



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

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

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Proposed Amendment to Technical Specification 3/4.6.1.7, "Containment Ventilation System,"
for Containment Purge Valve Operability Test Interval

Pursuant to 10CFR50.90, the South Texas Project requests approval of an amendment to the Unit 1 and Unit 2 Technical Specifications. The proposed amendment revises Technical Specification 3/4.6.1.7, "Containment Ventilation System," to extend the intervals between operability tests of the normal and supplementary containment purge valves. The current intervals are six months and three months, respectively. The proposed interval for each is 18 months. The Description and Assessment of the proposed change, and the proposed and revised replacement pages of the Technical Specifications, are included as attachments to this letter.

The South Texas Project has reviewed the attached proposed amendment pursuant to 10CFR50.92 and has determined that it does not involve a significant hazards consideration. There will be no significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment satisfies the criteria of 10CFR51.22(c)(9) for categorical exclusion from the requirement for an environmental assessment.

The South Texas Project Plant Operations Review Committee has reviewed the proposed amendment and recommended its approval. The South Texas Project Nuclear Safety Review Board has reviewed and approved the proposed change.

In accordance with 10CFR50.91(b), the South Texas Project is providing the State of Texas with a copy of this proposed amendment.

The South Texas Project requests that the effective date of the approved amendment be the date of approval, but not later than June 30, 2002. Although this request is neither exigent nor an emergency, prompt review by the Nuclear Regulatory Commission is requested.

If there are any questions, please contact either Mr. M. S. Lashley at (361) 972-7523 or me at (361) 972-8757.

I state under penalty of perjury that the foregoing is true and correct. Executed on 2/18/02.


J. J. Sheppard
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Attachments: 1) Description and Assessment
2) Proposed Technical Specification Changes
3) Revised Technical Specification Page

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U. S. Nuclear Regulatory Commission
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ATTACHMENT 1

LICENSEE EVALUATION

PROPOSED AMENDMENT TO TECHNICAL SPECIFICATION 3/4.6.1.7, "CONTAINMENT VENTILATION SYSTEM," FOR CONTAINMENT PURGE VALVE OPERABILITY TEST INTERVAL

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**SOUTH TEXAS PROJECT
UNITS 1 AND 2**

LICENSEE EVALUATION

**PROPOSED AMENDMENT TO TECHNICAL SPECIFICATION 3/4.6.1.7,
“CONTAINMENT VENTILATION SYSTEM,” FOR
CONTAINMENT PURGE VALVE OPERABILITY TEST INTERVAL**

1.0 DESCRIPTION

The proposed amendment will revise South Texas Project Technical Specification 3/4.6.1.7, “Containment Ventilation System,” to extend the intervals between operability tests of the containment normal and supplementary purge valves. Currently, the normal purge valves are tested twice per year, and the supplementary purge valves are tested quarterly. The proposed interval for both is 18 months.

2.0 PROPOSED CHANGE

Specifically, the South Texas Project proposes the following changes to the surveillance requirements:

4.6.1.7.2 At least once per 6 months on a STAGGERED TEST BASIS, the inboard and outboard isolation valves with resilient material seals in each sealed closed 48-inch containment purge supply and exhaust penetration shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than $0.05 L_a$ when pressurized to P_a .

The proposed interval is 18 months between tests, without staggering, so the requirement will read:

At least once per 18 months, the inboard and outboard isolation valves with resilient material seals in each sealed closed 48-inch containment purge supply and exhaust penetration shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than $0.05 L_a$ when pressurized to P_a .

4.6.1.7.3 At least once per 3 months each 18-inch supplementary containment purge supply and exhaust isolation valve with resilient material seals shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than $0.01 L_a$ when pressurized to P_a .

The proposed interval is 18 months between tests, so the requirement will read:

At least once per 18 months each 18-inch supplementary containment purge supply and exhaust isolation valve with resilient material seals shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than $0.01 L_a$ when pressurized to P_a .

These changes will allow the purge valve operability tests to be performed no more frequently than refueling outages.

3.0 BACKGROUND

System Description

Two subsystems are provided for purging the reactor containment atmosphere: one to be used under cold shutdown and refueling conditions only (Normal Containment Purge), and one to be used during plant operation (Supplementary Containment Purge).

Normal Containment Purge

The Normal Containment Purge subsystem is used to purge the containment atmosphere to reduce the concentration of gaseous and particulate contamination to enable safe personnel access during cold shutdown and refueling. Containment penetrations for this subsystem are 48 inches in diameter. The Normal Containment Purge isolation valves are required to remain closed during operational conditions other than cold shutdown and refueling.

Supplementary Containment Purge

The Supplementary Containment Purge Subsystem provides the capability to reduce gaseous and particulate contamination of the containment atmosphere during reactor operation to enable safe, continuous personnel access under operating conditions. Containment penetrations for this subsystem are 18 inches in diameter. The Supplementary Containment Purge isolation valves are primarily opened as needed during operational conditions other than cold shutdown and refueling in response to changes in containment air pressure, and may also be open during cold shutdown and refueling.

This subsystem can also provide controlled purging of the Containment atmosphere as a secondary means of combustible gas control.

4.0 TECHNICAL ANALYSIS

4.1 Containment Purge System Design

The South Texas Project containment purge isolation valves, penetrations, and supports are Safety Class 2, seismic category I.

Normal Containment Purge

There are two isolation valves included in the Normal Containment Purge supply subsystem, and two on the Normal Containment Purge exhaust subsystem. For each subsystem, one motor-operated isolation valve is inside the containment and one is outside the containment. The Normal Containment Purge isolation valves are designed to fail as-is on loss of power. Each is a butterfly valve with resilient seals.

Interlocks are provided to automatically close the valves upon Containment ventilation isolation signal. The Normal Containment Purge system isolation valves are kept closed during operational conditions other than cold shutdown and refueling.

Filters are provided in the Normal Containment Purge supply subsystem. The high efficiency filters are designed for 95 percent efficiency.

The Normal Containment Purge Subsystem operates during refueling operations. Should a fuel handling accident occur inside Containment, redundant purge isolation radiation monitors will sense the increased radiation levels and generate the Containment ventilation isolation signal to isolate the Containment. This prevents

further release of radioactive materials to the environment, and ensures that resulting accident doses are within the limits prescribed by 10CFR100.

Supplementary Containment Purge

There are two isolation valves included in the Supplementary Containment Purge supply subsystem, and two on the Supplementary Purge exhaust subsystem. For each subsystem, one motor-operated isolation valve is inside the containment and one air-operated isolation valve is outside the containment. The motor-operated valves fail as-is on loss of power, and the air-operated valves fail closed on loss of air pressure. Each is a butterfly valve with resilient seals.

Interlocks are provided to automatically close the valves upon Containment ventilation isolation signal. In the event of a LOCA or other Design Basis Accident (DBA) while the Supplementary Containment Purge Subsystem is in operation, containment isolation occurs such that resultant offsite doses are kept within the limits prescribed by 10CFR100.

Filters are provided in both the supply and exhaust Supplementary Containment Purge subsystems. High efficiency filters are provided to filter the air coming from the Reactor Containment Building prior to being exhausted through the plant vent. The high efficiency filters are designed for greater than 95 percent efficiency. Exhaust pre-filters are provided upstream of the high efficiency exhaust filters to protect them from coarse particles and are designed for greater than 55 percent efficiency.

As noted above, the supplementary containment purge system provides the installed capability for a controlled purge of the Containment atmosphere as a secondary means of combustible gas control. In the event that a supplementary isolation valve is unable to isolate, there would be no impact on the effectiveness of the combustible gas control function.

4.2 Control Room Protection

The control room envelope HVAC system is designed to satisfy the design requirement of limiting dose to control room operators following the DBA in accordance with General Design Criterion (GDC) 19 of 10CFR50 Appendix A.

Instrumentation and controls are provided to detect abnormal conditions such as smoke and high radioactivity concentrations in the makeup air. Surveillance of airborne radioactivity levels of the outside makeup air to the supply system is provided by the control room ventilation inlet air radiation monitors. On a high gaseous radioactivity or safety injection signal, control room makeup is automatically diverted through air makeup filter units. These units contain high-efficiency particulate air (HEPA) and charcoal filters.

4.3 Operability Testing

Method

The normal and supplementary containment purge isolation valves are tested as Type C valves against the criteria of 10CFR50 Appendix J. These valves are locally leak-tested by local pressurization to the maximum calculated accident containment pressure. Each valve to be tested is closed by normal operation without any preliminary exercising or adjustments (e.g., no tightening of the valve after closure by the valve actuator).

The administrative limit for measured leakage through the Normal Containment Purge valves is 25,872 sccm per penetration when pressurized to the peak accident containment pressure ($P_a = 41.2$ psig). The maintenance limit is 37,920 sccm.

The administrative limit for measured leakage through the Supplementary Containment Purge valves is 6,000 sccm per penetration when pressurized to the peak accident containment pressure ($P_a = 41.2$ psig). The maintenance limit is 7584 sccm.

Test Results

Review of results of tests performed beginning March 19, 1996, identified few instances of unacceptable seat leakage. One of the Unit 1 containment normal purge penetrations (M-41) was found to have leakage exceeding the maintenance limit; it was corrected by replacing the valve seal. The Unit 1 containment supplementary purge penetrations (M-43) have twice had test results exceeding the maintenance limit; these were corrected by replacing the valve seats.

4.4 Radiological Consequences

Refueling

As stated in the Safety Evaluation Report (reference 2), the South Texas Project has an adequate system for mitigation of the radiological consequences of a postulated fuel handling accident inside the containment. Should an accident occur inside containment during refueling, the normal containment purge subsystem would be in operation; the activity escaping the water in the refueling cavity would be exhausted to the environment until containment isolation is achieved. A dilution volume of 3% of the containment free volume was used based on an estimate of the extent of dilution of the release in containment from natural and forced convection. The resulting estimated radiological consequences are 35.8 rems to the thyroid at the exclusion area boundary and 10.5 rems to the thyroid at the low population zone outer boundary, assuming the accident occurs 42 hours after shutdown and the personnel airlock is closed, and allowing 72 seconds for valve closure.

Design Basis Loss-of-Coolant Accident

In the event of a LOCA coincident with supplementary purge operation, leakage of activity in the containment atmosphere to the environment before isolation is achieved will contribute to LOCA dose estimates. The assumed flow rate of 83,200 ft³/min takes into account the pressure transient expected to occur in containment following a design-basis LOCA. The source term used in the radiological calculations assumed a pre-existing iodine spike in determining primary coolant activity. Fuel failures as a result of the LOCA do not contribute to the source term due to the short isolation time of the supplementary purge valves. Allowing 23 seconds for purge isolation, the resulting estimated radiological consequences were 6.39 rems to the thyroid at the exclusion area boundary (0-2 hours) and 1.87 rems to the thyroid at the low population zone outer boundary (0-30 days).

4.5 Risk Assessment

Only the supplemental purge isolation valves are modeled in the Probabilistic Risk Assessment to represent the containment ventilation system. This is because the 48-inch normal purge valves are normally locked closed and leak-tested at the end of the refueling outages and do not contribute to Mode 1 core damage or large early release frequencies.

The major contributors to Large Early Release Frequency (LERF) are loss of offsite power, tornado-induced failure of switchyard/Essential Cooling Pond, and support system failures. All of these can lead to some form of station blackout, which contributes to an induced steam generator tube rupture release (ISGTR). Failure of the containment supplemental purge valves contributes approximately 6% to the LERF while ISGTR events contribute 87%. Extending the intervals between operability tests on the normal and supplementary containment purge valves will not significantly increase the LERF.

4.6 Reliability

Normal Purge Valves

The normal purge subsystem valves used for containment isolation are 48 inches in diameter. Normal purge supply and normal purge exhaust isolation valves cannot be exercised during power operation because of the Technical Specification requirement that these valves remain closed. The valves are normally left undisturbed between refueling outages. Leakage at the exhaust and supply penetrations is measured prior to plant startup. LOCA analyses assume containment leakage of 0.3% per day for the first 24 hours and 0.15% per day thereafter.

Supplementary Purge Valves

During power operation, release of instrument air from air-operated valves inside containment pressurizes the containment building. Containment pressure is monitored and conditions approaching the limits allowed by the Technical Specifications are annunciated. The increase in the containment pressure is reduced by periodic operation of the supplementary purge system. Although the valve seals are not left undisturbed between outages, typically, the supplementary purge system is operated no more than three times weekly between refueling outages. Recurring need to relieve containment pressure through purging indicates that the seals are effective in maintaining containment isolation. LOCA analyses assume containment leakage of 0.3% per day for the first 24 hours and 0.15% per day thereafter.

4.7 Summary

Previous test results performed at the current three month and six month intervals confirm that the normal and supplementary purge isolation valves experience a very low incidence of leakage exceeding allowable limits.

10CFR100.11(a)(1) and (2) specify the thyroid dose limit of 300 rem at the exclusion area boundary and the low population zone outer boundary. The redundant valve arrangement provides assurance that the 10CFR100 dose limits will not be exceeded.

Based upon the above, extending the interval between operability tests of the normal and supplementary purge valves to 18 months is justified.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration Determination

Pursuant to 10CFR50.91, this analysis provides a determination that the proposed changes to the Technical Specifications do not involve any significant hazards consideration as defined in 10CFR50.92.

Criterion 1: Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

Operability and leakage control effectiveness of the containment purge isolation valves have no effect on whether or not an accident occurs. Consequently, increasing the interval between surveillances of isolation valve effectiveness does not involve a significant increase in the probability of an accident previously evaluated.

The consequences of a non-isolated reactor containment building at the time of a fuel-handling accident or LOCA is release of radionuclides to the environment. Analyses have conservatively assumed that a purge system line is open at the time of an accident, and release to the environment continues until the isolation valves are closed. In addition, LOCA analyses assume containment leakage of 0.3% per day for the first 24 hours and 0.15% per day thereafter. Consequently, increasing the interval between surveillances of isolation valve effectiveness does not involve a significant increase in the consequences of an accident previously evaluated.

Criterion 2: Does the proposed change create the possibility of a new or different kind of accident from any previously evaluated?

Response: No.

The proposed changes do not involve a modification to the physical configuration of the plant (i.e., no new equipment will be installed) or change in the methods governing normal plant operation. The proposed change will not impose any new or different requirements or introduce a new accident initiator, accident precursor, or malfunction mechanism. The function of the containment purge systems is not altered by this change. Therefore, this proposed change does not create the possibility of an accident of a different kind than previously evaluated.

Criterion 3: Does the proposed change involve a significant reduction in the margin of safety?

Response: No.

This proposed change only increases the interval between surveillance tests of the containment purge valves. Analyses have conservatively assumed that the normal purge valves are open at the time of a fuel handling accident, and that purging by the supplementary purge system is in progress at the time of a loss of coolant accident. In addition, LOCA analyses assume containment leakage of 0.3% per day for the first 24 hours and 0.15% per day thereafter. The radiological consequences of both a fuel handling accident and a LOCA are unchanged and remain within the 10CFR100 limits. Therefore, the proposed change does not involve a significant reduction in the margin of safety.

5.2 Applicable Regulatory Requirements/Criteria

The South Texas Project has implemented the performance-based Option B of 10CFR50 Appendix J for containment leakage rate testing. However, the current test intervals, six months for normal purge and three months for supplementary purge, are not based on 10CFR50 Appendix J considerations. Generic Issue B-20, "Containment Leakage Due to Seal Deterioration," provides the basis for the determination that valves with resilient seals should be tested more frequently than required by Appendix J.

Excessive leakage past the resilient seats of isolation valves in purge vent lines is typically caused by severe environmental conditions and/or wear due to frequent use. This led to the conclusion that leakage test frequency for these valves should be keyed to the occurrence of severe environmental conditions and the use of the valves, rather than the current requirements of 10CFR50, Appendix J. The background for this conclusion is discussed in IE Circular 77-11, "Leakage of Containment Isolation Valves With Resilient Seats," issued on September 6, 1977.

5.3 Summary

Based on the evaluation provided above, the proposed changes do not involve a significant hazards consideration under 10CFR50.92(c), and will not have a significant effect on the safe operation of the plant. Therefore, there is reasonable assurance that operation of the South Texas Project in accordance with the proposed revised Technical Specifications will not endanger the public health and safety.

6.0 ENVIRONMENTAL CONSIDERATION

The South Texas Project has reviewed the attached proposed license amendment pursuant to 10CFR50.92 and determined that it does not involve:

- a significant hazards consideration,
- a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or
- a significant increase in individual or cumulative occupational radiation exposure.

Consequently, the proposed amendment meets the eligibility criteria of 10CFR51.22(c)(9) for categorical exclusion from the requirement for an environmental assessment. Therefore, pursuant to 10CFR51.22(b), an environmental assessment of the proposed change is not required.

7.0 REFERENCES

Generic Issue B-20, "Containment Leakage Due to Seal Deterioration"

NUREG-0781, "Safety Evaluation Report related to the operation of the South Texas Project, Units 1 and 2, Docket Nos. 50-498 and 50-499"

ATTACHMENT 2

PROPOSED TECHNICAL SPECIFICATION CHANGES

CONTAINMENT SYSTEMS

CONTAINMENT VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.1.7 Each containment purge supply and exhaust isolation valve shall be OPERABLE and:

- a. Each 48-inch containment shutdown purge supply and exhaust isolation valve shall be closed and sealed closed, and
- b. The 18-inch supplementary containment purge supply and exhaust isolation valves shall be closed to the maximum extent practicable but may be open for supplementary purge system operation for pressure control, for ALARA and respirable air quality considerations for personnel entry and for surveillance tests that require the valves to be open.

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

ACTION:

- a. With a 48-inch containment purge supply and/or exhaust isolation valve open or not sealed closed, close and/or seal close that valve or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With the 18-inch supplementary containment purge supply and/or exhaust isolation valve(s) open for reasons other than given in Specification 3.6.1.7.b. above, close the open 18-inch valve(s) or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours, and in COLD SHUTDOWN within the following 30 hours.
- c. With a containment purge supply and/or exhaust isolation valve(s) having a measured leakage rate in excess of the limits of Specifications 4.6.1.7.2 and/or 4.6.1.7.3, restore the inoperable valve(s) to OPERABLE status or isolate the penetrations so that the measured leakage rate does not exceed the limits of Specifications 4.6.1.7.2 and/or 4.6.1.7.3 within 24 hours, otherwise be in at least HOT STANDBY within the next 6 hours, and in COLD SHUTDOWN within the following 30 hours.

CONTAINMENT SYSTEMS

SURVEILLANCE REQUIREMENTS

4.6.1.7.1 Each 48-inch containment purge supply and exhaust isolation valve shall be verified to be sealed closed at least once per 31 days.

4.6.1.7.2 At least once per 6 ~~18~~ months ~~on a STAGGERED TEST BASIS~~, the inboard and outboard isolation valves with resilient material seals in each sealed closed 48-inch containment purge supply and exhaust penetration shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than $0.05 L_a$ when pressurized to P_a .

4.6.1.7.3 At least once per 3 ~~18~~ months, each 18-inch supplementary containment purge supply and exhaust isolation valve with resilient material seals shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than $0.01 L_a$ when pressurized to P_a .

4.6.1.7.4 At least once per 31 days each 18-inch supplementary containment purge supply and exhaust isolation valve shall be verified to be closed or open in accordance with Specification 3.6.1.7.b.

ATTACHMENT 3

REVISED TECHNICAL SPECIFICATION PAGES

CONTAINMENT SYSTEMS

CONTAINMENT VENTILATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.6.1.7 Each containment purge supply and exhaust isolation valve shall be OPERABLE and:

- a. Each 48-inch containment shutdown purge supply and exhaust isolation valve shall be closed and sealed closed, and
- b. The 18-inch supplementary containment purge supply and exhaust isolation valves shall be closed to the maximum extent practicable but may be open for supplementary purge system operation for pressure control, for ALARA and respirable air quality considerations for personnel entry and for surveillance tests that require the valves to be open.

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

ACTION:

- a. With a 48-inch containment purge supply and/or exhaust isolation valve open or not sealed closed, close and/or seal close that valve or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With the 18-inch supplementary containment purge supply and/or exhaust isolation valve(s) open for reasons other than given in Specification 3.6.1.7.b. above, close the open 18-inch valve(s) or isolate the penetration(s) within 4 hours, otherwise be in at least HOT STANDBY within the next 6 hours, and in COLD SHUTDOWN within the following 30 hours.
- c. With a containment purge supply and/or exhaust isolation valve(s) having a measured leakage rate in excess of the limits of Specifications 4.6.1.7.2 and/or 4.6.1.7.3, restore the inoperable valve(s) to OPERABLE status or isolate the penetrations so that the measured leakage rate does not exceed the limits of Specifications 4.6.1.7.2 and/or 4.6.1.7.3 within 24 hours, otherwise be in at least HOT STANDBY within the next 6 hours, and in COLD SHUTDOWN within the following 30 hours.

CONTAINMENT SYSTEMS

SURVEILLANCE REQUIREMENTS

4.6.1.7.1 Each 48-inch containment purge supply and exhaust isolation valve shall be verified to be sealed closed at least once per 31 days.

4.6.1.7.2 At least once per 18 months, the inboard and outboard isolation valves with resilient material seals in each sealed closed 48-inch containment purge supply and exhaust penetration shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than $0.05 L_a$ when pressurized to P_a .

4.6.1.7.3 At least once per 18 months each 18-inch supplementary containment purge supply and exhaust isolation valve with resilient material seals shall be demonstrated OPERABLE by verifying that the measured leakage rate is less than $0.01 L_a$ when pressurized to P_a .

4.6.1.7.4 At least once per 31 days each 18-inch supplementary containment purge supply and exhaust isolation valve shall be verified to be closed or open in accordance with Specification 3.6.1.7.b.