayne, w/o enclosures

Enclosure 1 to AEP-NRC-2016-56

AFFIRMATION

I, Q. Shane Lies, being duly sworn, state that I am the Site Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this request with the U. S. Nuclear Regulatory Commission on behalf of I&M, and that the statements made and the matters set forth herein pertaining to I&M are true and correct to the best of my knowledge, information, and belief.

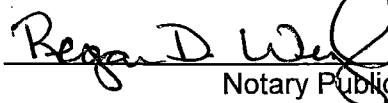
Indiana Michigan Power Company



Q. Shane Lies
Site Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 12th DAY OF July, 2016



Notary Public

My Commission Expires 01/21/2018

Enclosure 2 to AEP-NRC-2016-56

Response to Seventh Request for Additional Information Regarding the License Amendment Request to Adopt TSTF-490 and Implement Alternative Source Term

By letter dated November 14, 2014 (Reference 1), as supplemented by letter dated February 12, 2015 (Reference 2), Indiana Michigan Power Company (I&M), the licensee for the Donald C. Cook Nuclear Plant (CNP), Units 1 and 2, submitted a license amendment request. The proposed amendment consists of adoption of Technical Specifications Task Force (TSTF)-490, Revision 0, "Deletion of E Bar Definition and Revision to Reactor Coolant System Specific Activity Technical Specification," and implementation of a full scope alternative source term (AST) radiological analysis methodology.

The U. S. Nuclear Regulatory Commission (NRC) staff in the Radiation Protection and Consequence Branch (ARCB) of the Office of Nuclear Reactor Regulation is currently reviewing the submittal, as supplemented, and has determined that additional information is needed in order to complete the review (Reference 3). The text of the request for additional information (RAI) and I&M's response are provided below.

RAI-ARCB-10

The proposed change to the Donald C. Cook Nuclear Plant (CNP), Units 1 and 2, technical specification (TS) 3.4.16, in part, modifies Condition B to provide a Condition and Required Action for dose equivalent Xe-133 instead of gross specific activity. In the current TS 3.4.16, Condition A specifies that when dose equivalent I-131 is greater than 1.0 microcuries per gram ($\mu\text{Ci/gm}$), the required action is to restore dose equivalent I-131 to within limit, with a Completion Time of 48 hours. During this Condition, Limiting Condition for Operation (LCO) 3.0.4.c is applicable. If the dose equivalent I-131 is not restored within limit in 48 hours, the required action is to be in Mode 3 with average reactor coolant temperature (T_{avg}) less than 500 °F within 6 hours.

For the modified Condition B, the licensee proposes a Completion Time of 48 hours to restore dose equivalent Xe-133 within limits. A Note is also added allowing the applicability of LCO 3.0.4.c.

Technical Specification Task Force (TSTF)-490, Revision 0, provided the following justification for this change:

The Completion Time for revised TS 3.4.16 Required Action B.1 will require restoration of Dose Equivalent Xe-133 to within limit in 48 hours. This is consistent with the Completion Time for current Required Action A.2 for Dose Equivalent I-131. The Completion Time of 48 hours for revised Required Action B.1 is acceptable since it is expected that, if there were a noble gas spike, the normal coolant noble gas concentration would be restored within this time period. Also, there is a low probability of an accident occurring during this time period

While it is a correct statement that the proposed change makes the Completion Times of TS 3.4.16 Required Action A.2 and B.1 in NUREG-1431, "Standard Technical Specifications

Westinghouse Plants,” consistent, it is not clear why the Completion Times should be consistent. The plant Conditions for these Required Actions are different.

The CNP TS 3.4.16 Required Action A.2 is required when the plant is in a condition analyzed in the design basis accident analyses (reactor coolant dose equivalent I-131 is bound between 1 and 60 $\mu\text{Ci/gm}$). The new proposed TS 3.4.16 Required Action B.1 is required when the plant is in a condition not analyzed in the design basis accident analyses (dose equivalent Xe-133 is greater than 215.1 $\mu\text{Ci/gm}$).

Typically, the Required Action for a condition not analyzed requires the plant to take immediate actions to begin shutdown of the plant. The proposed change does not require immediate actions to begin shutdown of the plant, but allows 48 hours before the plant is required to begin shutting down.

- *Provide justification for the proposed Completion Time of 48 hours for TS 3.4.16 Condition B, to include why it is acceptable to be in an unanalyzed condition for 48 hours when the reactor coolant dose equivalent Xe-133 is greater than 215.1 $\mu\text{Ci/gm}$ without an upper bound.*

I&M Response to RAI-ARCB-10:

In response to this RAI, I&M conducted additional reviews of the information related to the establishment of the Completion Time (CT) for TS 3.4.16, “RCS Specific Activity,” Condition B. As described in the proposed TS Bases B 3.4.16 Applicable Safety Analyses section, the analyses for the steam line break and steam generator tube rupture accidents establish the acceptance limits for reactor coolant system (RCS) specific activity. For those accidents, the analysis assumptions include an initial condition of a source term equivalent to 1% failed fuel but with no further fuel damage occurring as a result of the accident, as discussed in Enclosure 5 of Reference 4, which replaced Enclosure 9 of Reference 1. The assumption of an initial condition of a source term equivalent to 1% failed fuel for these accidents is the basis for the established CNP TS 3.4.16 limit on Dose Equivalent Xenon-133 (DEX) activity.

Any spike in the RCS DEX activity levels that exceeded the limit specified in TS 3.4.16 would be expected to be caused by failed fuel elements and DEX activity increases caused by failed fuel cannot be returned to acceptable levels within 48 hours. Since there is not a current analysis that provides a value for DEX that is greater than 215.1 $\mu\text{Ci/gm}$ but below which the radiological consequences of the increased activity would not exceed the 10 CFR 50.67 dose guidelines, I&M concluded that the allowed CT for Condition B of TS 3.4.16 should be changed. Based on that conclusion, I&M has revised the proposed TS amendment request so that the CT is consistent with the CT for other unanalyzed conditions, which require the unit to be in Mode 3 within six hours. Therefore, the previous request to allow 48 hours to restore CNP TS 3.4.16 DEX activity within limits is revised to require the unit to be in Mode 3 within six hours and Mode 5 within 36 hours if the DEX activity limit is exceeded.

The I&M response to this RAI is the same as the response previously provided by Tennessee Valley Authority (TVA) for Sequoyah Nuclear Plant (Reference 5) to a similar RAI they received during NRC review of their LAR for conversion to Improved Technical Specifications and adoption of TSTF-490. The proposed response by TVA to require being in Mode 3 within six

hours and Mode 5 within 36 hours for DEX not within limit was approved by the NRC on September 30, 2015 (Reference 6).

The CNP TS markups have been revised to reflect the proposed changes to TS 3.4.16 Condition B, which will now state, "Required Action and associated Completion Time of Condition A not met, OR DOSE EQUIVALENT I-131 > 60 μ Ci/gm, OR DOSE EQUIVALENT XE-133 not within limit." Condition A remains the same as previously proposed in Reference 1.

The previously proposed TS 3.4.16 Condition C has been deleted. In addition, the proposed CT for the new Condition B has been revised to reflect the change from 48 hours to restore DEX within limit to the requirement to be in Mode 3 within six hours and Mode 5 within 36 hours.

The TS Bases have been revised to reflect the proposed changes to TS 3.4.16. In TS Bases B 3.4.16, the Actions section is revised to remove reference to a 48 hour CT and remove the discussion of the ability to restore DEX activity within limits. In addition, the originally proposed TS B 3.4.16 Actions section for Conditions C.1 and C.2 has been deleted and the information from that section moved under the discussion for Conditions B.1 and B.2.

Also in TS Bases B 3.4.16, the Surveillance Requirement (SR) section has been revised to remove the discussion of a Note that modifies SRs 3.4.16.1 and 3.4.16.2 to allow entry into MODES 2, 3, and 4 prior to performing the SR. That information should not have been included in the TS Bases mark-ups of the original LAR because those Notes were not included in TS 3.4.16 mark-ups for the original LAR.

REFERENCES

1. Letter from J. P. Gebbie, Indiana Michigan Power Company (I&M), to U. S. Nuclear Regulatory Commission (NRC), "Donald C. Cook Nuclear Plant, Units 1 and 2, License Amendment Request to Adopt TSTF-490, Revision 0, 'Deletion of E Bar Definition and Revision to Reactor Coolant System Specific Activity Technical Specification' and Implement Full-Scope Alternative Source Term," dated November 14, 2014, Agencywide Documents Access and Management System (ADAMS) Accession No. ML14324A209.
2. Letter from J. P. Gebbie, I&M, to NRC, "Donald C. Cook Nuclear Plant Unit 1 and Unit 2 - Supplemental Information for the License Amendment Request to Adopt TSTF-490, Revision 0, 'Deletion of E Bar Definition and Revision to Reactor Coolant System Specific Activity Technical Specification' and Implement Full-Scope Alternative Source Term," dated February 12, 2015, ADAMS Accession No. ML15050A247. /
3. E-mail capture from A. W. Dietrich, NRC, to H. L. Kish, I&M, "D.C. Cook Units 1 and 2 – ARCB RAI Concerning LAR to Adopt TSTF-490 and Implement Full-Scope AST (CAC Nos. MF5184 and MF5185)," dated June 14, 2016.
4. Letter from Q. S. Lies, I&M, to NRC, "Donald C. Cook Nuclear Plant Unit 1 and Unit 2 - Response to Sixth Request for Additional Information Regarding the License Amendment Request to Adopt TSTF-490 and Implement Alternative Source Term," dated May 6, 2016.

5. Letter from J. W. Shea, Tennessee Valley Authority (TVA), to NRC, "Sequoyah Nuclear Plant Units 1 and 2 – Technical Specifications Conversion to NUREG-1431, Rev. 4.0 (SQN-TS-11-10) – Supplement 2," dated June 19, 2015, ADAMS Accession No. ML15176A649.
6. Letter from NRC to J. W. Shea, TVA, "Sequoyah Nuclear Plant Units 1 and 2 – Issuance of Amendments for the Conversion to the Improved Technical Specifications with Beyond Scope Issues (TAC Nos. MF3128 and 3129)," dated September 30, 2015, ADAMS Accession No. ML15238B460.

Enclosure 3 to AEP-NRC-2016-56

CNP Unit 1 TS Pages Marked to Show Proposed Changes

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.16 RCS Specific Activity

LCO 3.4.16 ~~The specific activity of the reactor coolant shall be within limits.~~
RCS DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits.

APPLICABILITY: ~~MODES 1 and 2, 1, 2, 3, and 4.~~
~~MODE 3 with RCS average temperature (Tavg) ≥ 500°F.~~

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. DOSE EQUIVALENT I-131 > 1.0 μCi/gm. not within limit.</p>	<p>-----NOTE----- LCO 3.0.4.c is applicable. -----</p>	<p>Once per 4 hours</p>
	<p>A.1 Verify DOSE EQUIVALENT I-131 within the acceptable region of Figure 3.4.16-1. ≤ 60 μCi/gm.</p> <p><u>AND</u></p> <p>A.2 Restore DOSE EQUIVALENT I-131 to within limit.</p>	
<p>B. Required Action and associated Completion Time of Condition A not met.</p> <p><u>OR</u></p> <p>DOSE EQUIVALENT I-131 in the unacceptable region of Figure 3.4.16-1. <u>> 60 μCi/gm.</u></p> <p><u>OR</u></p> <p><u>DOSE EQUIVALENT XE-133</u> Gross specific activity of the reactor coolant not within limit.</p>	<p>B.1 Be in MODE 3 with Tavg < 500°F.</p> <p><u>AND</u></p> <p><u>B.2 Be in MODE 5.</u></p>	<p>6 hours</p> <p><u>36 hours</u></p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.16.1 Verify reactor coolant gross DOSE EQUIVALENT <u>XE-133</u> specific activity $\leq 100/\bar{E} - 215.1 \mu\text{Ci/gm}$.</p>	<p>7 days</p>
<p>SR 3.4.16.2 NOTE Only required to be performed in MODE 1.</p> <hr/> <p>Verify reactor coolant DOSE EQUIVALENT I-131 specific activity $\leq 1.0 \mu\text{Ci/gm}$.</p>	<p>14 days</p> <p><u>AND</u></p> <p>Between 2 and 6 hours after a THERMAL POWER change of $\geq 15\%$ RTP within a 1 hour period</p>
<p>SR 3.4.16.3 NOTE Not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.</p> <hr/> <p>Determine \bar{E} from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.</p>	<p>184 days</p>

Enclosure 4 to AEP-NRC-2016-56

**CNP Unit 1 TS Bases Pages Marked to Show Proposed Changes
(For Information Only)**

BASES

ACTIONS (continued)

~~A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S) while relying on the ACTIONS. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient specific activity excursions while the unit remains at, or proceeds to power operation.~~

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate that the specific activity is $\leq 60.0 \mu\text{Ci/gm}$. The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling is continued every 4 hours to provide a trend.

The DOSE EQUIVALENT I-131 must be restored to within limit within 48 hours. The Completion Time of 48 hours is acceptable since it is expected that, if there were an iodine spike, the normal coolant iodine concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S), relying on Required Actions A.1 and A.2 while the DOSE EQUIVALENT I-131 LCO limit is not met. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event that is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

B.1 and B.2

~~If any Required Action and associated Completion Time of Condition A is not met, if the DOSE EQUIVALENT I-131 is in the unacceptable region of Figure 3.4.16-1, or if gross specific activity of the reactor coolant is not within limit, the reactor must be brought to MODE 3 with RCS average temperature $< 500^\circ\text{F}$ within 6 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging unit systems.~~

If the Required Action and associated Completion Time of Condition A is not met, if the DOSE EQUIVALENT I-131 is $> 60.0 \mu\text{Ci/gm}$, or if DOSE EQUIVALENT XE-133 is not within limit, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an

BASES

ACTIONS (continued)

orderly manner and without challenging plant systems.

SURVEILLANCE
REQUIREMENTS

SR 3.4.16.1

~~SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the gross specific activity of the reactor coolant at least once every 7 days. While basically a quantitative measure of radionuclides with half lives longer than 15 minutes, excluding iodines, this measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in gross specific activity.~~

~~Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The 7 day Frequency considers the unlikelihood of a gross fuel failure during the time.~~

SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the noble gas specific activity of the reactor coolant at least once every 7 days. This measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in the noble gas specific activity.

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The 7-day Frequency considers the low probability of a gross fuel failure during this time.

Due to the inherent difficulty in detecting Kr-85 in a reactor coolant sample due to masking from radioisotopes with similar decay energies, such as F-18 and I-134, it is acceptable to include the minimum detectable activity for Kr-85 in the SR 3.4.16.1 calculation. If a specific noble gas nuclide listed in the definition of DOSE EQUIVALENT XE-133 is not detected, it should be assumed to be present at the minimum detectable activity.

SR 3.4.16.2

~~This Surveillance requires the verification that the reactor coolant DOSE EQUIVALENT I-131 specific activity is within limit. This Surveillance is accomplished by performing an isotopic analysis of a reactor coolant sample. This Surveillance is performed in MODE 1 only to ensure iodine remains within limit during normal operation and following fast power changes when fuel failure is more apt to occur. The 14 day Frequency is~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~adequate to trend changes in the iodine activity level, considering gross activity is monitored every 7 days. The Frequency, between 2 and 6 hours after a power change $\geq 15\%$ RTP within a 1 hour period, is established because the iodine levels peak during this time following fuel failure; samples at other times would provide inaccurate results.~~

This Surveillance is performed to ensure iodine specific activity remains within the LCO limit during normal operation and following fast power changes when iodine spiking is more apt to occur. The 14-day Frequency is adequate to trend changes in the iodine activity level, considering noble gas activity is monitored every 7 days. The Frequency, between 2 and 6 hours after a power change $> 15\%$ RTP within a 1 hour period, is established because the iodine levels peak during this time following iodine spike initiation; samples at other times would provide inaccurate results.

~~SR 3.4.16.3~~

~~A radiochemical analysis for \bar{E} determination is required every 184 days with the unit operating in MODE 1 equilibrium conditions. The \bar{E} determination directly relates to the LCO and is required to verify unit operation within the specified gross activity LCO limit. The analysis for \bar{E} is a measurement of the average energies per disintegration for isotopes with half lives longer than 15 minutes, excluding iodines. The Frequency of 184 days recognizes \bar{E} does not change rapidly.~~

~~This SR has been modified by a Note that indicates sampling is not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for at least 48 hours. This ensures that the radioactive materials are at equilibrium so the analysis for \bar{E} is representative and not skewed by a crud burst or other similar abnormal event.~~

REFERENCES

- ~~1. 10 CFR 100.11.~~
- ~~1. 10 CFR 50.67.~~
2. Standard Review Plan (SRP) Section 15.0.1 "Radiological Consequence Analyses Using Alternative Source Terms."
- 3.2. UFSAR, Section 14.2.4.
4. UFSAR, Section 14.2.5.

Enclosure 5 to AEP-NRC-2016-56

CNP Unit 2 TS Pages Marked to Show Proposed Changes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.4.16.1 Verify reactor coolant gross DOSE EQUIVALENT <u>XE-133</u> specific activity $\leq 400/\bar{E} - 215.1 \mu\text{Ci/gm}$.</p>	<p>7 days</p>
<p>SR 3.4.16.2 NOTE Only required to be performed in MODE 1.</p> <hr/> <p>Verify reactor coolant DOSE EQUIVALENT I-131 specific activity $\leq 1.0 \mu\text{Ci/gm}$.</p>	<p>14 days</p> <p><u>AND</u></p> <p>Between 2 and 6 hours after a THERMAL POWER change of $\geq 15\%$ RTP within a 1 hour period</p>
<p>SR 3.4.16.3 NOTE Not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.</p> <hr/> <p>Determine \bar{E} from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.</p>	<p>184 days</p>

Enclosure 6 to AEP-NRC-2016-56

**CNP Unit 2 TS Bases Pages Marked to Show Proposed Changes
(For Information Only)**

BASES

ACTIONS (continued)

~~A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S) while relying on the ACTIONS. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient specific activity excursions while the unit remains at, or proceeds to power operation.~~

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate that the specific activity is $\leq 60.0 \mu\text{Ci/gm}$. The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling is continued every 4 hours to provide a trend.

The DOSE EQUIVALENT I-131 must be restored to within limit within 48 hours. The Completion Time of 48 hours is acceptable since it is expected that, if there were an iodine spike, the normal coolant iodine concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S), relying on Required Actions A.1 and A.2 while the DOSE EQUIVALENT I-131 LCO limit is not met. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event that is limiting due to exceeding this limit, and the ability to restore transient-specific activity excursions while the plant remains at, or proceeds to, power operation.

B.1 and B.2

~~If any Required Action and associated Completion Time of Condition A is not met, if the DOSE EQUIVALENT I-131 is in the unacceptable region of Figure 3.4.16-1, or if gross specific activity of the reactor coolant is not within limit, the reactor must be brought to MODE 3 with RCS average temperature $< 500^\circ\text{F}$ within 6 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging unit systems.~~

If the Required Action and associated Completion Time of Condition A is not met, if the DOSE EQUIVALENT I-131 is $> 60.0 \mu\text{Ci/gm}$, or if DOSE EQUIVALENT XE-133 is not within limit, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to

BASES

ACTIONS (continued)

reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE SR 3.4.16.1
REQUIREMENTS

~~SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the gross specific activity of the reactor coolant at least once every 7 days. While basically a quantitative measure of radionuclides with half lives longer than 15 minutes, excluding iodines, this measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in gross specific activity.~~

~~Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The 7 day Frequency considers the unlikelihood of a gross fuel failure during the time.~~

SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the noble gas specific activity of the reactor coolant at least once every 7 days. This measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in the noble gas specific activity.

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The 7-day Frequency considers the low probability of a gross fuel failure during this time.

Due to the inherent difficulty in detecting Kr-85 in a reactor coolant sample due to masking from radioisotopes with similar decay energies, such as F-18 and I-134, it is acceptable to include the minimum detectable activity for Kr-85 in the SR 3.4.16.1 calculation. If a specific noble gas nuclide listed in the definition of DOSE EQUIVALENT XE-133 is not detected, it should be assumed to be present at the minimum detectable activity.

SR 3.4.16.2

~~This Surveillance requires the verification that the reactor coolant DOSE EQUIVALENT I-131 specific activity is within limit. This Surveillance is accomplished by performing an isotopic analysis of a reactor coolant sample. This Surveillance is performed in MODE 1 only to ensure iodine~~

BASES

SURVEILLANCE REQUIREMENTS (continued)

~~remains within limit during normal operation and following fast power changes when fuel failure is more apt to occur. The 14 day Frequency is adequate to trend changes in the iodine activity level, considering gross activity is monitored every 7 days. The Frequency, between 2 and 6 hours after a power change \geq 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following fuel failure; samples at other times would provide inaccurate results.~~

This Surveillance is performed to ensure iodine specific activity remains within the LCO limit during normal operation and following fast power changes when iodine spiking is more apt to occur. The 14-day Frequency is adequate to trend changes in the iodine activity level, considering noble gas activity is monitored every 7 days. The Frequency, between 2 and 6 hours after a power change $>$ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following iodine spike initiation; samples at other times would provide inaccurate results.

SR 3.4.16.3

~~A radiochemical analysis for \bar{E} determination is required every 184 days with the unit operating in MODE 1 equilibrium conditions. The \bar{E} determination directly relates to the LCO and is required to verify unit operation within the specified gross activity LCO limit. The analysis for \bar{E} is a measurement of the average energies per disintegration for isotopes with half lives longer than 15 minutes, excluding iodines. The Frequency of 184 days recognizes \bar{E} does not change rapidly.~~

~~This SR has been modified by a Note that indicates sampling is not required to be performed until 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for at least 48 hours. This ensures that the radioactive materials are at equilibrium so the analysis for \bar{E} is representative and not skewed by a crud burst or other similar abnormal event.~~

REFERENCES

~~1. 10 CFR 100.11.~~

~~1. 10 CFR 50.67.~~

2. Standard Review Plan (SRP) Section 15.0.1 "Radiological Consequence Analyses Using Alternative Source Terms."

3.2. UFSAR, Section 14.2.4.

4. UFSAR, Section 14.2.5.