Enclosure 1

Description and Assessment of the Proposed Changes

Subject: Application to Revise the Fuel Handling Accident Analysis, to Delete Technical Specification 3.9.4 “Containment Penetrations,” and to Modify Technical Specification 3.3.6 “Containment Ventilation Isolation Instrumentation” for Sequoyah Nuclear Plant (SQN-TS-24-01)

CONTENTS

Attachments

Description and Assessment of the Proposed Changes

1.0 SUMMARY DESCRIPTION

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, “Application for amendment of license, construction permit, or early site permit,” Tennessee Valley Authority (TVA) is submitting a license amendment request (LAR) for Renewed Facility Operating License Nos. DPR-77 and DPR-79 for Sequoyah Nuclear Plant (SQN), Units 1 and 2. This request is for three related items.

- Approval is requested for a revised fuel handling accident (FHA) analysis.
- Approval is requested to delete SQN Units 1 and 2 Technical Specifications (TS) 3.9.4, “Containment Penetrations.”
- Approval is requested for a change to SQN Units 1 and 2 TS 3.3.6, “Containment Ventilation Isolation Instrumentation,” to remove ACTION B and the SPECIFIED CONDITION (a) in Table 3.3.6-1, and to remove the reference to “movement of irradiated fuel” in the FREQUENCY for SR 3.3.6.4 and SR 3.3.6.6.

2.0 DETAILED DESCRIPTION

2.1 System Design and Operation

The reactor core is comprised of an array of fuel assemblies. The fuel assemblies are designed to accommodate expected conditions for handling during refueling operations. However, an FHA is postulated to occur. In this accident, the fuel rods in one assembly rupture and all of the gap activity in the damaged rods is released.

Containment Ventilation isolation instrumentation closes the containment isolation valves in the Containment Purge System. This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident.

2.2 Reason for the Proposed Changes

The basis for TS 3.9.4, for TS 3.3.6 ACTION B, and for SPECIFIED CONDITION (a) in Table 3.3.6-1 was a requirement for containment penetration closure during movement of irradiated fuel assemblies within containment to ensure that a release of fission product radioactivity within containment would be restricted to within regulatory limits.

Containment penetration closure is defined as “all potential escape paths are closed or capable of being closed.” This requirement was based on the previous FHA dose analysis.

However, the new FHA dose analysis does not credit containment penetration closure.

This proposed license amendment would allow material to be transferred through containment penetrations in parallel with movement of irradiated fuel assemblies, thus facilitating a more efficient refueling outage schedule with no adverse effect on public health and safety.

2.3 Description of the Proposed Changes

Attachment 1 to this Enclosure provides the existing SQN Unit 1 TS pages marked up to show the proposed changes. Attachment 2 provides the existing SQN Unit 2 TS pages marked up to show the proposed changes.

Attachment 3 provides the existing SQN Unit 1 TS Bases pages marked up to show the proposed changes. Attachment 4 provides the existing SQN Unit 2 TS Bases pages marked up to show the proposed changes. Changes to the existing TS Bases are provided for information only and will be implemented under the Technical Specification Bases Control Program.

The following changes are proposed.

2.3.1 Description of the Proposed Revision to the FHA

The revised FHA analysis demonstrates that the FHA outside containment bounds the FHA inside containment. Thus, this analysis no longer credits containment penetration closure.

Other changes include:

- the assumption in hours of delay after shutdown
- elimination of the tritium source term associated with a fuel assembly containing tritium-producing burnable absorber rods (TPBARs)
- atmospheric dispersion factors

2.3.2 Description of the Proposed TS Changes

The following changes to SQN, Units 1 and 2, TS 3.9.4 are proposed.

- SQN Units 1 and 2 TS 3.9.4 is being deleted.

The following changes to SQN, Units 1 and 2, TS 3.3.6 are proposed.

- SQN Units 1 and 2 TS 3.3.6 ACTION B is being deleted.
- SQN Units 1 and 2 SR 3.3.6.4 FREQUENCY is being changed to remove reference to “movement of irradiated fuel.”
- SQN Units 1 and 2 SR 3.3.6.6 FREQUENCY is being changed to remove reference to “movement of irradiated fuel.”
- SQN Units 1 and 2 TS Table 3.3.6-1 SPECIFIED CONDITION (a) is being deleted.

3.0 TECHNICAL EVALUATION

3.1 Fuel Handling Accident

The technical basis in support of these proposed TS changes is the FHA dose analysis.

3.1.1 Fuel Handling Accident Dose Analysis Methodology

The FHA dose analysis for SQN was last submitted by TVA and approved by the Nuclear Regulatory Commission (NRC) in 2003 (References 1 and 2) as part of a TS change and selective implementation of the Alternate Source Term (AST). The input and assumptions remain the same except for four areas:

1. delay after shutdown;
2. TPBARs;
3. FHA inside containment; and
4. atmospheric dispersion factors.

Table 3.1.1-1 outlines the inputs and assumptions used in the 2003 submittal with comparison to the values used to support the current submittal. Inputs and assumptions are consistent with Regulatory Guide (RG) 1.183 Revision 0, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors,” which is the current licensing basis.

Table 3.1.1-1 - Comparison of FHA Input Parameters		
	2003 Submittal	**Current**
Delay after shutdown (hours)	100	70
Average fuel assembly activity (Ci) at shutdown (no decay)		
I-131	4.90E+05	4.90E+05
I-132	7.18E+05	7.18E+05
I-133	1.01E+06	1.01E+06
I-135	9.65E+05	9.65E+05
Kr-85	5.35E+03	5.35E+03
Xe-131m	5.43E+03	5.43E+03
Xe-133m	3.19E+04	3.19E+04
Xe-133	9.92E+05	9.92E+05
Xe-135	3.33E+05	3.33E+05
Te-131m	9.62E+04	9.62E+04
Te-132	7.05E+05	7.05E+05
Peaking Factor	1.70	1.70
Fuel rod gap fraction		
I-131	0.08	0.08
Kr-85	0.10	0.10
All others	0.05	0.05
Fuel damaged	1 ASSEMBLY	1 ASSEMBLY
Tritium Released (Ci)	84,000	0

Table 3.1.1-1 - Comparison of FHA Input Parameters		
	2003 Submittal	**Current**
Iodine species split		
Elemental	99.85%	99.85%
Organic	0.15%	0.15%
Pool Scrubbing Factor		
Iodine	200	200
Noble Gas	1	1
FHA Outside Containment		
Release path filter efficiency for iodines	no credit	no credit
Isolation of release path	none	none
Duration of releases (hrs)	2	2
FHA Inside Containment		
mixing volume (ft^3)	32,550	*
Purge flow rate (cfm)	16,000	*
Release path filter efficiency for iodines	none	*
Isolation of purge release path (sec)	30	*
Duration of releases via the equipment hatch	30 sec-2 hr	*
Offsite Breathing Rate (m^3/sec)	3.47E-04	3.5E-04
Atmospheric Dispersion		
Exclusion Area Boundary (EAB) (sec/m^3)	8.59E-04	1.02E-03
Low Population Zone (LPZ) (sec/m^3)	1.39E-04	8.78E-05
Control Room Parameters		
Volume (ft^3)	2.60E+05	2.60E+05
Normal operation flow (unfiltered) (cfm)	3200	3200
Time to switch to emergency mode after signal (min)	5	5
Emergency mode filtered intake flow (cfm)	1000	1000
Emergency mode filtered recirculation flow (cfm)	2600	2600
Filter efficiency for iodine	95%	95%
Unfiltered Inleakage (cfm)	51	51
Atmospheric Dispersion Factors		
Auxiliary Building Stack (sec/m^3)	1.80E-03	2.56E-03
Shield Building Vent (sec/m^3)	5.63E-04	6.09E-04
Occupancy Factors		
0-24 hrs	1	1
1-4 days	0.6	0.6
4-30 days	0.4	0.4
Breathing Rate (m^3/sec)	3.5E-04	3.5E-04
* FHA outside containment bounds FHA inside containment		

For inputs and assumptions listed in Table 3.1.1-1, a discussion of each of the changes from the 2003 submittal to the current submittal follows.

Delay After Shutdown

The decay time is changed to provide a basis for a potential future LAR to amend TS 3.9.8 “Decay Time.” However, such a request is not part of this current submittal.

As noted in SQN Units 1 and 2 TS 1.1, “Definitions,” core alteration is defined as “the movement of any fuel, sources, reactivity control components, or other components affecting reactivity within the reactor vessel with the head removed and fuel in the vessel”. The requirement of SQN Units 1 and 2 TS limiting condition for operation (LCO) 3.9.8, “Decay Time,” (i.e., the reactor shall be subcritical for ≥ 100 hours before core alterations can begin) is unchanged. Thus, use of 70 hours delay after shutdown in this new analysis is conservative with respect to the TS 3.9.8 requirement of 100 hours as it will result in a larger source term due to less decay.

Tritium Released

TPBARs have not been installed at SQN (Reference 3), nor are there any future plans to install TPBARS at SQN (Reference 4); therefore, the tritium source term associated with a fuel assembly containing TPBARs was eliminated.

FHA inside Containment

The FHA inside containment is no longer analyzed. The FHA inside containment assumed the release is through the shield building (SB) vent until isolation of the purge system, and then through the auxiliary building (AB) vent. The FHA outside containment assumes the release is through the AB vent. The SB vent has a lower χ/Q than the AB vent. Therefore, because releases are assumed linearly over a two-hour time period for both scenarios, and because the source term and transport parameters are the same for both, the FHA outside containment will always be bounding due to the higher χ/Q values.

Atmospheric Dispersion Factors

Control room and offsite χ/Qs were both updated using meteorological data from 2004 to 2013. The meteorological program has been developed consistent with the guidance in RG 1.23 Revision 1, “Meteorological Monitoring Programs for Nuclear Power Plants.” Wind direction and speed are measured with an ultrasonic wind sensor. Air temperature is measured by a platinum wire resistant temperature detector. Wind speeds represent a scalar average, while wind direction is based on the unit vector consistent with Section 5.3.1 of ANSI 3.11, “Determining Meteorological Information at Nuclear Facilities.” The number of wind speed categories reflects the guidance of RIS 2006-04, “Experience with Implementation of Alternative Source Terms.” Enclosure 6 contains a spreadsheet with hourly meteorological data for each year.

Control Room χ/Qs

The control room χ/Qs were calculated using ARCON96 (not integrated with another code) with meteorological data from 2004 to 2013. The U1 SB vent, U2 SB vent, and AB vent were analyzed. The receptors are the normal Main Control Room (MCR) intake and emergency MCR intake as shown in Enclosure 2. The intakes to the Technical Support Center (TSC) are the same as the MCR as it is part of the Main Control Room Habitability Zone. The input and assumptions are consistent with Regulatory Guide 1.194. Enclosure 2 contains the calculation of the χ/Qs for the AB vent as well as drawings of the plant layout. Enclosure 4 contains marked-up drawings that show release and receptor layouts and elevations. Enclosure 6 provides the ARCON96 input and output files for all scenarios. Enclosure 6 also provides the meteorological data files used with the ARCON96 models. Table 3.1.1-2 provides a list of the input parameters used for each release point. Table 3.1.1-3 provides results for each scenario.

Table 3.1.1-2 - ARCON96 Input Parameters

Description	**Units**	**AB Vent**	**U1 SB Vent**	**U2 SB Vent**
Lower Measurement Height	m	9.7	9.7	9.7
Upper Measurement height	m	46.4	46.4	46.4
Release Type		Ground	Ground	Ground
Release Height	m	32.5	39.5	39.5
Building Area	m^2	1744.7	1744.7	1744.7
Direction to Source (Normal intake)	deg	187	116	176
Direction to Source (Emergency intake)	deg	83	74	138
Wind Direction Window		90	90	90
Distance to Normal Intake	m	45.4	67.9	119.3
Distance to Emergency Intake	m	37.9	108.7	79.6
Control Room intake Height	m	14.3	14.3	14.3
Reference Elevation Difference	m	0	0	0
Minimum Wind Speed	m/s	0.5	0.5	0.5
Surface Roughness	m	0.2	0.2	0.2
Averaging Sector Width constant		4.3	4.3	4.3
Initial Diffusion Coefficients	m	0	0	0

Table 3.1.1-3 - ARCON96 Results

	Normal Intake	**Emergency Intake**
AB Vent	2.56E-03	1.57E-03
U1 Shield Building	4.33E-04	4.10E-04
U2 Shield Building	4.52E-04	5.99E-04

<u>Offsite χ/Q's</u>

The EAB and LPZ χ/Q's were determined using PAVAN (not integrated with another code) with updated meteorological data from 2004 to 2013. Consistent with UFSAR Section 2.3 and Figure 2.1.2-2, three release zones were analyzed to determine the most conservative release point for the EAB. Release Zone 1 represents any releases from the AB vent and the SB vents on both units. Release Zone 2 represents any releases from the chemical hood exhaust. Release Zone 3 represents any releases from the condenser air ejector exhaust. The highest of the three was then used in the FHA analysis. The inputs and assumptions are consistent with RG 1.145. Table 3.1.1-4 provides a summary of the input to the PAVAN models. Table 3.1.1-5 provides the results. The summary report of the analyses is provided in Enclosure 3. A printout of the joint frequency distributions of wind speed and direction for the 2004 to 2013 timeframe is provided in Enclosure 5. Enclosure 6 contains the input and output files.

Table 3.1.1-4 - PAVAN Input Parameters	
Containment Building Height	40.8 m
Containment Building Min. Cross Sectional Area	1632 m^2
Wind Sensor Height	9.73 m
Lower-T Sensor Height	9.25 m
Intermediate-T sensor Height	45.99 m
Distance to EAB	
Release Zone 1	556 m
Release Zone 2	600 m
Release Zone 3	509 m
Distance to LPZ	4828 m
Type of Release	ground
Building Wake Credit	yes

Table 3.1.1-5 - PAVAN Results		
		0-2 hours
EAB	Release Zone 1	8.82E-04
	Release Zone 2	7.76E-04
	Release Zone 3	1.02E-03
LPZ		8.78E-05

3.1.2 Fuel Handling Accident Dose Analysis Results

Table 3.1.2-1 provides the results of the FHA analysis, expressed in total effective dose equivalent (TEDE).

Table 3.1.2-1 - Radiological Consequences of a Fuel Handling Accident		
	TEDE (rem)	**Acceptance Criteria**
EAB	3.72	6.3
LPZ	0.32	6.3
Control Room	0.59	5.0

3.1.3 Conclusion

The revised FHA analysis shows that doses for offsite and control room dose locations meet applicable RG 1.183 limits with margin.

3.2 Review Against the Criteria which Require a TS LCO

The TS changes proposed in this LAR have been reviewed against the four criteria of 10 CFR 50.36(c)(2)(ii), which require a TS LCO to be established for each item meeting one or more of these criteria.

3.2.1 TS 3.9.4 “Containment Penetrations”

TS 3.9.4 requires containment building airlock doors and penetrations to be closed or capable of being closed during movement of irradiated fuel assemblies within containment. This requirement was based on the previous FHA dose analysis. With approval of the revised FHA analysis, this function does not meet any of the four criteria as outlined in the response for each criterion given below.

Criterion 1: Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

Discussion: The closure of containment penetrations during movement of irradiated fuel assemblies within containment is not related to instrumentation used to indicate degradation of the reactor coolant pressure boundary.

Criterion 2: A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Discussion: Closing of containment penetrations during movement of irradiated fuel assemblies within containment does not involve a process variable, design feature or operating restriction.

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.

Discussion: The containment building equipment hatch and airlock doors open into the auxiliary building. If an FHA were to occur inside containment with these doors open, the releases would flow into the auxiliary building. This is the same scenario as the FHA outside containment, which is the bounding case. Therefore, closure of the containment building equipment hatch and airlock doors during movement of irradiated fuel assemblies is no longer a primary success path to mitigate an FHA.

The majority of the other containment building penetrations do not release to the environment. The SB vent is the normal release path for containment purge and the emergency gas treatment system. The FHA analysis has demonstrated that a release through that vent is bounded by a release through the AB vent. Therefore, isolation of that release path is no longer required to mitigate an FHA.

All other containment penetrations to the outside were determined to be below either control room intake, or farther away than the AB vent and not in a more dominant wind sector. Thus, a release from the AB vent bounds a release from any existing containment building penetration that opens to the environment. Therefore, isolation of that release path is no longer required to mitigate an FHA.

Thus, the closure of the containment building equipment hatch, airlock doors, and penetrations during movement of irradiated fuel assemblies within containment is not part of the primary success path to mitigate a design basis accident or transient.

Criterion 4: A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

Discussion: The closure of containment penetrations during movement of irradiated fuel assemblies within containment is not relied upon for any events modeled in the scope of the Probabilistic Risk Assessment model. The revised FHA analysis performed assuming no credit for the closure of containment penetrations during movement of irradiated fuel assemblies within containment has demonstrated that this function is not needed to protect the public health and safety.

The movement of recently irradiated fuel is precluded by TS 3.9.8 which remains in place with this submittal, thus ensuring that the assumptions of the FHA analysis are met.

3.2.2 TS 3.3.6 "Containment Ventilation Isolation Instrumentation"

LCO 3.3.6 requires the containment ventilation isolation instrumentation for each function in TS Table 3.3.6-1 to be OPERABLE as specified in that table. This LAR proposes to remove TS ACTION B and SPECIFIED CONDITION (a) in Table 3.3.6-1, which are applicable only during movement of irradiated fuel assemblies within containment. These were based on the requirement to automatically isolate containment in the event of a fuel handling accident during shutdown. However, this requirement was based on the previous FHA dose analysis. With approval of the revised FHA analysis, this function does not meet any of the four criteria as outlined in the response for each criterion given below.

Criterion 1: Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

Discussion: Containment ventilation isolation instrumentation is not used for detection and indication in the control room of any degradation of the reactor coolant pressure boundary.

Criterion 2: A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Discussion: The operability of containment ventilation isolation instrumentation during movement of irradiated fuel assemblies within containment is not an initial condition of a design basis accident or transient analysis.

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.

Discussion: The SB vent is the normal release path for the containment purge system. Containment ventilation isolation instrumentation serves to close the containment isolation valves in the containment purge system, thus isolating the purge to the SB vent. The revised FHA analysis demonstrates that a release through the AB vent bounds a release through the

SB vent. Therefore, the containment ventilation isolation instrumentation is no longer required to mitigate an FHA.

Criterion 4: A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety.

Discussion: The operability of containment ventilation isolation instrumentation during movement of irradiated fuel assemblies within containment is not relied upon for any events modeled in the scope of the Probabilistic Risk Assessment model. The revised FHA analysis performed assuming no credit for the operability of containment ventilation isolation instrumentation during movement of irradiated fuel assemblies within containment has demonstrated that this function is not needed to protect the public health and safety.

3.2.3 Conclusion

The TS changes proposed in this LAR meet the requirements of 10 CFR 50.36(c)(2)(ii) with no adverse effect on public health and safety.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements and Criteria

General Design Criteria

SQN Units 1 and 2 were designed to meet the intent of the "Proposed General Design Criteria (GDC) for Nuclear Power Plant Construction Permits" published in July 1967. The SQN construction permit was issued in May 1970. The UFSAR, however, addresses the NRC GDC published as Appendix A to 10 CFR 50 in July 1971.

> *Criterion 19 – 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 LOCA. 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 approvals or certifications under part 52 of this chapter who apply on or after January 10, 1997, applicants for and holders of combined licenses or manufacturing licenses under part 52 of this chapter who do not reference a standard design approval or 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.

Compliance with GDC 19 is described in Section 3.1.2 of the SQN UFSAR.

NRC Regulatory Guides

RG 1.23, “Meteorological Monitoring Programs for Nuclear Power Plants.”

Compliance with RG 1.23 is described in Section 2.3.3 of the SQN UFSAR.

RG 1.145, “Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants.”

Compliance with RG 1.145 is described in Section 2.3.4 of the SQN UFSAR.

RG 1.183, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors.”

Compliance with RG 1.183 is described in Section 15.5.6 of the SQN UFSAR.

RG 1.194, “Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants.”

With the implementation of the proposed changes, SQN Units 1 and 2 continue to meet the applicable regulations and requirements, subject to the previously approved exceptions.

4.2 Precedent

TVA submitted a LAR for the Watts Bar Nuclear Plant, Unit 1, to, in part, delete TS 3.9.4, "Containment Penetrations," and to modify TS 3.3.6 "Containment Vent Isolation Instrumentation," to eliminate the requirements for containment penetration closure during movement of irradiated fuel assemblies within containment, as part of selective implementation of AST for the FHA in Reference 5. This was supplemented by TVA in Reference 6. The NRC approved that request in Reference 7. The basis for this precedent is the same as the basis for this request.

4.3 No Significant Hazards Consideration

Tennessee Valley Authority (TVA) is requesting an amendment to Renewed Facility Operating License Nos. DPR-77 and DPR-79 for Sequoyah (SQN) Units 1 and 2. This proposed license amendment would:

- revise the Fuel Handling Accident (FHA) analysis.
- delete Technical Specifications (TS) 3.9.4, “Containment Penetrations.”
- modify TS 3.3.6, “Containment Ventilation Isolation Instrumentation,” to remove ACTION B and the SPECIFIED CONDITION (a) in Table 3.3.6-1, and to remove the reference to “movement of irradiated fuel” in the FREQUENCY for SR 3.3.6.4 and SR 3.3.6.6.

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendments by focusing on the three standards set forth in Title 10, Code of Federal Regulations, Part 50.92, “Issuance of amendment,” as discussed below.

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

   Response: No

The proposed changes do not affect any of the parameters or conditions that could contribute to the initiation of any accidents. Because design basis accident initiators are not being altered by adoption of the analysis of the FHA, the probability of an accident previously evaluated is not affected.

The dose consequences of an FHA have been evaluated utilizing the Alternate Source Term (AST) methodology recognized by 10 CFR 50.67 and the guidance contained within Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors." Based upon the results of this analysis, TVA has demonstrated that, with the requested changes, the dose consequences of the FHA are within the appropriate acceptance criteria of 10 CFR 50.67 and RG 1.183.

Therefore, the proposed change does 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?*

   Response: No.

   The proposed changes do not require any new or different accidents to be postulated, because no changes are being made to the plant that would introduce any new accident causal mechanisms. This license amendment request does not impact any plant systems that are potential accident initiators.

   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 margin of safety is related to the ability of the fission product barriers to perform their design functions during and following an accident. The proposed change does not alter the assumptions contained in the safety analyses regarding these barriers.

   The margin of safety associated with the acceptance criteria of any accident is unchanged. The proposed change will have no effect on the availability, operability, or performance of safety-related systems and components.

   Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed amendment does not involve a 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 Conclusion

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.

5.0 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 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.

6.0 REFERENCES

1. TVA Letter to NRC, TVA-SQN-TS-02-08, "Sequoyah Nuclear Plant, Units 1 and 2 – Technical Specification (TS) Change 02-08, ‘Partial Scope Implementation of the Alternate Source Term and Revision of Requirements for Closure of the Containment Building Equipment Door During Movement of Irradiated Fuel’," dated January 14, 2003 (ML030160157)

2. NRC Letter to TVA, "Sequoyah Nuclear Plant, Units 1 and 2 - Issuance of Amendments Regarding Closure of the Containment Building Equipment Doors During Movement of Irradiated Fuel (TAC Nos. MB7238 and MB7239) (TS-02-08)," dated October 28, 2003 (ML033030206)

3. TVA electronic mail to NRC, “FW: Restriction Regarding TPBARs Implementation at Sequoyah Nuclear Plant, Units 1 and 2,” dated October 12, 2011 (ML11285A203)

4. 89FR50664, “TENNESSEE VALLEY AUTHORITY Amended Record of Decision for the Production of Tritium in Commercial Light Water Reactors,” dated June 14, 2024.

5. TVA Letter to NRC, "Watts Bar Nuclear Plant Unit 1 - Application to Allow Selective Implementation of Alternate Source Term to Analyze the Dose Consequences Associated with Fuel Handling Accidents (WBN-TS-11-19)," dated June 13, 2012 (ML12171A317)

6. TVA Letter to NRC, "Response to NRC Request for Additional Information Regarding the Application to Allow Selective Implementation of Alternate Source Term to Analyze the Dose Consequences Associated With Fuel-Handling Accidents (TAC No. ME8877)," dated February 4, 2013 (ML13038A011)

7. NRC Letter to TVA, "Watts Bar Nuclear Plant Unit 1 - Issuance of Amendment to Allow Selective Implementation of Alternate Source Term to Analyze the Dose Consequences Associated with Fuel-Handling Accidents (TAC No. ME8877)," dated June 19, 2013 (ML13141A564)

Enclosure 1 - Attachment 1

Proposed TS Changes (Markups) for SQN Unit 1

(5 pages)

~~ACTIONS (continued)~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~B. -----------NOTE----------- Only applicable during movement of irradiated fuel assemblies within containment. ----------------------------~~	~~B.1 Place and maintain containment purge supply and exhaust valves in closed position.~~	~~Immediately~~
	~~OR~~	
~~One or more Functions with one or more manual or automatic actuation trains inoperable.~~ ~~OR~~ ~~One required radiation monitoring channel inoperable.~~	~~B.2 Enter applicable Conditions and Required Actions of LCO 3.9.4, "Containment Penetrations," for containment purge supply and exhaust isolation valves made inoperable by isolation instrumentation.~~	~~Immediately~~

Deleted

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.4	Perform COT.	~~Within 100 hours prior to start of movement of irradiated fuel~~ ~~AND~~ In accordance with the Surveillance Frequency Control Program
SR 3.3.6.5	Perform SLAVE RELAY TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.6.6	------------------------------NOTE------------------------------ Verification of setpoint is not required. --- Perform TADOT.	~~Within 100 hours prior to start of movement of irradiated fuel~~ ~~AND~~ In accordance with the Surveillance Frequency Control Program

Table 3.3.6-1 (page 1 of 1)
Containment Ventilation Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	1,2,3,4~~, (a)~~	2	SR 3.3.6.6	NA
2. Automatic Actuation				NA
a. Logic	1,2,3,4	2 trains	SR 3.3.6.2	NA
b. Relays	1,2,3,4~~, (a)~~	2 trains	SR 3.3.6.3 SR 3.3.6.5	NA
3. Containment Purge Air Radiation Monitor	1,2,3,4	1	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7 SR 3.3.6.8	≤ 8.5 x 10^{-3} μCi/cc
	~~(a)~~	~~2~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.4~~ ~~SR 3.3.6.7~~	~~≤ 8.5 x 10^{-3} μCi/cc~~
4. Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.			

~~(a) During movement of irradiated fuel assemblies within containment.~~

3.9 REFUELING OPERATIONS

3.9.4 ~~Containment Penetrations~~ Deleted

~~LCO 3.9.4~~ ~~The containment penetrations shall be in the following status:~~

~~a.~~ ~~The equipment hatch is closed and held in place by four bolts;~~

~~b.~~ ~~One door in each air lock is capable of being closed; and~~

~~c.~~ ~~Each penetration providing direct access from the containment atmosphere to the outside atmosphere is either:~~

~~1.~~ ~~Closed by a manual or automatic isolation valve, blind flange, or equivalent; or~~

~~2.~~ ~~Capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve.~~

~~------------------------------------NOTE------------------------------------~~
~~Penetration flow path(s) providing direct access from the containment atmosphere that transverse and terminate in the Auxiliary Building Secondary Containment Enclosure may be unisolated under administrative controls.~~
~~---~~

~~APPLICABILITY:~~ ~~3.9.4.a. Containment Building Equipment Hatch - During movement of recently irradiated fuel assemblies within containment.~~
~~3.9.4.b. and c. Containment Building Airlock Doors and Penetrations - During movement of irradiated fuel assemblies within containment.~~

~~ACTIONS~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~A. Containment equipment hatch not in required status during movement of recently irradiated fuel assemblies.~~	~~A.1 Suspend movement of recently irradiated fuel assemblies within containment.~~	~~Immediately~~
~~B. One or more containment penetrations not in required status during movement of irradiated fuel assemblies.~~	~~B.1 Suspend movement of irradiated fuel assemblies within containment.~~	~~Immediately~~

~~SURVEILLANCE REQUIREMENTS~~

~~SURVEILLANCE~~		~~FREQUENCY~~
~~SR 3.9.4.1~~	~~Verify each required containment penetration is in the required status.~~	~~In accordance with the Surveillance Frequency Control Program~~
~~SR 3.9.4.2~~	~~-----------------------------NOTE-----------------------------~~ ~~Not required to be met for containment ventilation isolation valve(s) in penetrations closed to comply with LCO 3.9.4.c.1.~~ ~~---~~ ~~Verify each required containment ventilation isolation valve that is not locked, sealed, or otherwise secured in position, actuates to the isolation position on an actual or simulated actuation signal.~~	 ~~In accordance with the Surveillance Frequency Control Program~~

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Enclosure 1 - Attachment 2

Proposed TS Changes (Markups) for SQN Unit 2

(5 pages)

~~ACTIONS (continued)~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~B. ------------NOTE------------ Only applicable during movement of irradiated fuel assemblies within containment. -------------------------------~~	~~B.1 Place and maintain containment purge supply and exhaust valves in closed position.~~	~~Immediately~~
	~~OR~~	
~~One or more Functions with one or more manual or automatic actuation trains inoperable.~~ ~~OR~~ ~~One required radiation monitoring channel inoperable.~~	~~B.2 Enter applicable Conditions and Required Actions of LCO 3.9.4, "Containment Penetrations," for containment purge supply and exhaust isolation valves made inoperable by isolation instrumentation.~~	~~Immediately~~

Deleted

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.6.4	Perform COT.	~~Within 100 hours prior to start of movement of irradiated fuel~~ ~~AND~~ In accordance with the Surveillance Frequency Control Program
SR 3.3.6.5	Perform SLAVE RELAY TEST.	In accordance with the Surveillance Frequency Control Program
SR 3.3.6.6	------------------------------NOTE------------------------------ Verification of setpoint is not required. -- Perform TADOT.	~~Within 100 hours prior to start of movement of irradiated fuel~~ ~~AND~~ In accordance with the Surveillance Frequency Control Program

Table 3.3.6-1 (page 1 of 1)
Containment Ventilation Isolation Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS	TRIP SETPOINT
1. Manual Initiation	1,2,3,4~~, (a)~~	2	SR 3.3.6.6	NA
2. Automatic Actuation				NA
a. Logic	1,2,3,4	2 trains	SR 3.3.6.2	NA
b. Relays	1,2,3,4~~, (a)~~	2 trains	SR 3.3.6.3 SR 3.3.6.5	NA
3. Containment Purge Air Radiation Monitor	1,2,3,4	1	SR 3.3.6.1 SR 3.3.6.4 SR 3.3.6.7 SR 3.3.6.8	≤ 8.5 x 10^{-3} μCi/cc
	~~(a)~~	~~2~~	~~SR 3.3.6.1~~ ~~SR 3.3.6.4~~ ~~SR 3.3.6.7~~	~~≤ 8.5 x 10^{-3} μCi/cc~~
4. Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements.			

~~(a) During movement of irradiated fuel assemblies within containment.~~

3.9 REFUELING OPERATIONS

3.9.4 ~~Containment Penetrations~~ Deleted

~~LCO 3.9.4~~ ~~The containment penetrations shall be in the following status:~~

~~a. The equipment hatch is closed and held in place by four bolts;~~

~~b. One door in each air lock is capable of being closed; and~~

~~c. Each penetration providing direct access from the containment atmosphere to the outside atmosphere is either:~~

~~1. Closed by a manual or automatic isolation valve, blind flange, or equivalent; or~~

~~2. Capable of being closed by an OPERABLE automatic Containment Ventilation isolation valve.~~

~~---NOTE---~~
~~Penetration flow path(s) providing direct access from the containment atmosphere that transverse and terminate in the Auxiliary Building Secondary Containment Enclosure may be unisolated under administrative controls.~~
~~---~~

~~APPLICABILITY:~~ ~~3.9.4.a. Containment Building Equipment Hatch - During movement of recently irradiated fuel assemblies within containment.~~
~~3.9.4.b. and c. Containment Building Airlock Doors and Penetrations - During movement of irradiated fuel assemblies within containment.~~

~~ACTIONS~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~A. Containment equipment hatch not in required status during movement of recently irradiated fuel assemblies.~~	~~A.1 Suspend movement of recently irradiated fuel assemblies within containment.~~	~~Immediately~~
~~B. One or more containment penetrations not in required status during movement of irradiated fuel assemblies.~~	~~B.1 Suspend movement of irradiated fuel assemblies within containment.~~	~~Immediately~~

~~SURVEILLANCE REQUIREMENTS~~

~~SURVEILLANCE~~		~~FREQUENCY~~
~~SR 3.9.4.1~~	~~Verify each required containment penetration is in the required status.~~	~~In accordance with the Surveillance Frequency Control Program~~
~~SR 3.9.4.2~~	~~-----------------------------NOTE-----------------------------~~ ~~Not required to be met for containment ventilation isolation valve(s) in penetrations closed to comply with LCO 3.9.4.c.1.~~ ~~---~~ ~~Verify each required containment ventilation isolation valve that is not locked, sealed, or otherwise secured in position, actuates to the isolation position on an actual or simulated actuation signal.~~	~~In accordance with the Surveillance Frequency Control Program~~

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Enclosure 1 - Attachment 3

Proposed TS Bases Changes (Markups) for SQN Unit 1

(12 pages)

(For Information Only)

B 3.3 INSTRUMENTATION

B 3.3.6 Containment Ventilation Isolation Instrumentation

BASES

BACKGROUND

Containment Ventilation isolation instrumentation closes the containment isolation valves in the Containment Purge System. This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident. The Containment Purge System may be in use during reactor operation and with the reactor shutdown.

Containment Ventilation isolation initiates on a automatic safety injection (SI) signal or by manual actuation. The Bases for LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," discuss initiation of SI signals.

The containment purge system has inner and outer containment isolation valves in its supply and exhaust ducts. A high radiation signal initiates containment ventilation isolation, which closes both inner and outer containment isolation valves in the Containment Purge System. This system is described in the Bases for LCO 3.6.3, "Containment Isolation Valves."

APPLICABLE SAFETY ANALYSES

The safety analyses assume that the containment remains intact with containment purge isolated early in the event, within approximately 300 seconds. The containment ventilation isolation radiation monitors, in addition to the SI signal, ensure closing of the containment purge supply and exhaust valves. ~~They are also the primary means for automatically isolating containment in the event of a fuel handling accident during shutdown.~~ Containment isolation in turn ensures meeting the containment leakage rate assumptions of the safety analyses, and ensures that the calculated accidental offsite radiological doses are below 10 CFR 100 (Ref. 1) limits ~~(10 CFR 50.67 limits for a fuel handling accident)~~.

The containment ventilation isolation instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO (continued)

3. Containment Radiation

Table 3.3.6-1 specifies the number of required channels of radiation monitors to ensure that the radiation monitoring instrumentation necessary to initiate Containment Ventilation Isolation remains OPERABLE.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of the channel electronics. OPERABILITY also requires correct valve lineup and sample pump operation, as well as detector OPERABILITY, for trip to occur under the conditions assumed by the safety analyses.

4. Safety Injection (SI)

Refer to LCO 3.3.2, Function 1, for all initiating Functions and requirements.

APPLICABILITY

The Manual Initiation, Automatic Actuation Logic and Actuation Relays, Safety Injection, and Containment Radiation Functions are required OPERABLE as annotated on Table 3.3.6-1. Under these conditions, the potential exists for an accident that could release significant fission product radioactivity into containment. Therefore, the containment ventilation isolation instrumentation must be OPERABLE in these MODES.

While in MODES 5 and 6 ~~without fuel handling in progress~~, the containment ventilation isolation instrumentation need not be OPERABLE since the potential for radioactive releases is minimized and operator action is sufficient to ensure post accident offsite doses are maintained within the limits of Reference 1.

The Applicability for the containment ventilation isolation on the ESFAS Safety Injection Functions are specified in LCO 3.3.2. Refer to the Bases for LCO 3.3.2 for discussion of the Safety Injection Function Applicability.

BASES

ACTIONS

The most common cause of channel inoperability is outright failure or drift sufficient to exceed the tolerance allowed by unit specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. This determination is generally made during the performance of a COT, when the process instrumentation is set up for adjustment to bring it within specification. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate Condition entered.

A Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.6-1. The Completion Time(s) of the inoperable channel(s)/train(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to all Containment Ventilation Isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these Functions. It also addresses the failure of required radiation monitoring channel.

If a train is inoperable or the required channel is inoperable, operation may continue as long as the Required Action for the applicable Conditions of LCO 3.6.3 is met for each valve made inoperable by failure of isolation instrumentation.

A Note is added stating that Condition A is only applicable in MODE 1, 2, 3, or 4.

~~B.1 and B.2~~

~~Condition B applies to all Containment Ventilation Isolation Functions and addresses the train orientation of the SSPS and the master and slave relays for these Functions. It also addresses the failure of the required radiation monitoring channel. If a train or the required radiation monitoring channel is inoperable, operation may continue as long as the Required Action to place and maintain containment ventilation isolation valves in their closed position is met or the applicable Conditions of LCO 3.9.4, "Containment Penetrations," are met for each valve made inoperable by failure of isolation instrumentation. The Completion Time for these Required Actions is Immediately.~~

BASES

ACTIONS (continued)

~~A Note states that Condition B is applicable during movement of irradiated fuel assemblies within containment.~~

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.6-1 determines which SRs apply to which Containment Ventilation Isolation Functions.

SR 3.3.6.1

Performance of the CHANNEL CHECK ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

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

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.3.6.2

SR 3.3.6.2 is the performance of an ACTUATION LOGIC TEST. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and there is an intact voltage signal path to the master relay coils.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

LCO

Containment OPERABILITY is maintained by limiting leakage to ≤ 1.0 L_a, except prior to the first startup after performing a required Containment Leakage Rate Testing Program leakage test. At this time the applicable leakage limits must be met.

Compliance with this LCO will ensure a containment configuration, including equipment hatches, that is structurally sound and that will limit leakage to those leakage rates assumed in the safety analysis.

Individual leakage rates specified for the containment air lock (LCO 3.6.2), purge valves with resilient seals, and secondary bypass leakage (LCO 3.6.3) are not specifically part of the acceptance criteria of 10 CFR 50, Appendix J. Therefore, leakage rates exceeding these individual limits only result in the containment being inoperable when the leakage results in exceeding the overall acceptance criteria of the Containment Leakage Rate Testing Program.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material into containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, containment is not required to be OPERABLE in MODES 5 and 6 to prevent leakage of radioactive material from containment. ~~The requirements for containment during MODE 6 are addressed in LCO 3.9.4, "Containment Penetrations."~~

ACTIONS

A.1

In the event containment is inoperable, containment must be restored to OPERABLE status within 1 hour. The 1 hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining containment OPERABLE during MODES 1, 2, 3, and 4. This time period also ensures that the probability of an accident (requiring containment OPERABILITY) occurring during periods when containment is inoperable is minimal.

B.1 and B.2

If containment cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to 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 orderly manner and without challenging plant systems.

BASES

LCO

Each containment air lock forms part of the containment pressure boundary. As part of the containment pressure boundary, the air lock safety function is related to control of the containment leakage rate resulting from a DBA. Thus, each air lock's structural integrity and leak tightness are essential to the successful mitigation of such an event.

Each air lock is required to be OPERABLE. For the air lock to be considered OPERABLE, the air lock interlock mechanism must be OPERABLE, the air lock must be in compliance with the Type B air lock leakage test, and both air lock doors must be OPERABLE. The interlock allows only one air lock door of an air lock to be opened at one time. This provision ensures that a gross breach of containment does not exist when containment is required to be OPERABLE. Closure of a single door in each air lock is sufficient to provide a leak tight barrier following postulated events. Nevertheless, both doors are kept closed when the air lock is not being used for normal entry into or exit from containment.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment air locks are not required in MODES 5 and 6 to prevent leakage of radioactive material from containment. ~~The requirements for the containment air locks during MODE 6 are addressed in LCO 3.9.4, "Containment Penetrations."~~

ACTIONS

The ACTIONS are modified by a Note that allows entry and exit to perform repairs on the affected air lock component. If the outer door is inoperable, then it may be easily accessed for most repairs. It is preferred that the air lock be accessed from inside primary containment by entering through the other OPERABLE air lock. However, if this is not practicable, or if repairs on either door must be performed from the barrel side of the door then it is permissible to enter the air lock through the OPERABLE door, which means there is a short time during which the containment boundary is not intact (during access through the OPERABLE door). The ability to open the OPERABLE door, even if it means the containment boundary is temporarily not intact, is acceptable due to the low probability of an event that could pressurize the containment during the short time in which the OPERABLE door is expected to be open. After each entry and exit, the OPERABLE door must be immediately closed. If ALARA conditions permit, entry and exit should be via an OPERABLE air lock.

BASES

LCO (continued)

intact. These passive isolation valves/devices are those listed in Reference 2.

Purge valves with resilient seals and shield building bypass leakage paths must meet additional leakage rate requirements. The other containment isolation valve leakage rates are addressed by LCO 3.6.1, "Containment," as Type C testing.

This LCO provides assurance that the containment isolation valves and purge valves will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the containment boundary during accidents.

Note that due to competing requirements and dual functions associated with the containment vacuum relief isolation valves (FCV-30-46, -47, and -48), the air supply and solenoid arrangement is designed such that upon the unavailability of Train A essential control air, the containment vacuum relief isolation valves are incapable of automatic closure and are therefore considered inoperable for the containment isolation function without operator action.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment isolation valves are not required to be OPERABLE in MODES 5 and 6. ~~The requirements for containment isolation valves during MODE 6 are addressed in LCO 3.9.4, "Containment Penetrations."~~

ACTIONS

The ACTIONS are modified by a Note allowing penetration flow paths, to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for containment isolation is indicated.

A second Note has been added to provide clarification that, for this LCO, separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable containment isolation valve. Complying with the Required Actions may allow for continued operation, and subsequent inoperable containment isolation valves are governed by subsequent Condition entry and application of associated Required Actions.

The ACTIONS are further modified by a third Note, which ensures

B 3.9 REFUELING OPERATIONS

B 3.9.4 ~~Containment Penetrations~~ Deleted

BASES

BACKGROUND

During movement of irradiated fuel assemblies within containment, a release of fission product radioactivity within containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In MODE 6, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. The LCO requirements are referred to as "containment closure" rather than "containment OPERABILITY." Containment closure means that all potential escape paths are closed or capable of being closed. Since there is no potential for containment pressurization, the Appendix J leakage criteria and tests are not required.

The containment serves to contain fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained within the requirements of 10 CFR 50.67. Additionally, the containment provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment equipment hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of containment. During movement of recently irradiated fuel assemblies within containment, the equipment hatch must be held in place by at least four bolts. Good engineering practice dictates that the bolts required by this LCO be approximately equally spaced.

The containment air locks, which are also part of the containment pressure boundary, provide a means for personnel access during MODES 1, 2, 3, and 4 unit operation in accordance with LCO 3.6.2, "Containment Air Locks." Each air lock has a door at both ends. The doors are normally interlocked to prevent simultaneous opening when containment OPERABILITY is required. During periods of unit shutdown when containment closure is not required, the door interlock mechanism may be disabled, allowing both doors of an air lock to remain open for extended periods when frequent containment entry is necessary. During movement of irradiated fuel assemblies within containment, containment closure is required; therefore, the door interlock mechanism may remain disabled, but one air lock door must always remain capable of being closed.

BASES

BACKGROUND (continued)

The requirements for containment penetration closure ensure that a release of fission product radioactivity within containment will be restricted to within regulatory limits.

The Reactor Building Purge Ventilation (RBPV) System includes three subsystems. The normal subsystem includes four 24 inch purge penetrations and two 24 inch exhaust penetrations. The second subsystem, a pressure relief system, includes an 8 inch exhaust penetration. The third subsystem includes a 12 inch instrument room supply penetration and a 12 inch exhaust penetration. During MODES 1, 2, 3, and 4, no more than one pair of containment purge lines (one set of supply valves and one set of exhaust valves) may be opened (Ref. 4). None of the subsystems are subject to a Specification in MODE 5.

In MODE 6, large air exchangers are necessary to conduct refueling operations. The normal 24 inch purge system is used for this purpose, and all valves are closed by Containment Ventilation Isolation in accordance with LCO 3.3.6, "Containment Ventilation Isolation Instrumentation."

The other containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be isolated on at least one side. Isolation may be achieved by an OPERABLE automatic isolation valve (either open or closed), or by a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods must be approved and may include use of a material that can provide a temporary, atmospheric pressure, ventilation barrier for the other containment penetrations during irradiated fuel movements (Ref. 1).

APPLICABLE SAFETY ANALYSES

During movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel resulting from dropping a single irradiated fuel assembly (Ref. 2). The requirements of LCO 3.9.7, "Refueling Cavity Water Level," in conjunction with a minimum decay time of 100 hours prior to irradiated fuel movement with containment closure capability, ensures that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are within the values specified in 10 CFR 50.67 or the NRC staff approved licensing basis (e.g., Regulatory Guide 1.183, (Ref. 3) limits).

Containment penetrations satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

This LCO limits the consequences of a fuel handling accident involving handling irradiated fuel in containment by limiting the potential escape paths for fission product radioactivity released within containment. The LCO requires any penetration providing direct access from the containment atmosphere to the outside atmosphere or to the auxiliary building secondary containment enclosure, to be closed except for the OPERABLE containment purge and exhaust penetrations and the containment personnel air locks. For the OPERABLE containment purge and exhaust penetrations, this LCO ensures that these penetrations are isolable by an automatic Containment Ventilation isolation valve. The OPERABILITY requirements for this LCO ensure that the containment ventilation isolation valve closure times specified in the UFSAR can be achieved and, therefore, meet the assumptions used in the safety analysis to ensure that releases through the valves are terminated, such that radiological doses are within the acceptance limit.

During movement of recently irradiated fuel assemblies within containment, the equipment hatch is required to be held in place by at least four bolts.

The LCO is modified by a Note allowing penetration flow paths with direct access from the containment atmosphere that transverse and terminate in the Auxiliary Building Secondary Containment Enclosure to be unisolated under administrative controls. Administrative controls ensure that 1) appropriate personnel are aware of the open status of the penetration flow path during movement of irradiated fuel assemblies within containment, and 2) specified individuals are designated and readily available to isolate the flow path in the event of a fuel handling accident.

The containment personnel air lock doors may be open during movement of irradiated fuel in the containment provided that one door is capable of being closed in the event of a fuel handling accident. Should a fuel handling accident occur inside containment, at least one personnel air lock door will be closed following an evacuation of containment.

APPLICABILITY

The containment penetration requirements are applicable when there is a potential for the limiting fuel handling accident (FHA). The applicability requirements are based on the FHA analysis which assumes a fuel assembly is dropped and damaged during refueling. In MODES 1, 2, 3, and 4, containment penetration requirements are addressed by LCO 3.6.1. In MODES 5 and 6, when movement of irradiated fuel assemblies within containment is not being conducted, the potential for a fuel handling accident does not exist. Additionally, due to radioactive decay, a fuel handling accident involving handling irradiated fuel that is not "recently" irradiated (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours) will result in doses that are within the values specified in 10 CFR 50.67 even without containment closure capability. The applicability of 3.9.4.a. for the Containment Building

BASES

APPLICABILITY (continued)

Equipment Hatch is "During the movement of recently irradiated fuel in containment" which maintains the containment closure requirements when the fuel has not sufficiently decayed to remain within these limits. The applicability of 3.9.4.b. and c. for the Containment Air Lock Doors and containment penetrations that provide direct access from containment atmosphere to outside atmosphere is "During movement of irradiated fuel in containment."

ACTIONS

A.1

If the containment equipment hatch, is not in the required status, the unit must be placed in a condition where the isolation function is not needed. This is accomplished by immediately suspending movement of recently irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

B.1

If the containment building air lock doors or any other containment penetration that provides direct access from the containment atmosphere to the outside atmosphere is not in the required status, including the Containment Ventilation Isolation valve(s) not capable of automatic actuation when the purge and exhaust valves are open, the unit must be placed in a condition where the isolation function is not needed. This is accomplished by immediately suspending movement of irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.9.4.1

This Surveillance demonstrates that each containment penetration is in its required status. The requirement that penetrations are capable of being closed by an OPERABLE automatic containment ventilation isolation valve, can be verified by ensuring that each required containment ventilation isolation valve operator has motive power.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.9.4.2

This Surveillance demonstrates that each containment ventilation isolation valve, that is not locked, sealed, or otherwise secured in

BASES

SURVEILLANCE REQUIREMENTS (continued)

position, actuates to its isolation position on manual initiation or on an actual or simulated actuation signal.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

The SR is modified by a Note stating that this Surveillance is not required to be met for valves in isolated penetrations. The LCO provides the option to close penetrations in lieu of requiring automatic actuation capability.

REFERENCES

1. GPU Nuclear Safety Evaluation SE-0002000-001, Rev. 0, May 20, 1988.

2. Document ID: LTR-CRA-02-219, Westinghouse Electric Company, "Radiological Consequences of Fuel Handling Accidents for the Sequoyah Nuclear Plant Units 1 and 2."

3. Regulatory Guide 1.183, Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors, July 2000.

4. UFSAR, Section 9.4.7.

Enclosure 1 - Attachment 4

Proposed TS Bases Changes (Markups) for SQN Unit 2

(12 pages)

(For Information Only)

B 3.3 INSTRUMENTATION

B 3.3.6 Containment Ventilation Isolation Instrumentation

BASES

BACKGROUND	Containment Ventilation isolation instrumentation closes the containment isolation valves in the Containment Purge System. This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident. The Containment Purge System may be in use during reactor operation and with the reactor shutdown. Containment Ventilation isolation initiates on a automatic safety injection (SI) signal or by manual actuation. The Bases for LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," discuss initiation of SI signals. The containment purge system has inner and outer containment isolation valves in its supply and exhaust ducts. A high radiation signal initiates containment ventilation isolation, which closes both inner and outer containment isolation valves in the Containment Purge System. This system is described in the Bases for LCO 3.6.3, "Containment Isolation Valves."
APPLICABLE SAFETY ANALYSES	The safety analyses assume that the containment remains intact with containment purge isolated early in the event, within approximately 300 seconds. The containment ventilation isolation radiation monitors, in addition to the SI signal, ensure closing of the containment purge supply and exhaust valves. ~~They are also the primary means for automatically isolating containment in the event of a fuel handling accident during shutdown.~~ Containment isolation in turn ensures meeting the containment leakage rate assumptions of the safety analyses, and ensures that the calculated accidental offsite radiological doses are below 10 CFR 100 (Ref. 1) limits ~~(10 CFR 50.67 limits for a fuel handling accident)~~. The containment ventilation isolation instrumentation satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO (continued)

3. Containment Radiation

Table 3.3.6-1 specifies the number of required channels of radiation monitors to ensure that the radiation monitoring instrumentation necessary to initiate Containment Ventilation Isolation remains OPERABLE.

For sampling systems, channel OPERABILITY involves more than OPERABILITY of the channel electronics. OPERABILITY also requires correct valve lineup and sample pump operation, as well as detector OPERABILITY, for trip to occur under the conditions assumed by the safety analyses.

4. Safety Injection (SI)

Refer to LCO 3.3.2, Function 1, for all initiating Functions and requirements.

APPLICABILITY

The Manual Initiation, Automatic Actuation Logic and Actuation Relays, Safety Injection, and Containment Radiation Functions are required OPERABLE as annotated on Table 3.3.6-1. Under these conditions, the potential exists for an accident that could release significant fission product radioactivity into containment. Therefore, the containment ventilation isolation instrumentation must be OPERABLE in these MODES.

While in MODES 5 and 6 ~~without fuel handling in progress~~, the containment ventilation isolation instrumentation need not be OPERABLE since the potential for radioactive releases is minimized and operator action is sufficient to ensure post accident offsite doses are maintained within the limits of Reference 1.

The Applicability for the containment ventilation isolation on the ESFAS Safety Injection Functions are specified in LCO 3.3.2. Refer to the Bases for LCO 3.3.2 for discussion of the Safety Injection Function Applicability.

BASES

ACTIONS

The most common cause of channel inoperability is outright failure or drift sufficient to exceed the tolerance allowed by unit specific calibration procedures. Typically, the drift is found to be small and results in a delay of actuation rather than a total loss of function. This determination is generally made during the performance of a COT, when the process instrumentation is set up for adjustment to bring it within specification. If the Trip Setpoint is less conservative than the tolerance specified by the calibration procedure, the channel must be declared inoperable immediately and the appropriate Condition entered.

A Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.6-1. The Completion Time(s) of the inoperable channel(s)/train(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to all Containment Ventilation Isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these Functions. It also addresses the failure of required radiation monitoring channel.

If a train is inoperable or the required channel is inoperable, operation may continue as long as the Required Action for the applicable Conditions of LCO 3.6.3 is met for each valve made inoperable by failure of isolation instrumentation.

A Note is added stating that Condition A is only applicable in MODE 1, 2, 3, or 4.

~~B.1 and B.2~~

~~Condition B applies to all Containment Ventilation Isolation Functions and addresses the train orientation of the SSPS and the master and slave relays for these Functions. It also addresses the failure of the required radiation monitoring channel. If a train or the required radiation monitoring channel is inoperable, operation may continue as long as the Required Action to place and maintain containment ventilation isolation valves in their closed position is met or the applicable Conditions of LCO 3.9.4, "Containment Penetrations," are met for each valve made inoperable by failure of isolation instrumentation. The Completion Time for these Required Actions is Immediately.~~

BASES

ACTIONS (continued)

~~A Note states that Condition B is applicable during movement of irradiated fuel assemblies within containment.~~

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.6-1 determines which SRs apply to which Containment Ventilation Isolation Functions.

SR 3.3.6.1

Performance of the CHANNEL CHECK ensures that a gross failure of instrumentation has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION.

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

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.3.6.2

SR 3.3.6.2 is the performance of an ACTUATION LOGIC TEST. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and there is an intact voltage signal path to the master relay coils.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

BASES

LCO

Containment OPERABILITY is maintained by limiting leakage to ≤ 1.0 L_a, except prior to the first startup after performing a required Containment Leakage Rate Testing Program leakage test. At this time the applicable leakage limits must be met.

Compliance with this LCO will ensure a containment configuration, including equipment hatches, that is structurally sound and that will limit leakage to those leakage rates assumed in the safety analysis.

Individual leakage rates specified for the containment air lock (LCO 3.6.2), purge valves with resilient seals, and secondary bypass leakage (LCO 3.6.3) are not specifically part of the acceptance criteria of 10 CFR 50, Appendix J. Therefore, leakage rates exceeding these individual limits only result in the containment being inoperable when the leakage results in exceeding the overall acceptance criteria of the Containment Leakage Rate Testing Program.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material into containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, containment is not required to be OPERABLE in MODES 5 and 6 to prevent leakage of radioactive material from containment. ~~The requirements for containment during MODE 6 are addressed in LCO 3.9.4, "Containment Penetrations."~~

ACTIONS

A.1

In the event containment is inoperable, containment must be restored to OPERABLE status within 1 hour. The 1 hour Completion Time provides a period of time to correct the problem commensurate with the importance of maintaining containment OPERABLE during MODES 1, 2, 3, and 4. This time period also ensures that the probability of an accident (requiring containment OPERABILITY) occurring during periods when containment is inoperable is minimal.

B.1 and B.2

If containment cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to 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 orderly manner and without challenging plant systems.

BASES

LCO

Each containment air lock forms part of the containment pressure boundary. As part of the containment pressure boundary, the air lock safety function is related to control of the containment leakage rate resulting from a DBA. Thus, each air lock's structural integrity and leak tightness are essential to the successful mitigation of such an event.

Each air lock is required to be OPERABLE. For the air lock to be considered OPERABLE, the air lock interlock mechanism must be OPERABLE, the air lock must be in compliance with the Type B air lock leakage test, and both air lock doors must be OPERABLE. The interlock allows only one air lock door of an air lock to be opened at one time. This provision ensures that a gross breach of containment does not exist when containment is required to be OPERABLE. Closure of a single door in each air lock is sufficient to provide a leak tight barrier following postulated events. Nevertheless, both doors are kept closed when the air lock is not being used for normal entry into or exit from containment.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment air locks are not required in MODES 5 and 6 to prevent leakage of radioactive material from containment. ~~The requirements for the containment air locks during MODE 6 are addressed in LCO 3.9.4, "Containment Penetrations."~~

ACTIONS

The ACTIONS are modified by a Note that allows entry and exit to perform repairs on the affected air lock component. If the outer door is inoperable, then it may be easily accessed for most repairs. It is preferred that the air lock be accessed from inside primary containment by entering through the other OPERABLE air lock. However, if this is not practicable, or if repairs on either door must be performed from the barrel side of the door then it is permissible to enter the air lock through the OPERABLE door, which means there is a short time during which the containment boundary is not intact (during access through the OPERABLE door). The ability to open the OPERABLE door, even if it means the containment boundary is temporarily not intact, is acceptable due to the low probability of an event that could pressurize the containment during the short time in which the OPERABLE door is expected to be open. After each entry and exit, the OPERABLE door must be immediately closed. If ALARA conditions permit, entry and exit should be via an OPERABLE air lock.

BASES

LCO (continued)

intact. These passive isolation valves/devices are those listed in Reference 2.

Purge valves with resilient seals and shield building bypass leakage paths must meet additional leakage rate requirements. The other containment isolation valve leakage rates are addressed by LCO 3.6.1, "Containment," as Type C testing.

This LCO provides assurance that the containment isolation valves and purge valves will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the containment boundary during accidents.

Note that due to competing requirements and dual functions associated with the containment vacuum relief isolation valves (FCV-30-46, -47, and -48), the air supply and solenoid arrangement is designed such that upon the unavailability of Train A essential control air, the containment vacuum relief isolation valves are incapable of automatic closure and are therefore considered inoperable for the containment isolation function without operator action.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment isolation valves are not required to be OPERABLE in MODES 5 and 6. ~~The requirements for containment isolation valves during MODE 6 are addressed in LCO 3.9.4, "Containment Penetrations."~~

ACTIONS

The ACTIONS are modified by a Note allowing penetration flow paths, to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for containment isolation is indicated.

A second Note has been added to provide clarification that, for this LCO, separate Condition entry is allowed for each penetration flow path. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable containment isolation valve. Complying with the Required Actions may allow for continued operation, and subsequent inoperable containment isolation valves are governed by subsequent Condition entry and application of associated Required Actions.

The ACTIONS are further modified by a third Note, which ensures

B 3.9 REFUELING OPERATIONS

B 3.9.4 ~~Containment Penetrations~~ Deleted

BASES

BACKGROUND

During movement of irradiated fuel assemblies within containment, a release of fission product radioactivity within containment will be restricted from escaping to the environment when the LCO requirements are met. In MODES 1, 2, 3, and 4, this is accomplished by maintaining containment OPERABLE as described in LCO 3.6.1, "Containment." In MODE 6, the potential for containment pressurization as a result of an accident is not likely; therefore, requirements to isolate the containment from the outside atmosphere can be less stringent. The LCO requirements are referred to as "containment closure" rather than "containment OPERABILITY." Containment closure means that all potential escape paths are closed or capable of being closed. Since there is no potential for containment pressurization, the Appendix J leakage criteria and tests are not required.

The containment serves to contain fission product radioactivity that may be released from the reactor core following an accident, such that offsite radiation exposures are maintained within the requirements of 10 CFR 50.67. Additionally, the containment provides radiation shielding from the fission products that may be present in the containment atmosphere following accident conditions.

The containment equipment hatch, which is part of the containment pressure boundary, provides a means for moving large equipment and components into and out of containment. During movement of recently irradiated fuel assemblies within containment, the equipment hatch must be held in place by at least four bolts. Good engineering practice dictates that the bolts required by this LCO be approximately equally spaced.

The containment air locks, which are also part of the containment pressure boundary, provide a means for personnel access during MODES 1, 2, 3, and 4 unit operation in accordance with LCO 3.6.2, "Containment Air Locks." Each air lock has a door at both ends. The doors are normally interlocked to prevent simultaneous opening when containment OPERABILITY is required. During periods of unit shutdown when containment closure is not required, the door interlock mechanism may be disabled, allowing both doors of an air lock to remain open for extended periods when frequent containment entry is necessary. During movement of irradiated fuel assemblies within containment, containment closure is required; therefore, the door interlock mechanism may remain disabled, but one air lock door must always remain capable of being closed.

BASES

BACKGROUND (continued)

The requirements for containment penetration closure ensure that a release of fission product radioactivity within containment will be restricted to within regulatory limits.

The Reactor Building Purge Ventilation (RBPV) System includes three subsystems. The normal subsystem includes four 24 inch purge penetrations and two 24 inch exhaust penetrations. The second subsystem, a pressure relief system, includes an 8 inch exhaust penetration. The third subsystem includes a 12 inch instrument room supply penetration and a 12 inch exhaust penetration. During MODES 1, 2, 3, and 4, no more than one pair of containment purge lines (one set of supply valves and one set of exhaust valves) may be opened (Ref. 4). None of the subsystems are subject to a Specification in MODE 5.

In MODE 6, large air exchangers are necessary to conduct refueling operations. The normal 24 inch purge system is used for this purpose, and all valves are closed by Containment Ventilation Isolation in accordance with LCO 3.3.6, "Containment Ventilation Isolation Instrumentation."

The other containment penetrations that provide direct access from containment atmosphere to outside atmosphere must be isolated on at least one side. Isolation may be achieved by an OPERABLE automatic isolation valve (either open or closed), or by a manual isolation valve, blind flange, or equivalent. Equivalent isolation methods must be approved and may include use of a material that can provide a temporary, atmospheric pressure, ventilation barrier for the other containment penetrations during irradiated fuel movements (Ref. 1).

APPLICABLE SAFETY ANALYSES

During movement of irradiated fuel assemblies within containment, the most severe radiological consequences result from a fuel handling accident. The fuel handling accident is a postulated event that involves damage to irradiated fuel resulting from dropping a single irradiated fuel assembly (Ref. 2). The requirements of LCO 3.9.7, "Refueling Cavity Water Level," in conjunction with a minimum decay time of 100 hours prior to irradiated fuel movement with containment closure capability, ensures that the release of fission product radioactivity, subsequent to a fuel handling accident, results in doses that are within the values specified in 10 CFR 50.67 or the NRC staff approved licensing basis (e.g., Regulatory Guide 1.183, (Ref. 3) limits).

Containment penetrations satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES

LCO

This LCO limits the consequences of a fuel handling accident involving handling irradiated fuel in containment by limiting the potential escape paths for fission product radioactivity released within containment. The LCO requires any penetration providing direct access from the containment atmosphere to the outside atmosphere or to the auxiliary building secondary containment enclosure, to be closed except for the OPERABLE containment purge and exhaust penetrations and the containment personnel air locks. For the OPERABLE containment purge and exhaust penetrations, this LCO ensures that these penetrations are isolable by an automatic Containment Ventilation isolation valve. The OPERABILITY requirements for this LCO ensure that the containment ventilation isolation valve closure times specified in the UFSAR can be achieved and, therefore, meet the assumptions used in the safety analysis to ensure that releases through the valves are terminated, such that radiological doses are within the acceptance limit.

During movement of recently irradiated fuel assemblies within containment, the equipment hatch is required to be held in place by at least four bolts.

The LCO is modified by a Note allowing penetration flow paths with direct access from the containment atmosphere that transverse and terminate in the Auxiliary Building Secondary Containment Enclosure to be unisolated under administrative controls. Administrative controls ensure that 1) appropriate personnel are aware of the open status of the penetration flow path during movement of irradiated fuel assemblies within containment, and 2) specified individuals are designated and readily available to isolate the flow path in the event of a fuel handling accident.

The containment personnel air lock doors may be open during movement of irradiated fuel in the containment provided that one door is capable of being closed in the event of a fuel handling accident. Should a fuel handling accident occur inside containment, at least one personnel air lock door will be closed following an evacuation of containment.

APPLICABILITY

The containment penetration requirements are applicable when there is a potential for the limiting fuel handling accident (FHA). The applicability requirements are based on the FHA analysis which assumes a fuel assembly is dropped and damaged during refueling. In MODES 1, 2, 3, and 4, containment penetration requirements are addressed by LCO 3.6.1. In MODES 5 and 6, when movement of irradiated fuel assemblies within containment is not being conducted, the potential for a fuel handling accident does not exist. Additionally, due to radioactive decay, a fuel handling accident involving handling irradiated fuel that is not "recently" irradiated (i.e., fuel that has occupied part of a critical reactor core within the previous 100 hours) will result in doses that are within the values specified in 10 CFR 50.67 even without containment closure capability. The applicability of 3.9.4.a. for the Containment Building

BASES

APPLICABILITY (continued)

Equipment Hatch is "During the movement of recently irradiated fuel in containment" which maintains the containment closure requirements when the fuel has not sufficiently decayed to remain within these limits. The applicability of 3.9.4.b. and c. for the Containment Air Lock Doors and containment penetrations that provide direct access from containment atmosphere to outside atmosphere is "During movement of irradiated fuel in containment."

ACTIONS

A.1

If the containment equipment hatch, is not in the required status, the unit must be placed in a condition where the isolation function is not needed. This is accomplished by immediately suspending movement of recently irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

B.1

If the containment building air lock doors or any other containment penetration that provides direct access from the containment atmosphere to the outside atmosphere is not in the required status, including the Containment Ventilation Isolation valve(s) not capable of automatic actuation when the purge and exhaust valves are open, the unit must be placed in a condition where the isolation function is not needed. This is accomplished by immediately suspending movement of irradiated fuel assemblies within containment. Performance of these actions shall not preclude completion of movement of a component to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.9.4.1

This Surveillance demonstrates that each containment penetration is in its required status. The requirement that penetrations are capable of being closed by an OPERABLE automatic containment ventilation isolation valve, can be verified by ensuring that each required containment ventilation isolation valve operator has motive power.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.9.4.2

This Surveillance demonstrates that each containment ventilation isolation valve, that is not locked, sealed, or otherwise secured in

BASES

SURVEILLANCE REQUIREMENTS (continued)

position, actuates to its isolation position on manual initiation or on an actual or simulated actuation signal.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

The SR is modified by a Note stating that this Surveillance is not required to be met for valves in isolated penetrations. The LCO provides the option to close penetrations in lieu of requiring automatic actuation capability.

REFERENCES

1. GPU Nuclear Safety Evaluation SE-0002000-001, Rev. 0, May 20, 1988.

2. Document ID: LTR-CRA-02-219, Westinghouse Electric Company, "Radiological Consequences of Fuel Handling Accidents for the Sequoyah Nuclear Plant Units 1 and 2."

3. Regulatory Guide 1.183, Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors, July 2000.

4. UFSAR, Section 9.4.7.