Nuclear Operating Company
South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

September 26, 2019
NOC-AE-19003677
10 CFR 50.90

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

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
License Amendment Request to Revise Technical Specifications to Adopt TSTF-490, Revision 0, "Deletion of E Bar Definition and Revision to RCS Specific Activity Tech Spec."

Pursuant to 10 CFR 50.90, STP Nuclear Operating Company (STPNOC) hereby requests a license amendment to South Texas Project (STP) Renewed Facility Operating Licenses NPF-76 and NPF-80 to revise Technical Specification Limiting Condition for Operation (LCO) 3.4.8 "Specific Activity," and associated Surveillance Requirements by adoption of NRC-approved Technical Specification Task Force (TSTF) traveler TSTF-490, Revision 0, "Deletion of E Bar Definition and Revision to RCS Specific Activity Tech Spec."

The proposed changes would replace the current Technical Specification limit on Reactor Coolant System (RCS) gross specific activity with a new limit on RCS noble gas specific activity. The noble gas specific activity limit would be based on a new DOSE EQUIVALENT XE-133 definition that would replace the current E-Bar average disintegration energy definition.

The Enclosure to this letter provides a description and assessment of the proposed changes including technical and regulatory evaluations and a No Significant Hazards Consideration Determination Analysis. Marked-up and re-typed (clean) Technical Specification pages are provided in Enclosure Attachments 1 and 2, respectively. A marked-up copy of the Technical Specification Bases is provided for information only in Enclosure Attachment 3.

STPNOC is requesting approval of this license amendment request by October 1, 2020. STPNOC will implement the amendment within 180 days of the NRC approval date.

In accordance with 10 CFR 50.91(b), STPNOC is notifying the State of Texas of this license amendment request by transmitting a copy of this letter and Enclosure to the designated State Official. The proposed amendment has been reviewed and approved by the STPNOC Plant Operations Review Committee and has undergone an independent organizational unit review.

There are no regulatory commitments in this amendment request.

If there are any questions or if additional information is needed, please contact Nic Boehmisch at (361) 972-8172 or me at (361) 972-7888.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 9/26/2019

Michael Schaefer
Site Vice President

Enclosure: Evaluation of the Proposed Change

STI: 34887594

cc:

Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Glen E. Miller
U.S. Nuclear Regulatory Commission
One White Flint North (Mail Stop O9E01)
11555 Rockville Pike
Rockville, MD 20852

ENCLOSURE

Evaluation of the Proposed Change

Subject: License Amendment Request to Revise Technical Specifications to Adopt TSTF-490, Revision 0, “Deletion of E Bar Definition and Revision to RCS Specific Activity Tech Spec.”

1. SUMMARY DESCRIPTION

2. DETAILED DESCRIPTION

3. TECHNICAL EVALUATION

4. REGULATORY EVALUATION

    4.1 Applicable Regulatory Requirements/Criteria
    4.2 Precedent
    4.3 No Significant Hazards Consideration Determination Analysis
    4.4 Conclusions

5. ENVIRONMENTAL CONSIDERATION

6. REFERENCES

ATTACHMENTS:

1. Technical Specification Page Markups
2. Retyped Technical Specification Pages
3. Technical Specification Bases Pages Markups (Information Only)

1 SUMMARY DESCRIPTION

The proposed changes would replace the current limits for primary coolant gross specific activity with limits on primary coolant noble gas activity. The noble gas activity will be based on DOSE EQUIVALENT XE-133 (DEX) and will take into account only the noble gas activity in the primary coolant. These changes were approved in an NRC Safety Evaluation (SE) dated March 19, 2007 (Reference 1). Technical Specification Task Force (TSTF) change traveler TSTF-490, Revision 0, "Deletion of E Bar Definition and Revision to RCS Specific Activity Tech Spec," was announced for availability in Reference 1 as part of the Consolidated Line Item Improvement Process (CLIIP). By memorandum from the Chief, Licensing Processes Branch, to the Plant Licensing Branch Chiefs, dated March 14, 2012, the NRC staff indicated that License Amendment Requests (LARs) related to TSTF-490 can be accepted for review, but will be handled through the normal LAR review process, instead of the expedited six-month CLIIP schedule.

2 DETAILED DESCRIPTION

Consistent with NRC-approved TSTF-490, Revision 0, STP Nuclear Operating Company proposes the following Technical Specification changes:

1. Delete the definition of Ē- AVERAGE DISINTEGRATION ENERGY.

2. Add a new Technical Specification definition for DOSE EQUIVALENT XE-133.

3. Revise LCO 3.4.8 “SPECIFIC ACTIVITY” to read as follows: “Reactor coolant system DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits.” and delete Figure 3.4-1. The removed limit values are incorporated into the new Action ‘a.’

4. Revise LCO 3.4.8 Applicability to specify the LCO is applicable in MODES 1, 2, 3 and 4.

5. Modify Actions as follows:
    a. References to applicable MODES and associated note is deleted.
    b. Action ‘a’ is modified based on changes to Actions ‘a’ and ‘b’ to reflect the changes in the LCO applicability. Action ‘a’ is renumbered to action ‘c’
    c. Action ‘b’ is modified to provide a Required Action for DOSE EQUIVALENT XE-133 instead of gross activity of the reactor coolant. The completion time is changed from 6 hours to 48 hours.
    d. Action ‘c’ is renumbered to Action ‘d.’
    e. The unnumbered Action is modified to replace “specific activity” with DOSE EQUIVALENT I-131” and define an upper limit for DOSE EQUIVALENT I-131 that is applicable at MODES 1 through 4. The unnumbered Action is renumbered to Action ‘a.’

6. Table 4.4-4 is deleted and replaced by revising Surveillance Requirement 4.4.8 (renumbered as 4.4.8.1) to verify the limit for DOSE EQUIVALENT XE-133 and a new Surveillance Requirement 4.4.8.2 to verify the limit for DOSE EQUIVALENT I-131.

For STPNOC, a few minor variations exist within the amendment compared to the TSTF that does not change the technical intent of the changes proposed.

1. STP uses different numbering than the improved Standard Technical Specifications (STS) for RCS Specific Activity. This difference is administrative and does not affect the applicability of TSTF-490 to the STP Technical Specifications.

2. The current STP Technical Specifications have incorporated TSTF-425, “Relocate Surveillance Frequencies to Licensee Control” via amendment 188/175 dated October 31, 2008. Therefore, the proposed pages reflect the current use of the Surveillance Frequency Control Program instead of the frequency values reflected in the TSTF-490 markup pages.

3. Reference to the NRC staff SE, dated September 27, 2006 (ML062700612) is changed to refer to the NRC staff SE in Reference 1, because the SE dated September 27, 2006, that is referred to in the model application is not publicly available. The SE posted in the Federal Register on March 19, 2007 is publicly available and approved for use.

4. STP’s current definition of DOSE EQUIVALENT I-131 is equivalent to the proposed wording.

3 TECHNICAL EVALUATION

STPNOC has reviewed References 1 and 2. STPNOC has applied the methodology in Reference 1 to develop the proposed TS changes. STPNOC has also concluded that the justifications presented in TSTF-490, Revision 0 and the model SE prepared by the NRC staff are applicable to STP and justify this amendment for the incorporation of the changes to STP's Technical Specifications.

To assist in the NRC staff review of this amendment request, the inputs for determining DEX limits are summarized below.

The determination of DEX is performed using effective dose conversion factors for air submersion listed in Table III.1 of EPA Federal Guidance Report No. 12 (FGR-12) (Reference 3), as shown in Table 1 below. To normalize each radioisotope, each FGR-12 effective dose conversion factor is divided by the FGR-12 effective dose conversion factor for Xe-133. The resultant number is each radioisotope’s equivalence factor.

The equivalence factors are then multiplied by the concentrations of noble gases based on 1% failed fuel, as provided in Column 2, Table 1. The nuclide concentrations are assumed to be the total sum of the degassed gamma activities and the gaseous gamma activities for each appropriate nuclide. The products for each radionuclide are then summed to come up with the DEX Technical Specification limit. The DEX Technical Specification limit is calculated to be 545.8 µCi/g; however, the DEX limit will be implemented, conservatively, as 540 µCi/g. Kr-83m contributes 0.0 to the DEX calculation, and so will not be included in the Technical Specification definition of the term. Kr-83m was included in the calculation for completeness.

Table 1 – Calculation of DEX Limit for STP

Isotopes	1% Failed Fuel Conc. µCi/gm	DCF (EDE) Sv-m^3/Bq-s	DE Xe-133 µCi/gm
Kr-83m	0.37	1.50E-18	0.0
Kr-85m	1.50	7.48E-15	7.2
Kr-85	7.60	1.19E-16	0.6
Kr-87	0.98	4.12E-14	25.9
Kr-88	2.80	1.02E-13	183
Xe-131m	2.80	3.89E-16	0.7
Xe-133m	4.20	1.37E-15	3.7
Xe-133	240	1.56E-15	240
Xe-135m	0.40	2.04E-14	5.2
Xe-135	7.60	1.19E-14	58.0
Xe-138	0.58	5.77E-14	21.5
DEX Limit			**545.8**

4 REGULATORY EVALUATION

4.1. Applicable Regulatory Requirements/Criteria

A Description of this proposed change and its relationship to applicable regulatory requirements and guidance was provided in the NRC Notice of Availability dated March 19, 2007 (Reference 1), the NRC Notice for Comment published on November 20, 2006 (Reference 2), and TSTF-490, Revision 0.

4.2. Precedent

STPNOC is not proposing significant variations or deviations from the TS changes described in TSTF-490, Revision 0, or in the content of the NRC's model SE published in Reference 1. The NRC has previously approved similar amendment requests to the TS for Palo Verde Nuclear Generating Station Units 1, 2, and 3 (ML13294A576); Braidwood Station Units 1 and 2 and Byron Station Units 1 and 2 (ML100690386); and Three Mile Island Nuclear Station Unit 1 (ML100320493). Submittals by these plants to request implementation of TSTF-490 were reviewed, along with corresponding requests for additional information (RAIs). The letters for issuance of amendment were also reviewed to establish the final version of the approved amendment.

4.3. No Significant Hazards Consideration Determination Analysis

South Texas Project Nuclear Operating Company (STPNOC) has reviewed the proposed no significant hazards consideration determination published in the Federal Register on March 19, 2007 (Reference 1). STPNOC has concluded that the proposed determination presented in the notice is applicable to South Texas Project, Units 1 and 2 (STP), and the full determination evaluation is provided below.

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

   Response: No.

   Reactor coolant specific activity is not an initiator for any accident previously evaluated. The Completion Time when primary coolant gross activity is not within limit is not an initiator for any accident previously evaluated. The current variable limit on primary coolant iodine concentration is not an initiator nor an input to any accident previously evaluated. As a result, the proposed change does not significantly increase the probability or consequence of an accident. The proposed change will limit primary coolant noble gases to concentrations consistent with the accident analyses and therefore has no change to the accident consequences as analyzed. The proposed change to the Completion Time has no impact on the consequences of any design basis accident since the consequences of an accident during the extended Completion Time are the same as the consequences of an accident during the Completion Time. As a result, the consequences of any accident previously evaluated are not significantly increased.

   Therefore, there is no impact to the probability or consequences of an accident previously evaluated due to the proposed change.

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

   Response: No.

   The proposed change in specific activity limits does not alter any physical part of the plant nor does it affect any plant operating parameter. The change does not create the potential for a new or different kind of accident from any previously calculated.

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

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

   Response: No.

   The proposed change revises the limits on noble gas radioactivity in the primary coolant. The proposed change is consistent with the assumptions in the safety analyses and will ensure the monitored values protect the initial assumptions in the safety analyses. Based upon the reasoning presented above and the previous discussion of the amendment request, the requested change does not involve a significant hazards consideration.

   Therefore, the proposed change does not impact margin of safety.

Based on the above, STPNOC concludes that the proposed change 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.

4.4. Conclusions

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.

5 ENVIRONMENTAL CONSIDERATION

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 a significant increase in the amounts of any effluents 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.

6 REFERENCES

1 Federal Register Notice of Availability published on March 19, 2007, 72 FR 12838, "Notice of Availability of Model Application Concerning Technical Specification Improvement Regarding Deletion of E Bar Definition and Revision to Reactor Coolant System Specific Activity Technical Specification Using the Consolidated Line Item Improvement Process."

2 Federal Register Notice for Comment published on November 20, 2006, 71 FR 67170, "Notice of Opportunity To Comment on Model Safety Evaluation and Model License Amendment Request on Technical Specification Improvement Regarding Deletion of E Bar Definition and Revision to Reactor Coolant System Specific Activity Technical Specification; Babcock and Wilcox Pressurized Water Reactors, Westinghouse Pressurized Water Reactors, Combustion Engineering Pressurized Water Reactors Using the Consolidated Line Item Improvement Process."

3 EPA-402-R-93-081 Federal Guidance Report No. 12, "External Exposure to Radionuclides in Air, Water, and Soil," 1993.

Attachment 1

Technical Specification Page Markups

INDEX

1.0 DEFINITIONS

SECTION		PAGE
1.1	ACTION	1-1
1.2	ACTUATION LOGIC TEST	1-1
1.3	ANALOG CHANNEL OPERATIONAL TEST	1-1
1.4	AXIAL FLUX DIFFERENCE	1-1
1.5	CHANNEL CALIBRATION	1-1
1.6	CHANNEL CHECK	1-1
1.7	CONTAINMENT INTEGRITY	1-2
1.8	CONTROLLED LEAKAGE	1-2
1.9	CORE ALTERATIONS	1-2
1.9a	CORE OPERATING LIMITS REPORT	1-2
1.10	DIGITAL CHANNEL OPERATIONAL TEST	1-2
1.11	DOSE EQUIVALENT I-131	1-2
~~1.12~~	~~Ē-AVERAGE DISINTEGRATION ENERGY~~	~~1-3~~
1.12	**DOSE EQUIVALENT Xe-133**	**1-3**
1.13	ENGINEERED SAFETY FEATURES RESPONSE TIME	1-3
1.14	FREQUENCY NOTATION	1-3
1.15	GASEOUS WASTE PROCESSING SYSTEM	1-3
1.16	IDENTIFIED LEAKAGE	1-3
1.17	MASTER RELAY TEST	1-4
1.18	MEMBER(S) OF THE PUBLIC	1-4
1.19	OFFSITE DOSE CALCULATION MANUAL	1-4
1.20	OPERABLE - OPERABILITY	1-4
1.21	OPERATIONAL MODE - MODE	1-4
1.22	PHYSICS TESTS	1-4
1.23	PRESSURE BOUNDARY LEAKAGE	1-4
1.24	PROCESS CONTROL PROGRAM	1-5
1.25	PURGE - PURGING	1-5
1.26	QUADRANT POWER TILT RATIO	1-5
1.27	RATED THERMAL POWER	1-5

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION		PAGE
3/4.4	REACTOR COOLANT SYSTEM	
3/4.4.1	REACTOR COOLANT LOOPS AND COOLANT CIRCULATION	
	Startup and Power Operation	3/4 4-1
	Hot Standby	3/4 4-2
	Hot Shutdown	3/4 4-3
	Cold Shutdown - Loops Filled	3/4 4-5
	Cold Shutdown - Loops Not Filled	3/4 4-6
3/4.4.2	SAFETY VALVES	
	Shutdown	3/4 4-7
	Operating	3/4 4-8
3/4.4.3	PRESSURIZER	3/4 4-9
3/4.4.4	RELIEF VALVES	3/4 4-10
3/4.4.5	STEAM GENERATOR TUBE INTEGRITY	3/4 4-12
3/4.4.6	REACTOR COOLANT SYSTEM LEAKAGE	
	Leakage Detection Systems	3/4 4-19
	Operational Leakage	3/4 4-20
TABLE 3.4-1	REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES	3/4 4-22
3/4.4.7	(This specification not used)	
3/4.4.8	SPECIFIC ACTIVITY	3/4 4-26
FIGURE 3.4-1	~~DOSE EQUIVALENT I-131 REACTOR COOLANT SPECIFIC ACTIVITY LIMIT VERSUS PERCENT OF RATED THERMAL POWER WITH THE REACTOR COOLANT SPECIFIC ACTIVITY >1 μCi/gram DOSE EQUIVALENT I-131~~ **(This figure not used)**	~~3/4 4-28~~
TABLE 4.4-4	~~REACTOR COOLANT SPECIFIC ACTIVITY SAMPLE AND ANALYSIS PROGRAM~~ **(This table not used)**	~~3/4 4-29~~
3/4.4.9	PRESSURE/TEMPERATURE LIMITS	
	Reactor Coolant System	3/4 4-31
FIGURE 3.4-2	REACTOR COOLANT SYSTEM HEATUP LIMITATIONS - APPLICABLE UP TO 32 EFPY	3/4 4-32

This page is included for completeness.
No changes to this page.

CONTAINMENT INTEGRITY

1.7 CONTAINMENT INTEGRITY shall exist when:

a. All penetrations required to be closed during accident conditions are either:

1) Capable of being closed by an OPERABLE containment automatic isolation valve system, or

2) Closed by manual valves, blind flanges, or deactivated automatic valves secured in their closed positions, except as provided in Specification 3.6.3.

b. All equipment hatches are closed and sealed,

c. Each air lock is in compliance with the requirements of Specification 3.6.1.3,

d. The containment leakage rates are within the limits of Specification 3.6.1 2, and

e. The sealing mechanism associated with each penetration (e.g., welds, bellows, or O-rings) is OPERABLE.

CONTROLLED LEAKAGE

1.8 CONTROLLED LEAKAGE shall be that seal water flow supplied to the reactor coolant pump seals.

CORE ALTERATIONS

1.9 CORE ALTERATIONS shall be the movement of any fuel, sources, or reactivity control components [excluding rod cluster control assemblies (RCCAs) locked out in the integrated head package] within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.

CORE OPERATING LIMITS REPORT

1.9a The CORE OPERATING LIMITS REPORT is the unit-specific document that provides core operating limits for the current operating reload cycle. These cycle-specific core operating limits shall be determined for each reload cycle in accordance with Specification 6.9.1.6. Plant operation within these core operating limits is addressed within the individual Specifications.

DIGITAL CHANNEL OPERATIONAL TEST

1.10 DIGITAL CHANNEL OPERATIONAL TEST shall consist of injecting simulated process data where available or exercising the digital computer hardware using data base manipulation to verify OPERABILITY of alarm, interlock, and/or trip functions.

DOSE EQUIVALENT I-131

1.11 DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microCurie/gram) which alone would produce the same Committed Effective Dose Equivalent dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The Committed Effective Dose Equivalent dose conversion factors used for this calculation shall be those listed in Federal Guidance Report 11, “Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion and Ingestion,” 1988 (Table 2.1, Exposure-to-Dose Conversion Factors for Inhalation).

~~$\bar{E}$ AVERAGE DISINTEGRATION ENERGY~~

~~1.12 $\bar{E}$ shall be the average (weighted in proportion to the concentration of each radionuclide in the sample) of the sum of the average beta and gamma energies per disintegration (MeV/d) for the isotopes, other than iodines, with half lives greater than 15 minutes, making up at least 95% of the total non-iodine activity in the coolant.~~

Insert A →

ENGINEERED SAFETY FEATURES RESPONSE TIME

1.13 The ENGINEERED SAFETY FEATURES (ESF) RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF Actuation Setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.

FREQUENCY NOTATION

1.14 The FREQUENCY NOTATION specified for the performance of Surveillance Requirements shall correspond to the intervals defined in Table 1.1.

GASEOUS WASTE PROCESSING SYSTEM

1.15 A GASEOUS WASTE PROCESSING SYSTEM shall be any system designed and installed to reduce radioactive gaseous effluents by collecting Reactor Coolant System offgases from the Reactor Coolant System and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

IDENTIFIED LEAKAGE

1.16 IDENTIFIED LEAKAGE shall be:

a. Leakage (except CONTROLLED LEAKAGE) into closed systems, such as pump seal or valve packing leaks that are captured and conducted to a sump or collecting tank, or

b. Leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of Leakage Detection Systems or not to be PRESSURE BOUNDARY LEAKAGE, or

c. Reactor Coolant System leakage through a steam generator to the Secondary Coolant System.

INSERT A

DOSE EQUIVALENT XE-133

1.12 DOSE EQUIVALENT XE-133 shall be the concentration of Xe-133 (microcuries per gram) that alone would produce the same acute dose to the whole body as the combined activities of noble gas nuclides Kr-85m, Kr-85, Kr-87, Kr-88, Xe-131m, Xe-133m, Xe-133, Xe-135m, Xe-135, and Xe-138 actually present. If a specific noble gas nuclide is not detected, it should be assumed to be present at the minimum detectable activity. The determination of DOSE EQUIVALENT XE-133 shall be performed using effective dose conversion factors for air submersion listed in Table III.1 of EPA Federal Guidance Report No. 12, 1993, “External Exposure to Radionuclides in Air, Water, and Soil.”

3/4.4.8 SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

3.4.8 ~~The~~ **Reactor Coolant System DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133** specific activity ~~of the reactor coolant~~ shall be ~~limited to~~ within limits~~:~~**.**

~~a. Less than or equal to 1 microCurie per gram DOSE EQUIVALENT I-131, and~~

~~b. Less than or equal to 100/$\bar{E}$ microCuries per gram of gross radioactivity.~~

APPLICABILITY: MODES 1, 2, 3, **and** 4~~, and 5~~.

INSERT B

ACTION:

~~MODES 1, 2 and 3*:~~

~~a. With the specific activity of the reactor coolant greater than 1 microCurie per gram DOSE EQUIVALENT I-131 for more than 48 hours during one continuous time interval, or exceeding the limit line shown on Figure 3.4-1, be in at least HOT STANDBY with T_{avg} less than 500°F within 6 hours; and~~

~~b. With the gross specific activity of the reactor coolant greater than 100/$\bar{E}$ microCuries per gram, be in at least HOT STANDBY with T_{avg} less than 500°F within 6 hours.~~

~~c. Specification 3.0.4.c is applicable.~~

~~MODES 1, 2, 3, 4, and 5:~~

~~With the specific activity of the reactor coolant greater than 1 microCurie per gram DOSE EQUIVALENT I-131 or greater than 100/$\bar{E}$ microCuries per gram, perform the sampling and analysis requirements of Item 4.a) of Table 4.4-4 until the specific activity of the reactor coolant is restored to within its limits.~~

~~*With T_{avg} greater than or equal to 500°F.~~

INSERT B

a. With the Reactor Coolant System DOSE EQUIVALENT I-131 not within limit:

   1. Verify DOSE EQUIVALENT I-131 ≤ 60 microCuries per gram once every 4 hours, and

   2. Restore DOSE EQUIVALENT I-131 to within limit within 48 hours.

b. With the Reactor Coolant System DOSE EQUIVALENT XE-133 not within limit, restore DOSE EQUIVALENT XE-133 to within limit within 48 hours.

c. With the requirements of ACTION a or ACTION b not met or DOSE EQUIVALENT I-131 exceeding 60 microCuries per gram, be in HOT STANDBY within 6 hours and COLD SHUTDOWN within 36 hours.

d. The provisions of Specification 3.0.4.c are applicable to ACTION a and ACTION b.

Contents of this page will be incorporated into the preceding page.

SURVEILLANCE REQUIREMENTS

~~4.4.8 The specific activity of the reactor coolant shall be determined to be within the limits by performance of the sampling and analysis program of Table 4.4-4.~~

4.4.8.1 Verify Reactor Coolant System DOSE EQUIVALENT XE-133 specific activity ≤ 540 microCuries per gram at a frequency in accordance with the surveillance frequency control program.

4.4.8.2 Verify Reactor Coolant System DOSE EQUIVALENT I-131 specific activity ≤ 1.0 microCuries per gram:

a. At a frequency in accordance with the surveillance frequency control program, and

b. Between 2 and 6 hours after THERMAL POWER change of 15 % or greater RATED THERMAL POWER within a 1 hour period.

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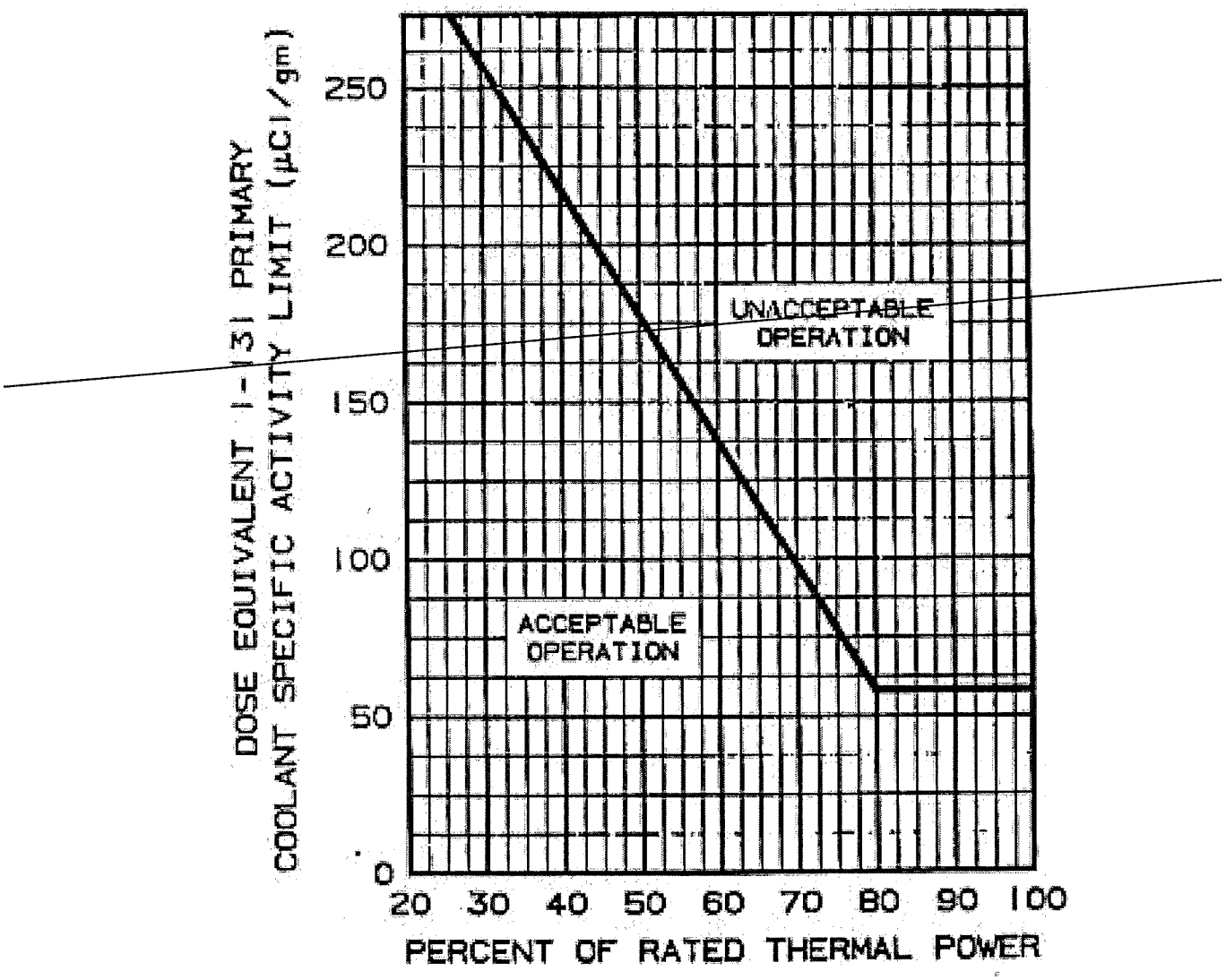

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FIGURE 3.4-1

~~DOSE EQUIVALENT I-131 REACTOR COOLANT SPECIFIC ACTIVITY LIMIT VERSUS PERCENT OF RATED THERMAL POWER WITH THE REACTOR COOLANT SPECIFIC ACTIVITY >1 μCi/gram DOSE EQUIVALENT I-131~~

TABLE 4.4-4

REACTOR COOLANT SPECIFIC ACTIVITY SAMPLE AND ANALYSIS PROGRAM

	TYPE OF MEASUREMENT AND ANALYSIS	SAMPLE AND ANALYSIS FREQUENCY	MODES IN WHICH SAMPLE AND ANALYSIS REQUIRED
1.	Gross Radioactivity Determination	At a frequency in accordance with the Surveillance Frequency Control Program.	1, 2, 3, 4
2.	Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	At a frequency in accordance with the Surveillance Frequency Control Program.	1
3.	Radiochemical for $\bar{E}$ Determination*	At a frequency in accordance with the Surveillance Frequency Control Program**	1
4.	Isotopic Analysis for Iodine Including I-131, I-133, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1 μCi/gram DOSE EQUIVALENT I-131 or $100/\bar{E}$ μCi/gram of gross radioactivity, and	1#, 2#, 3#, 4#, 5#
		b) One sample between 2 and 6 hours following a THERMAL POWER change exceeding 15% of the RATED THERMAL POWER within a 1-hour period.	1, 2, 3

(This table not used)

~~TABLE 4.4-4 (Continued)~~

~~TABLE NOTATIONS~~

~~* A radiochemical analysis for Ē shall consist of the quantitative measurement of the specific activity for each radionuclide, except for radionuclides with half-lives less than 15 minutes and all radioiodines, which is identified in the reactor coolant. The specific activities for these individual radionuclides shall be used in the determination of Ē for the reactor coolant sample. Determination of the contributors to Ē shall be based upon those energy peaks identifiable with a 95% confidence level.~~

~~** Sample to be taken after a minimum of 2 EFPD and 20 days of POWER OPERATION have elapsed since reactor was last subcritical for 48 hours or longer.~~

~~# Until the specific activity of the Reactor Coolant System is restored within its limits.~~

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Enclosure
NOC-AE-19003677
Attachment 3

Attachment 2

Retyped Technical Specification Pages

1.0 DEFINITIONS

SECTION		PAGE
1.1	ACTION	1-1
1.2	ACTUATION LOGIC TEST	1-1
1.3	ANALOG CHANNEL OPERATIONAL TEST	1-1
1.4	AXIAL FLUX DIFFERENCE	1-1
1.5	CHANNEL CALIBRATION	1-1
1.6	CHANNEL CHECK	1-1
1.7	CONTAINMENT INTEGRITY	1-2
1.8	CONTROLLED LEAKAGE	1-2
1.9	CORE ALTERATIONS	1-2
1.9a	CORE OPERATING LIMITS REPORT	1-2
1.10	DIGITAL CHANNEL OPERATIONAL TEST	1-2
1.11	DOSE EQUIVALENT I-131	1-2
1.12	DOSE EQUIVALENT XE-133	1-2
1.13	ENGINEERED SAFETY FEATURES RESPONSE TIME	1-3
1.14	FREQUENCY NOTATION	1-3
1.15	GASEOUS WASTE PROCESSING SYSTEM	1-3
1.16	IDENTIFIED LEAKAGE	1-3
1.17	MASTER RELAY TEST	1-4
1.18	MEMBER(S) OF THE PUBLIC	1-4
1.19	OFFSITE DOSE CALCULATION MANUAL	1-4
1.20	OPERABLE - OPERABILITY	1-4
1.21	OPERATIONAL MODE - MODE	1-4
1.22	PHYSICS TESTS	1-4
1.23	PRESSURE BOUNDARY LEAKAGE	1-4
1.24	PROCESS CONTROL PROGRAM	1-5
1.25	PURGE - PURGING	1-5
1.26	QUADRANT POWER TILT RATIO	1-5
1.27	RATED THERMAL POWER	1-5

INDEX

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

SECTION		PAGE
3/4.4	REACTOR COOLANT SYSTEM	
3/4.4.1	REACTOR COOLANT LOOPS AND COOLANT CIRCULATION	
	Startup and Power Operation	3/4 4-1
	Hot Standby	3/4 4-2
	Hot Shutdown	3/4 4-3
	Cold Shutdown - Loops Filled	3/4 4-5
	Cold Shutdown - Loops Not Filled	3/4 4-6
3/4.4.2	SAFETY VALVES	
	Shutdown	3/4 4-7
	Operating	3/4 4-8
3/4.4.3	PRESSURIZER	3/4 4-9
3/4.4.4	RELIEF VALVES	3/4 4-10
3/4.4.5	STEAM GENERATOR TUBE INTEGRITY	3/4 4-12
3/4.4.6	REACTOR COOLANT SYSTEM LEAKAGE	
	Leakage Detection Systems	3/4 4-19
	Operational Leakage	3/4 4-20
TABLE 3.4-1	REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES	3/4 4-22
3/4.4.7	(This specification not used)	
3/4.4.8	SPECIFIC ACTIVITY	3/4 4-26
FIGURE 3.4-1	(This Figure not used)	
TABLE 4.4-4	(This Table not used)	
3/4.4.9	PRESSURE/TEMPERATURE LIMITS	
	Reactor Coolant System	3/4 4-31
FIGURE 3.4-2	REACTOR COOLANT SYSTEM HEATUP LIMITATIONS - APPLICABLE UP TO 32 EFPY	3/4 4-32

This page is included for completeness.
No changes to this page.

CONTAINMENT INTEGRITY

1.7 CONTAINMENT INTEGRITY shall exist when:

a. All penetrations required to be closed during accident conditions are either:

1) Capable of being closed by an OPERABLE containment automatic isolation valve system, or

2) Closed by manual valves, blind flanges, or deactivated automatic valves secured in their closed positions, except as provided in Specification 3.6.3.

b. All equipment hatches are closed and sealed,

c. Each air lock is in compliance with the requirements of Specification 3.6.1.3,

d. The containment leakage rates are within the limits of Specification 3.6.1 2, and

e. The sealing mechanism associated with each penetration (e.g., welds, bellows, or O-rings) is OPERABLE.

CONTROLLED LEAKAGE

1.8 CONTROLLED LEAKAGE shall be that seal water flow supplied to the reactor coolant pump seals.

CORE ALTERATIONS

1.9 CORE ALTERATIONS shall be the movement of any fuel, sources, or reactivity control components [excluding rod cluster control assemblies (RCCAs) locked out in the integrated head package] within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.

CORE OPERATING LIMITS REPORT

1.9a The CORE OPERATING LIMITS REPORT is the unit-specific document that provides core operating limits for the current operating reload cycle. These cycle-specific core operating limits shall be determined for each reload cycle in accordance with Specification 6.9.1.6. Plant operation within these core operating limits is addressed within the individual Specifications.

DIGITAL CHANNEL OPERATIONAL TEST

1.10 DIGITAL CHANNEL OPERATIONAL TEST shall consist of injecting simulated process data where available or exercising the digital computer hardware using data base manipulation to verify OPERABILITY of alarm, interlock, and/or trip functions.

DOSE EQUIVALENT I-131

1.11 DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microCurie/gram) which alone would produce the same Committed Effective Dose Equivalent dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The Committed Effective Dose Equivalent dose conversion factors used for this calculation shall be those listed in Federal Guidance Report 11, “Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion and Ingestion,” 1988 (Table 2.1, Exposure-to-Dose Conversion Factors for Inhalation).

DOSE EQUIVALENT XE-133

1.12 DOSE EQUIVALENT XE-133 shall be the concentration of Xe-133 (microcuries per gram) that alone would produce the same acute dose to the whole body as the combined activities of noble gas nuclides Kr-85m, Kr-85, Kr-87, Kr-88, Xe-131m, Xe-133m, Xe-133, Xe-135m, Xe-135, and Xe-138 actually present. If a specific noble gas nuclide is not detected, it should be assumed to be present at the minimum detectable activity. The determination of DOSE EQUIVALENT XE-133 shall be performed using effective does conversion factors for air submersion listed in Table III.1 of EPA Federal Guidance Report No. 12, 1993, “External Exposure to Radionuclides in Air, Water, and Soil.”

ENGINEERED SAFETY FEATURES RESPONSE TIME

1.13 The ENGINEERED SAFETY FEATURES (ESF) RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF Actuation Setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC.

FREQUENCY NOTATION

1.14 The FREQUENCY NOTATION specified for the performance of Surveillance Requirements GASEOUS WASTE PROCESSING SYSTEM shall correspond to the intervals defined in Table 1.1.

1.15 A GASEOUS WASTE PROCESSING SYSTEM shall be any system designed and installed to reduce radioactive gaseous effluents by collecting Reactor Coolant System offgases from the Reactor Coolant System and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

IDENTIFIED LEAKAGE

1.16 IDENTIFIED LEAKAGE shall be:

a. Leakage (except CONTROLLED LEAKAGE) into closed systems, such as pump seal or valve packing leaks that are captured and conducted to a sump or collecting tank, or

b. Leakage into the containment atmosphere from sources that are both specifically located and known either not to interfere with the operation of Leakage Detection Systems or not to be PRESSURE BOUNDARY LEAKAGE, or

c. Reactor Coolant System leakage through a steam generator to the Secondary Coolant System.

3/4.4.8 SPECIFIC ACTIVITY

LIMITING CONDITION FOR OPERATION

3.4.8 Reactor Coolant System DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 specific activity shall be within limits.

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

ACTION:

a. With the Reactor Coolant System DOSE EQUIVALENT I-131 not within the limit:

   1. Verify DOSE EQUIVALENT I-131 ≤ 60 microCuries per gram once every 4 hours, and

   2. Restore DOSE EQUIVALENT I-131 to within limit within 48 hours.

b. With the Reactor Coolant System DOSE EQUIVALENT XE-133 not within limit, restore DOSE EQUIVALENT XE-133 to within limit within 48 hours.

c. With the requirements of ACTION a or ACTION b not met or DOSE EQUIVALENT I-131 exceeding 60 microCuries per gram, be in HOT STANDBY within 6 hours and COLD SHUTDOWN within 36 hours.

d. The provisions of Specification 3.0.4.c are applicable to ACTION a and ACTION b.

SURVEILLANCE REQUIREMENTS

4.4.8.1 Verify Reactor Coolant System DOSE EQUIVALENT XE-133 specific activity ≤ 540 microCuries per gram at a frequency in accordance with the surveillance frequency control program.

4.4.8.2 Verify Reactor Coolant System DOSE EQUIVALENT I-131 specific activity ≤ 1.0 microCuries per gram:

   a. At a frequency in accordance with the surveillance frequency control program, and

   b. Between 2 and 6 hours after THERMAL POWER change of 15 % or greater RATED THERMAL POWER within a 1 hour period.

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FIGURE 3.4-1

(This figure not used)

Table 4.4-4

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Attachment 3

Technical Specification Bases Pages Markups
(Information Only)

3/4.4.8 SPECIFIC ACTIVITY

The limitations on the specific activity of the reactor coolant ensure that the resulting 2-hour doses at the SITE BOUNDARY will not exceed an appropriately small fraction of 10 CFR Part 100 dose guideline values following a steam generator tube rupture accident in conjunction with an assumed steady-state reactor-to-secondary steam generator leakage rate of 150 gpd per steam generator. The values for the limits on specific activity represent limits based upon a parametric evaluation by the NRC of typical site locations. These values are conservative in that specific site parameters of the STPEGS site, such as SITE BOUNDARY location and meteorological conditions, were not considered in this evaluation.

The ACTION statement permitting POWER OPERATION to continue for limited time periods with the reactor coolant's specific activity greater than 1 microCurie/gram DOSE EQUIVALENT I-131, but within the allowable limit ~~shown on Figure 3.4-1~~ **60 microCuries per gram**, accommodates possible iodine spiking phenomenon which may occur following changes in THERMAL POWER.

~~Action c. permits the use of provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S) while relying on the ACTIONS.~~

~~The sample analysis for determining the gross specific activity and E can exclude the radioiodines because of the low reactor coolant limit of 1 microCurie/gram DOSE EQUIVALENT I-131, and because, if the limit is exceeded, the radioiodine level is to be determined every 4 hours. If the gross specific activity level and radioiodine level in the reactor coolant were at their limits, the radioiodine contribution would be approximately 1%. In a release of reactor coolant with a typical mixture of radioactivity, the actual radioiodine contribution would probably be about 20%. The exclusion of radionuclides with half-lives less than 15 minutes from these determinations has~~

INSERT B1

SPECIFIC ACTIVITY (Continued)

been made for several reasons. The first consideration is the difficulty to identify short-lived radionuclides in a sample that requires a significant time to collect, transport, and analyze. The second consideration is the predictable delay time between the postulated release of radioactivity from the reactor coolant to its release to the environment and transport to the SITE BOUNDARY, which is relatable to at least 30 minutes decay time. The choice of 15 minutes for the half-life cutoff was made because of the nuclear characteristics of the typical reactor coolant radioactivity. The radionuclides in the typical reactor coolant have half-lives of less than 4 minutes or half-lives of greater than 14 minutes, which allows a distinction between the radionuclides above and below a half-life of 15 minutes. For these reasons the radionuclides that are excluded from consideration are expected to decay to very low levels before they could be transported from the reactor coolant to the SITE BOUNDARY under any accident condition.

Based upon the above considerations for excluding certain radionuclides from the sample analysis, the allowable time of 2 hours between sample taking and completing the initial analysis is based upon a typical time necessary to perform the sampling, transport the sample, and perform the analysis of about 90 minutes. After 90 minutes, the gross count should be made in a reproducible geometry of sample and counter having reproducible beta or gamma self-shielding properties. The counter should be reset to a reproducible efficiency versus energy. It is not necessary to identify specific nuclides. The radiochemical determination of nuclides should be based on multiple counting of the sample within typical counting basis following sampling of less than 1 hour, about 2 hours, about 1 day, about 1 week, and about 1 month.

Reducing T_{avg} to less than 500°F prevents the release of activity should a steam generator tube rupture since the saturation pressure of the reactor coolant is below the lift pressure of the atmospheric steam relief valves. The Surveillance Requirements provide adequate assurance that excessive specific activity levels in the reactor coolant will be detected in sufficient time to take corrective action. A reduction in frequency of isotopic analyses following power changes may be permissible if justified by the data obtained.

3/4.4.9 PRESSURE/TEMPERATURE LIMITS

The temperature and pressure changes during heatup and cooldown are limited to be consistent with the requirements given in the ASME Boiler and Pressure Vessel Code, Section III, Appendix G:

1. The reactor coolant temperature and pressure and system heatup and cooldown rates (with the exception of the pressurizer) shall be limited in accordance with Figures 3.4-2 and 3.4-3 for the service period specified thereon:

INSERT B1

In MODES 1, 2, 3, and 4, operation within the LCO limits for DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 is necessary to limit the potential consequences of a SLB or SGTR to within the acceptance criteria. In MODES 5 and 6, the steam generators are not being used for decay heat removal, the RCS and steam generators are depressurized, and primary to secondary leakage is minimal. Therefore, the monitoring of RCS specific activity is not required.

Action d permits the use of the provisions of LCO 3.0.4.c for ACTION a and b. This allowance permits entry into the applicable MODE(S), relying on Required Actions 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 which 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.

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 60.0 microCurie/gram or less. The Completion Time of 4 hours is required to obtain and analyze a sample. The DOSE EQUIVALENT I-131 and DOSE EQUIVALENT XE-133 must be restored to within their respective limit within 48 hours. The Completion Time of 48 hours is acceptable since it is expected that, if there were a spike, the normal coolant concentration would be restored within this time period. Also, there is a low probability of a SLB or SGTR occurring during this time period.

SR 4.4.8.1 requires performing a gamma isotopic analysis as a measure of the noble gas specific activity of the reactor coolant. 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. 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 4.4.8.1 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.

The Frequency, between 2 and 6 hours after a power change of 15% RTP or greater 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.