MEMORANDUM TO: PD IV-1 File February 24, 1997

FROM: Tom Alexion ORIGINAL SIGNED BY:

SUBJECT: LICENSEE'S UNIT 2 CYCLE 6 ROD CLUSTER CONTROL ASSEMBLY (RCCA) EVALUATION AND LICENSEE'S UNIT 2 STEAM GENERATOR (SG) INSPECTION RESULTS

I recently received the subject faxes from the licensee. In addition, I had recently faxed questions from the NRC staff on SG inspection results to help structure that telephone call with the licensee.

Docket No. 50-499

Attachments:
1. Unit 2 Cycle 6 RCCA Evaluation and Response to NRC Questions on Incomplete Rod Insertion
2. Unit 2 SG Inspection Results
3. Questions on Unit 2 SG Tube Inspection Results

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 24, 1997

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Plant Operations Review Committee
PORC Review Cover Sheet

Originating Document No. USQE 97-0102 Revision No. 0

TITLE ST-HB-HL-1683, Unit 2 Cycle 6 RCCA Evaluation

The PORC has reviewed this item and has determined that (check as appropriate):

It ___ does ✓ does NOT involve an UNREVIEWED SAFETY QUESTION.

It ___ does ✓ does NOT adversely impact plant nuclear safety.

It ___ does ✓ does NOT adversely impact the health and safety of plant personnel or the public.

It ✓ does ___ does NOT require further review by the Plant Mgr, the NSRB, or other individuals/groups.

✓ Plant Manager ✓ NSRB ___ Other (specify below)

Unit 1 2

REMARKS

The PORC recommends this item for:

✓ APPROVAL ___ DISAPPROVAL ___ OTHER ___ PORC MEETING NO. 97-010

COMPLETED BY RC Sobey
PORC Secretary

DATE 2/19/97

This form, when completed, SHALL be retained in accordance with the retention requirements of the originating document.

ATTACHMENT 1

Unreviewed Safety Question Evaluation # 97-0102 Rev. No. 0 Page 1 of 4

Originating Document: ST-UB-HL-1683, Unit 2 Cycle 6 RCCA Evaluation Rev. No. 0

NOTE: Attach 10CFR50.59 Screening Form or License Compliance Review Form to this USQE.

TPNS # N/A

System two-letter designator or structure name N/A UNIT 1 ☐ UNIT 2 ☒ BOTH ☐

NOTE: Use additional sheets as necessary to provide the bases.

A.1

I. Does the subject of this evaluation increase the probability of occurrence of an accident previously evaluated in the Safety Analysis Report?

☐ YES ☒ NO

Bases: See Attached.

II. Does the subject of this evaluation increase the consequences of an accident previously evaluated in the Safety Analysis Report?

☐ YES ☒ NO

Bases: See Attached.

III. Does the subject of this evaluation increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the Safety Analysis Report?

☐ YES ☒ NO

Bases: See Attached.

IV. Does the subject of this evaluation increase the consequences of a malfunction of equipment important to safety previously evaluated in the Safety Analysis Report?

☐ YES ☒ NO

Bases: See Attached.

Unreviewed Safety Question Evaluation # 97-0102 Rev. No. 0 Page 2 of 4

Originating Document: ST-UB-HL-1683, Unit 2 Cycle 6 RCCA Evaluation Rev. No. 0

A.2

I. Does the subject of the evaluation create the possibility of an accident of a different type than any previously evaluated in the Safety Analysis Report? ☐ YES ☒ NO

Bases: See Attached.

II. Does the subject of this evaluation create the possibility of a different type of malfunction than any previously evaluated in the Safety Analysis Report? ☐ YES ☒ NO

Bases: See Attached.

A.3

I. Does the subject of this evaluation reduce the margin of safety as defined in the basis for any Technical Specification? ☐ YES ☒ NO

Bases: See Attached.

Unreviewed Safety Question Evaluation # 97-0102 Rev. No. 0 Page 3 of 4

Originating Document: ST-UB-HL-1683, Unit 2 Cycle 6 RCCA Evaluation Rev. No. 0

SAFETY EVALUATION SUMMARY

This evaluation has shown that the South Texas Project has taken reasonable precautions to ensure that the failure of the RCCAs to fully insert will not occur, or otherwise be limited, for the duration of Unit 2 Cycle 6. However, should RCCAs become stuck, the Safety Analysis provides bounding results with respect to the Reload Safety Analysis Checklist. Furthermore, this safety evaluation demonstrates that the subject condition of the RCCAs failing to insert given the bounding scenarios examined for South Texas Unit 2 Cycle 6 is acceptable since it does not represent an unreviewed safety question according to the criteria of 10CFR50.59.

Unreviewed Safety Question Evaluation # 97-0102 Rev. No. 0 Page 4 of 4

Originating Document: ST-UB-HL-1683, Unit 2 Cycle 6 RCCA Evaluation Rev. No. 0

B. 1. X All of the above questions were answered No; therefore, the originating document does not involve an Unreviewed Safety Question. The Condition Report Action for changing the UFSAR per 0PGP05-ZN-0004 is _____ .

2. _____ One or more of the above questions was marked YES; therefore, the originating document involves an Unreviewed Safety Question. The originating document, as presented, shall NOT be implemented without prior approval by the NRC. Provide a recommendation for disposition of the Unreviewed Safety Question below. Refer to 0PGP05-ZN-0004 for processing licensing amendments. Further processing of this form to the PORC, Plant Manager and NSRB is not required. Notify Procedure Control that the evaluation involved an Unreviewed Safety Question so that Procedure Control can close the USQE number.

RECOMMENDED DISPOSITION:

Approve USQE 97-0102

PREPARED BY: J. M. Wigginton [signature] ORIGINATOR 2/18/97 Date

REVIEWED BY: R. L. Boyer [signature] QUALIFIED REVIEWER 2-18-97 Date

APPROVED BY: D. G. [signature] DEPARTMENT MANAGER 2-19-97 Date

PORC MEETING NO. 97-10 2/19/97 Date

APPROVED BY: [signature] PLANT MANAGER 2/19/97 Date

REMARKS:

☐ UNIT #1 ☐ UFSAR CN ☐ DESIGN CHANGE ☒ OTHER ________

☒ UNIT #2

TPNS # N/A

System two-letter designator or structure name N/A UNIT 1 ☐ UNIT 2 ☒ BOTH ☐

ORIGINATING DOCUMENT NO. ST-UB-HL-1653, Unit 2 Cycle 6 RCCA Evaluation REV. NO. 0

DESCRIPTION OF CHANGE

Should the South Texas Unit 2 Cycle 6 experience the condition where, upon reactor trip, the Rod Cluster Control Assemblies (RCCAs) fail to fully insert, the safety evaluation contained herein demonstrates that the subject condition does not involve a USQ.

PRELIMINARY SCREENING

		YES	NO
1.	Does the proposed change represent a change to the Plant Technical Specifications?	☐	☒
2.	Is an Unreviewed Safety Question known to be associated with the subject change? NOTE: If "YES" to either questions 1 or 2 refer to 0PGP05-ZN-0004.	☐	☒
	Does the proposed change represent:		
3.	A change to only correct a typographical, editorial or drafting error?	☐	☒
4.	A change which is identical to and addressed in its entirety by an existing approved 10CFR50.59 Screening/USQE or NRC approved licensing submittal?	☐	☒
5.	A spare or replacement part/component change with an equivalent part/component? (See Section 2.3 for a definition of equivalent)	☐	☒
6.	A configuration change within existing design specifications?	☐	☒

If all answers to the above questions are "NO" perform the final screening and mark N/A in the approval blocks below.
If the answer to any question (3) through (6) is "YES" a final screening is not necessary.
Sign approval blocks below and discard pages 2 and 3.
Provide a justification and references if any of items (3) through (6) is answered "YES".

	YES	NO
The UFSAR requires revision per 0PGP05-ZN-0004?	☐	☒

The Condition Report Action for changing the UFSAR is ____________.

Prepared by: N/A ________ Date
Originator

Approved by: N/A ________ Date
Qualified Reviewer

Originating Document No. ST-UB-HL-1683, Unit 2 Cycle 6 RCCA Evaluation Rev. No. 0

FINAL SCREENING

In response to the questions below, if the change involves something that is not described in the SAR and is not part of the licensing basis, the "NO" is appropriate. However, this decision must be clearly documented with adequate technical justification for each question and the sections reviewed of applicable documents and applicable attributes reviewed should be indicated. The listing of attributes and documents for 10CFR50.59 screening can be found in Addendum 5.

Inter-discipline Coordination Required? ☒ YES ☐ NO
If "yes", obtain appropriate concurrence.

☐ Risk and Reliability Analysis ☐ Thermal Hydraulics ______ ☑ Reactor Engr. R.F. [signature] 2/13/97

☐ Civil ______ ☐ Mech ______ ☐ Elect ______ ☐ EQ ______ ☒ Other Reactor Eng.

	YES	NO
1. Does the subject of this review involve a change to the facility as described in the Safety Analysis Report?	☒	☐

UFSAR Section 4.2.3.6 states, "The guide thimbles of the fuel assemblies provide a clear channel for insertion of the rod cluster control rods." This could be construed as deviating from the above statement should the rods fail to fully insert to rod bottom during Unit 2, Cycle 6. Therefore, the subject in review is considered a change to the facility.

	YES	NO
2. Does the subject of this review involve a change to the procedures as described in the Safety Analysis Report? Refer to 0PAP01-ZA-0103.	☐	☒

Failure of certain rods to fully insert to rod bottom involves a change to the facility and does not involve a change to procedures.

Originating Document No. ST-UB-HL-1683 Unit 2 Cycle 6 RCCA Evaluation   Rev. No. 0

	YES	NO
3. Does the subject of this review propose the conduct of test or experiments not described in the Safety Analysis Report? The failure of certain rods to fully insert to rod bottom is a change to the facility and does not propose any new tests or experiments.	☐	☒
4. Does the proposed change affect conditions or bases assumed in the Safety Analysis Report or safety-related functions of equipment/systems, even though the proposed change does not entail any physical change in existing structures, systems, or procedures as described in the SAR? The failure of multiple control rods to fully insert to rod bottom has the potential to affect assumptions in several Safety Analyses that rely on rod cluster control assemblies for reactivity control for shutdown.	☒	☐

If any answer is affirmative, complete the screening form and perform an Unreviewed Safety Question Evaluation.

If all answers are negative, no Unreviewed Safety Question Evaluation is required.

The UFSAR requires revision per 0PGP05-ZN-0004?	☐	☒
The Condition Report Action for changing the UFSAR is ____.		

Prepare by: J. M. Wigginton J. M Wigginton   2/18/97
Originator   Date

Approved by: R. L. Boyer Roger L Boyer   2-18-97
Qualified Reviewer   Date

Attachment to USQE 97-0102, Rev. 0
Unit 2 Cycle 6 RCCA Evaluation
(J. M. Wigginton, February 1997)

Table of Contents

1.0 Summary

1.1 Introduction

The purpose of this evaluation is to determine the impact of this condition on the safety analysis of record and provide documentation that this condition does not represent an unreviewed safety question for South Texas Unit 2 Cycle 6. This evaluation will show that the South Texas Project has taken all reasonable precautions to ensure that the failure of the RCCAs to fully insert will not occur, or otherwise be limited, for the duration of Unit 2 Cycle 6. However, should RCCAs become stuck, this safety analysis provides bounding results with respect to the Reload Safety Analysis Checklist. Furthermore, this safety evaluation demonstrates that the subject condition of the RCCAs failing to insert given the bounding scenarios examined in this USQE for South Texas Unit 2 Cycle 6 is acceptable since it does not represent an unreviewed safety question according to the criteria of 10CFR50.59.

Section 1.2 of this report presents a brief discussion of the history of the Incomplete Rod Insertion (IRI) issue at STP. Section 1.1 documents the occurances of rods failing to insert at STP. Following the historical review of events a discussion of the remedial actions taken to address the IRI for U2C6. Remedial actions have been taken reduce the probability of IRI during U2C6 In addition evaluations have been performed to demonstrate that if IRI occurs during U2C6, adequate trip reactivity and shutdown margin exist. Section 3.0 presents a discussion of evaluations that have been performed concerning the IRI issue at STP. Section 4.0 provides a discussion of the Safety Analyses performed to address the IRI issue. Discussions of the impact of IRI on trip reactivity and shutdown margin are presented. Section 5.0 presents a discussion of the IRI issue's impact of Technical Specifications. Section 6.0 provides the responses to the 7 USQE questions. The USQE question responses provide the basis for the determination that the IRI issue does not pose an unreviewed safety question for U2C6. Section 7 provides the references used in the development of this evaluation. Finally Section 8 contains all tables and figures.

1.2 History

In Cycle 6 of Unit 1, it was noted that several Rod Cluster Control Assemblies (RCCAs) were failing to fully insert following various plant trips and rod drop tests. Specifically, failure to fully insert was first noted during a reactor trip on 12/18/95 when three RCCAs in core locations F-10, C-9, and N-7, were shown by the Digital Rod Position Indication (DRPI) system to be at 6 steps withdrawn. The RCCAs in locations C-9 and N-7 belonged to Shutdown Bank B and the RCCA in F-10 belonged to Control Bank C. Stuck rods occurred in Standard fuel assemblies with accumulated assembly burnups of approximately 43,000 MWD/MTU. A prior reactor trip on 8/29/95 was uneventful.

In subsequent rod drop testing performed on 3/2/96, the RCCAs in locations N-9, D-8, F-6 and K-10 were also observed to be at six steps withdrawn. These RCCAs were also located in Standard fuel assemblies with burnups greater than 43,000 MWD/MTU.

When the reactor was shutdown for 1RE06 on 5/18/96, the RCCAs in locations C-9, N-9, D-8, F-6 and K-10 were again observed to be stuck at six steps withdrawn while N-7 and F-10 were at 12 steps withdrawn. In addition, the RCCAs in locations C-5, C-7, E-11, and K-8 were all shown to be at 6 steps withdrawn, making a total of 11 RCCAs which did not fully insert. All stuck rods occurred in Standard fuel assemblies with the lowest average assembly burnup at approximately 32,000 MWD/MTU.

Subsequent drag testing of U1C6 assemblies was performed in July of 1996 for CR 96-14358. During the drag testing, the assemblies that failed to fully insert on 5/18/96 exhibited excessive drag in the lower dashpot region.

In rod drop testing performed during Cycle 7 of Unit 1 on 1/25/97, the RCCAs in core locations C-9 and K-8 were observed to stick at 6 steps from the bottom after being dropped. These RCCAs were located in V5H fuel assemblies with a lowest average assembly burnup of approximately 26,000 MWD/MTU. These were the first observed incomplete rod insertions in V5H fuel assemblies.

When Unit 2 was shutdown for 2RE05 on 2/8/97, rod drop testing was performed. During the testing, the RCCAs in core locations D-8, E-11, F-6 and H-8 stuck at 6 steps, while the RCCA in core location F-10 stuck at 12 steps making a total of 5 RCCAs that did not insert. All stuck rods occurred in Standard fuel with a lowest average assembly burnup of approximately 40,000 MWD/MTU.

The Unit 2 End Of Cycle 5 rod drop testing also indicated that several rods experienced a small amount of slowing above the fuel assembly dashpot. The maximum rod drop time (dashpot entry) was 1.83 seconds in a high burnup (approximately 50,000 MWD/MTU) Standard fuel assembly, which represented a 0.25 second increase since the previous rod drop test performed on 01/11/96. All drop times were well below the Technical Specification limit of 2.8 seconds. The increased rod drop times are an indication of increased resistance above the fuel assembly dashpot region.

2.0 Remedial Actions

The South Texas Project has taken several actions to both minimize the possibility of this phenomena occurring in Unit 2 Cycle 6, and to ensure that adequate shutdown margin and trip reactivity exist if IRI does occur.

First and foremost, the U2C6 core was redesigned to minimize the burnup experienced by assemblies in rodded locations. The current core design has only fresh V5H fuel assemblies and once burned Standard fuel assemblies from U2C1 in rodded locations. The projected maximum end of hot full power burnup for V5H assemblies is 26,300 MWD/MTU and 32,000 MWD/MTU for Standard fuel assemblies. Including a 52 EFPD coastdown, the projected maximum EOC burnup for V5H assemblies is 29,000 MWD/MTU and 34,000 MWD/MTU for Standard assemblies.

In addition to core redesign, all of the U2C1 assemblies that are to be loaded in U2C6 were drag tested in the U-2 Spent Fuel Pool as an action for CR 97-1805. All assemblies exhibited drag forces that were well below the Westinghouse F-5.1 specification criteria (less than 100 pounds in dashpot, less than 40 pounds above dashpot).

Safety Analyses have been performed which postulate RCCAs sticking in worst case scenarios, as discussed in the *Safety Analysis* section of this document. These safety analyses bound all incomplete rod insertion conditions experienced to date for STP Units 1 and 2. Based on the facts that: a) The analyses bound previous incomplete rod insertion conditions, b) test data indicates that the probability of incomplete rod insertions increases with increasing burnup, and c) the assembly average burnups for assemblies in rodded locations of the U2C6 core are minimized, the safety analyses will bound any incomplete rod insertion conditions that may occur for U2C6.

3.0 Mechanical Evaluation

The South Texas Project conducted rod drop time testing for the affected banks to help establish the characteristics of the incomplete rod insertion for Unit 1 Cycle 6. The rod drop profiles provided important information relative to the affected RCCA locations. Specifically, the traces indicate that all RCCAs inserted within normal drop time ranges of approximately 1.6 seconds which is well within the Technical Specification limit of 2.8 seconds. The traces also allow for evaluation of the lower thimble tube deceleration or interference. Typical good locations (fully inserted) in Standard fuel of Unit 1 Cycle 6, showed characteristic spring dampening occurring in the dashpot region as the RCCA spring pack contacts the fuel assembly adapter plate (i.e. recoil). This spring action is clearly missing from the affected assemblies, indicating the failure of the RCCA to overcome the interference within the dashpot at these locations and achieve the same free motion. All tests indicated that the time to dashpot entry was not affected and is consistent with previous startup testing performed in the Spring of 1995 for Unit 1.

During the Unit 1 Cycle 6 rod drop tests in December of 1995, an additional RCCA failed to fully insert at core location N-9. This RCCA was also in a Standard fuel assembly, and stopped approximately 6 steps above the fully-inserted position. During the tests, RCCAs in locations N-7, C-9, and F-10 failed once again to immediately achieve full insertion. However, after approximately 1 hour, RCCAs N-7 and N-9 achieved full insertion without any additional assistance.

Further testing was performed in which the RCCAs which failed to fully insert were first withdrawn 6 steps and then stepped in. When this was done, full insertion of the RCCAs was achieved. When the RCCAs were subsequently withdrawn to 24 steps and tripped, they stopped again at 6 steps withdrawn. The RCCAs residing at 6 steps (C-9 and F-10) were then manually inserted to rod bottom.

For Unit 2 Cycle 5, rod drop testing was performed on 1/11/96 during the planned electrical generator outage. All 57 RCCAs were tested and all rods dropped to rod bottom without any degradation in rod drop times.

When Unit 1 was shutdown for 1RE06 on 5/18/96, a total of 11 RCCAs did not fully insert. All stuck rods occurred in Standard fuel assemblies with the lowest average assembly burnup at approximately 32,000 MWD/MTU.

On June 3, 1996, Unit 1 Cycle 7 Mode 5 (cold conditions) Rod Drop Tests were performed in accordance with 0PSP10-DM-0003 (without surveillance credit). These tests indicated normal responses (i.e. including recoil) for all rodded locations.

Drag testing was performed in July of 1996 to determine the root cause of the U1C6 incomplete rod insertions. A matrix of Standard fuel assemblies from U1C6, including both assemblies that stuck and assemblies that fully inserted on 5/18/96, were tested. During the testing, assemblies that failed to fully insert on 5/18/96 were observed to exhibit excessive drag in the lower dashpot region. The Spent Fuel Pool IRI testing results indicated that the dashpot region of the

assemblies that stuck on 5/18/96 had become deformed. Based on the Spent Fuel Pool IRI testing results the root cause of the U1C6 incomplete rod insertion problem was determined to be guide tube distortion in the dashpot due to the in-vessel axial compressive load. The "most likely" cause for the excessive distortion was determined to be inadequate resistance to mechanical buckling in the fuel assembly design. Contributing factors included "irradiation effects and thermal creep at higher burnup levels".

The upper guide tube clearance with the RCCA is more than 5 times that of the 6 mil diametral dashpot clearance. Any interference within the guide tubes in the high burnup assemblies is likely to be limited to the lower dashpot area, i.e., in the region from 0 to 14 steps withdrawn (Figure 1). This is supported by the test results performed on South Texas Units 1 and 2.

When Unit 2 was shutdown for 2RE05 on 2/8/97, rod drop testing was performed. During the testing, RCCAs in core locations D-8, E-11, F-6 and H-8 were shown by the Digital Rod Position Indication (DRPI) system to be at 6 steps withdrawn, while the RCCA in core location F-10 was shown by the DRPI system to be at 12 steps withdrawn, making a total of 5 RCCAs that did not fully insert. All 5 RCCAs were inserted into Standard fuel assemblies, with a lowest average assembly burnup of approximately 40,000 MWD/MTU.

The Unit 2 End Of Cycle 5 rod drop testing also indicated that several rods experienced a small amount of slowing down above the fuel assembly dashpot. The maximum rod drop time (dashpot entry) was 1.83 seconds in a high burnup (@ 50,000 MWD/MTU) Standard fuel assembly, which represented a 0.25 second increase since the previous rod drop test performed on 01/11/96. All drop times were well below the Technical Specification limit of 2.8 seconds. The increased rod drop times are the an indication of increased resistance above the fuel assembly dashpot region. The increase in rod drop time is not expected to impact U2C6 since a rod drop time increase of this magnitude has only been observed in a high burnup fuel assembly. U2C6 was redesigned to minimize assembly burnup in rodded locations.

The above evaluations support several important conclusions:

- The interference or binding causing incomplete insertion is limited to the lower dash pot region.
- Scram times are well within Technical Specification requirements.
- The incomplete rod insertions are a recent occurrence as the prior scrams (before 12/15/95) were uneventful.
- The test results did not indicate that the phenomenon was related to a loose part.
- The test results do not indicate that the phenomenon is related to degradation in the RCCAs.

4.0 Safety Analysis

Westinghouse has performed Core Physics Analyses for the various conditions listed in Table 1 and Figures 2 and 3 for Unit 2 Cycle 6. These analyses show that all Reload Safety Analysis Checklist (RSAC) parameters continue to be met for a variety of RCCAs stuck at various core locations and positions (as depicted in the Table and Figures). Key among these parameters is Shutdown Margin and Trip Reactivity, which continue to be satisfied. This demonstrates that 10CFR50 Appendix A, General Design Criteria will continue to be satisfied, especially the following:

- GDC 25 Protection system requirements for reactivity control malfunctions.
- GDC 26 Reactivity control system redundancy and capability.
- GDC 27 Combined reactivity control systems capability

The control rods provide two functions with regard to the safety analysis. First, the control rods must insert sufficient reactivity to reduce power such that safety limits (DNB and reactor pressure) are not exceeded (trip reactivity). Secondly, the control rods must insert sufficient negative reactivity to maintain shutdown margin as defined in Technical Specifications 3.1.1.1 and 3.1.1.2.

4.1 Impact of Incomplete Rod Insertion on Power Reduction

The trip reactivity requirement for the full power accidents defined in UFSAR Chapter 15 is satisfied by all but the highest worth RCCA falling into the dash pots within the Technical Specification rod drop limit of 2.8 seconds during an accident. During the accidents the highest worth rod is modeled to remain full out. Since all measured rod drop times (dashpot entry) to date are well below the 2.8 second limit, and since no rods have been observed to stick above the dashpots, the trip reactivity requirement for full power accidents will continue to be met for U2C6.

The Trip reactivity requirement for the Rod Withdrawal From Subcritical (RWFS) accident for U2C6 is 2 %$\Delta\rho$. Westinghouse performed bounding trip reactivity evaluations for U2C6 based on all inserted rods stuck at 28 steps for without a post-trip cooldown or stuck at 22 with a post trip cooldown from 567°F to 550°F. The results of the evaluation are presented in Table 1. Table 1 shows that the RWFS trip reactivity requirement is met in both cases.

In order to evaluate the IRI safety implications related to shutdown margin, shutdown margin evaluations were performed based on the following conservative assumptions:

- All inserted RCCAs could be stuck at 12 steps or less withdrawn, or up to 12 RCCAs could be stuck at 22 steps or less withdrawn; or 20 RCCAs could be stuck at 16 steps

withdrawn following reactor trip with or without a post-trip cooldown from 567°F to 550°F.

- No location or burnup restrictions were assumed in determining the number of allowable incompletely inserted RCCAs.

- The highest worth RCCA is stuck fully withdrawn.

These assumption are conservative for the following reasons:

- Use of 12 or more (See Table 1) RCCAs represents a bounding case since a maximum of 11 RCCAs in Unit 1 and 5 in Unit 2 have been shown to be affected based on numerous rod drop tests.

- The number of allowable incompletely inserted RCCAs was determined without placing any restrictions based on location or assembly average burnup. The locations used in the analysis (see Figures 1 through 4) were selected to minimize the N-1 rod worth (thus minimizing the available shutdown margin).

- The use of an assumed insertion to only 22 steps withdrawn exceeds the elevation at which RCCAs became stuck in actual rod drop testing.

- During Unit 2 Cycle 5, there was over 30% margin to the rod drop time limit of 2.8 seconds stipulated in the Technical Specifications.

- STP U2C6 core loading pattern has been developed to minimize rodded, EOL, fuel burnups, for example 21 once burned Standard fuel assemblies from U2C1 and 36 fresh V5H assemblies are under control rods.

The results of the analyses for the above scenarios are presented in Table 1. Table 1 shows that the shutdown margin RSAC limit of 1.3% $\Delta\rho$ is met. In addition, Westinghouse determined that the case of all 21 RCCAs located in the once burned Standard fuel assemblies sticking at 14 or fewer steps with all other rods fully inserting would result in no RSAC violations. This is significant since there have been no recorded cases of RCCAs sticking in fresh assemblies at STP, and all stuck rods have stuck at an indicated position of 12 steps or less.

4.2 Core Physics Analysis

Specific analysis of the conditions described in Section 4.1 were performed to cover a range of cycle burnup from 0 MWD/MTU to 22,100 MWD/MTU (The end of full power operation plus coastdown). The calculations confirmed that ALL Reload Safety Analysis Checklist (RSAC) (refer to USQE 97-0101) current limits continue to be met including shutdown margin and the current licensing basis RWFS trip reactivity limit of 2 %$\Delta\rho$.

4.3 Loss of Coolant Accident

4.3.1 Large Break LOCA

The Large Break LOCA analysis does not take credit for any RCCA insertion to shutdown the core. The void formation during the LOCA produces the negative reactivity to shutdown the core. Therefore, this accident scenario bounds the assumed operating condition.

4.3.2 Small Break LOCA

The Small Break LOCA analysis credits the shutdown of the core due to the reactor trip and the rod insertion time. Given that the RCCAs will continue to shut down the core within the RSAC limits and do not cause the time to go above the safety limit for rod insertion, the Small Break LOCA analysis is unaffected by this assumption.

4.3.3 Long Term Cooling

The South Texas Project Long term cooling analysis does not take credit for RCCA insertion to keep the core subcritical. The boron concentration of the ECCS produces the negative reactivity to keep the core subcritical. Therefore, this accident scenario bounds the assumed operating condition.

4.3.4 Hot Leg Switchover Analysis

The hot leg switchover analysis does not credit any rod insertion to keep the core subcritical. The boron concentration of the ECCS and the rate of safety injection during hot leg recirculation produces the negative reactivity to keep the core subcritical. Therefore, this accident scenario bounds the assumed operating condition.

4.4 Emergency Operating Procedures

The EOP procedure actions in 0POP05-E0-ES01 requires emergency boration of 228 ppm for each stuck rod greater than 18 steps when more than one rod is stuck, and 60 ppm for each rod stuck less than or equal to 18 steps. The failure of the RCCAs considered in this USQE are bounded by the 228/60 ppm/RCCA criteria, since they were based on previously bounded cases as determined through the 10CFR50.59 process. Therefore, the EOPs are not impacted by this USQE.

4.5 Other Safety Related Areas

Other safety related areas have been reviewed and it was determined that none of these are affected by the subject condition. These include the following (as discussed in Reference 7.1):

- mechanical and fluid systems
- instrumentation and control systems
- LOCA and steam line break mass/energy release and impact on containment analysis
- radiological consequences
- steam generator tube rupture
- probabilistic risk assessment
- Technical Specifications
- protection system setpoints

5.0 Technical Specifications and System Function

Technical Specification 3.1.3.1 requires that all full-length shutdown and control rods shall be OPERABLE and positioned within +/- 12 steps (indicated position of their group step counter as compared to demand position). A control rod is considered OPERABLE if it is capable of being tripped, movable, and properly aligned. The RCCAs have been demonstrated to be capable of being tripped, movable, and proper alignment can be maintained. The RCCAs are fully capable of performing their design function in conformance with the definition of OPERABLE/OPERABILITY. The accident analyses assume that the RCCAs insert adequate negative reactivity within the prescribed drop time (2.8 sec.). This analysis shows that Shutdown Margin will continue to be met for those cases presented in Table 1 and Figures 2 and 3. The rod drop times are still well within the required limit. Consequently, the RCCAs are fully OPERABLE with regard to TS 3.1.3.1 and 3.1.1.1 (Modes 1, 2, and 3 at no load Tavg).

STP has concluded from the evaluation above that the IRI condition does not affect the Technical Specification requirements for the operability of the control rods.

The condition will not affect the rod control system function during normal operation of the plant. The RCCAs have been demonstrated to be fully controllable by the rod control system. The condition will have no impact on the manual or automatic features of the rod control system.

6.0 Determination of Unreviewed Safety Question

The subject condition of the failure of RCCAs to fully insert to the rod bottom position has been evaluated using the guidance of 0PGP05-ZA-0002 and, on the basis of the following justification, does not involve an unreviewed safety question per the criteria of 10 CFR 50.59.

1. Will the probability of an accident previously evaluated in the UFSAR be increased?

This safety evaluation documents that the probability of an accident previously evaluated in the UFSAR is not increased. All applicable design criteria and all pertinent licensing basis acceptance criteria are met. The demonstrated adherence to applicable standards and acceptance criteria precludes new challenges to components and systems that could increase the probability of any previously evaluated accident. The fuel clad integrity is maintained and the structural integrity of the fuel rods, fuel assemblies, and core is not affected. The condition does not impact fuel rod performance or dimensional stability nor will it cause the core to operate in excess of pertinent design basis operating limits. The condition does not introduce any accident initiators. Control rod accidents involve rod ejection or uncontrolled withdrawal, neither of which are affected by this condition. Therefore, the probability of occurrence of an accident previously evaluated in the UFSAR has not increased.

2. Will the consequences of an accident previously evaluated in the UFSAR be increased?

This safety evaluation documents that the consequences of an accident previously evaluated in the UFSAR is not increased. All applicable design criteria and all pertinent licensing basis acceptance criteria are met. The demonstrated adherence to these standards and criteria precludes new challenges to components and systems that could: a) adversely affect the ability of existing components and systems to mitigate the consequences of any accident and/or; b) adversely affect the integrity of the fuel rod cladding as a fission product barrier. Furthermore, adherence to applicable standards and criteria ensures that these fission product barriers maintain design margin to safety. The condition has no impact on chemical, physical or mechanical properties nor will it cause the core to operate in excess of pertinent design basis operating limits. Thus, fuel clad integrity is maintained. The RCCAs are capable of performing in accordance with the accident analysis assumptions for drop time and insertion of negative reactivity. Since the conclusions of the UFSAR remain valid, the consequences of accidents previously evaluated in the UFSAR have not increased.

3. <u>May the possibility of an accident which is different from any already in the UFSAR be created?</u>

This safety evaluation documents that the possibility of an accident which is different from any already in the UFSAR is not created. All applicable design criteria and all pertinent licensing basis acceptance criteria are met. The demonstrated adherence to these standards and criteria precludes new challenges to components and systems that could introduce a new type of accident. All design and performance criteria will continue to be met, no new single failure mechanisms have been created, and the core will not operate in excess of pertinent design basis operating limits. The condition does not introduce any accident initiators. Control rod accidents involve rod ejection or uncontrolled withdrawal, neither of which are affected by this condition. Therefore, the possibility of an accident of a different type than any previously evaluated in the UFSAR has not been created.

4. <u>Will the probability of a malfunction of equipment important to safety previously evaluated in the UFSAR be increased?</u>

This safety evaluation documents that the probability of a malfunction of equipment important to safety previously evaluated in the UFSAR is not increased. All applicable design criteria and all pertinent licensing basis acceptance criteria are met. Demonstrated adherence to applicable standards and acceptance criteria precludes new challenges to components and systems that could increase the probability of any previously evaluated malfunction of equipment important to safety. No new performance requirements are being imposed on any system or component such that any design criteria will be exceeded nor will the condition cause the core to operate in excess of pertinent design basis operating limits. No new modes or limiting single failures have been created by the condition noted above. Therefore, the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the UFSAR has not increased.

5. <u>Will the consequences of a malfunction of equipment important to safety previously evaluated in the SAR be increased?</u>

This safety evaluation documents that the consequences of a malfunction of equipment important to safety previously evaluated in the UFSAR are not increased. All applicable design criteria and all pertinent licensing basis acceptance criteria are met. The demonstrated adherence to these standards and criteria precludes new challenges to components and systems that could: a) adversely affect the ability of existing components and systems to mitigate the consequences of any accident and/or; b) adversely affect the integrity of the fuel rod cladding as a fission product barrier. Furthermore, adherence to applicable standards and criteria ensures that these fission product barriers maintain design margin of safety. The condition does not change the performance requirements on any system or component such that any design criteria will be exceeded nor will it cause the core to operate in excess of pertinent design basis operating limits. No new modes or limiting single failures have been created by

the condition mentioned above. Therefore, the consequences of a malfunction of equipment important to safety previously evaluated in the UFSAR have not increased.

6. May the possibility of a malfunction of equipment important to safety different from any already evaluated in the UFSAR be created?

This safety evaluation documents that the possibility of a malfunction of equipment important to safety different from any already evaluated in the UFSAR is not created. All applicable design criteria and all pertinent licensing basis acceptance criteria are met. The demonstrated adherence to these standards and criteria precludes new challenges to components and systems that could introduce a new type of a malfunction of equipment important to safety. All original performance criteria continue to be met, and no new failure modes have been created for any system, component, or piece of equipment. No new single failure mechanisms have been introduced nor will they cause the core to operate in excess of pertinent design basis operating limits. Therefore, the possibility of a malfunction of equipment important to safety of a different type than any previously evaluated in the UFSAR has not been created.

7. Will the margin of safety as defined in the BASES to any technical specifications be reduced?

This safety evaluation documents that the margin of safety as defined in the Bases to any Technical Specifications is not reduced. All applicable design criteria and all pertinent licensing basis acceptance criteria are met, especially with respect to Shutdown Margin and Trip Reactivity. Shutdown Margin is controlled by Technical Specifications, and this change does not reduce the Shutdown Margin below the acceptable Technical Specification Limit.

It has been determined that the design and safety analysis limits remain applicable, and that these limits are supported by the applicable Technical Specifications. The evaluation of this condition takes into consideration normal core operating conditions allowed in the Technical Specifications. This condition has been evaluated using approved design methods. This evaluation includes consideration of the core physics analysis peaking factors and core average linear heat rate effects. Therefore, the margin of safety as defined in the Bases to the Technical Specifications has not been reduced.

7.0 References

References Used in Evaluation

1) ST-UB-HL-1588, "Westinghouse Safety Evaluation Checklist (SECL 96-089), Failure of RCCAs to Achieve Full Insertion After Reactor Trip.", Revision 0

2) ST-UB-HL-1539, "Westinghouse Safety Evaluation Checklist (SECL 95-192), Failure of RCCAs to Achieve Full Insertion After Reactor Trip.", Revision 1

3) ST-UB-HL-1536, "Westinghouse Safety Evaluation Checklist (SECL 95-192), Failure of RCCAs to Achieve Full Insertion After Reactor Trip.", Revision 0

4) CR 95-14358, "Unit 1 Control Rod Insertion Anomaly."

5) ST-UB-HL-1683, "Westinghouse Safety Evaluation Checklist (SECL 95-192), Failure of RCCAs to Achieve Full Insertion After Reactor Trip.", Revision 4

References Checked

6) NUREG-0781, Safety Evaluation Report for the South Texas Project (Sections 4.2, 4.3, and 15)

7) Updated Final Safety Evaluation Report (Sections 3.1, 3.9, 4.2, 4.3, 7.7, and 15)

8) USQE 97-0101, "Unit 2 Cycle 6 Reload Safety Evaluation," Rev. 0

9) 5N079NB1000, "Accident Analysis Design Basis Documents"

10) Title 10, Code of Federal Regulations, Part 50, Appendix A, General Design Criteria

8.0 Tables and Figures

8.1 Table 1, Hypothetical Stuck RCCA Positions

South Texas Project Unit 2 Cycle 6 Without Post-Trip Cooldown						
Case	Stuck Position (Step Withdrawn)	No. of Rods	Shutdown Margin	Trip Reactivity *	Cycle Burnup (MWD/MTU) **	Stuck Rod Core Location
1	22	12	3.17%	2.19%	150	H8
2	16	20	3.30%		150	H8
3	12	56	3.24%		150	H8
4	22	12	2.18%	2.67%	22100	H8
5	16	20	2.18%		22100	H8
6	12	56	2.03%		22100	H8
South Texas Project Unit 2 Cycle 6 With Post-Trip Cooldown (550°F)						
1	22	12	3.03%	2.38%	150	H8
2	16	20	3.16%		150	H8
3	12	56	3.09%		150	H8
4	22	12	1.66%	2.86%	22100	H8
5	16	20	1.65%		22100	H8
6	12	56	1.50%		22100	H8

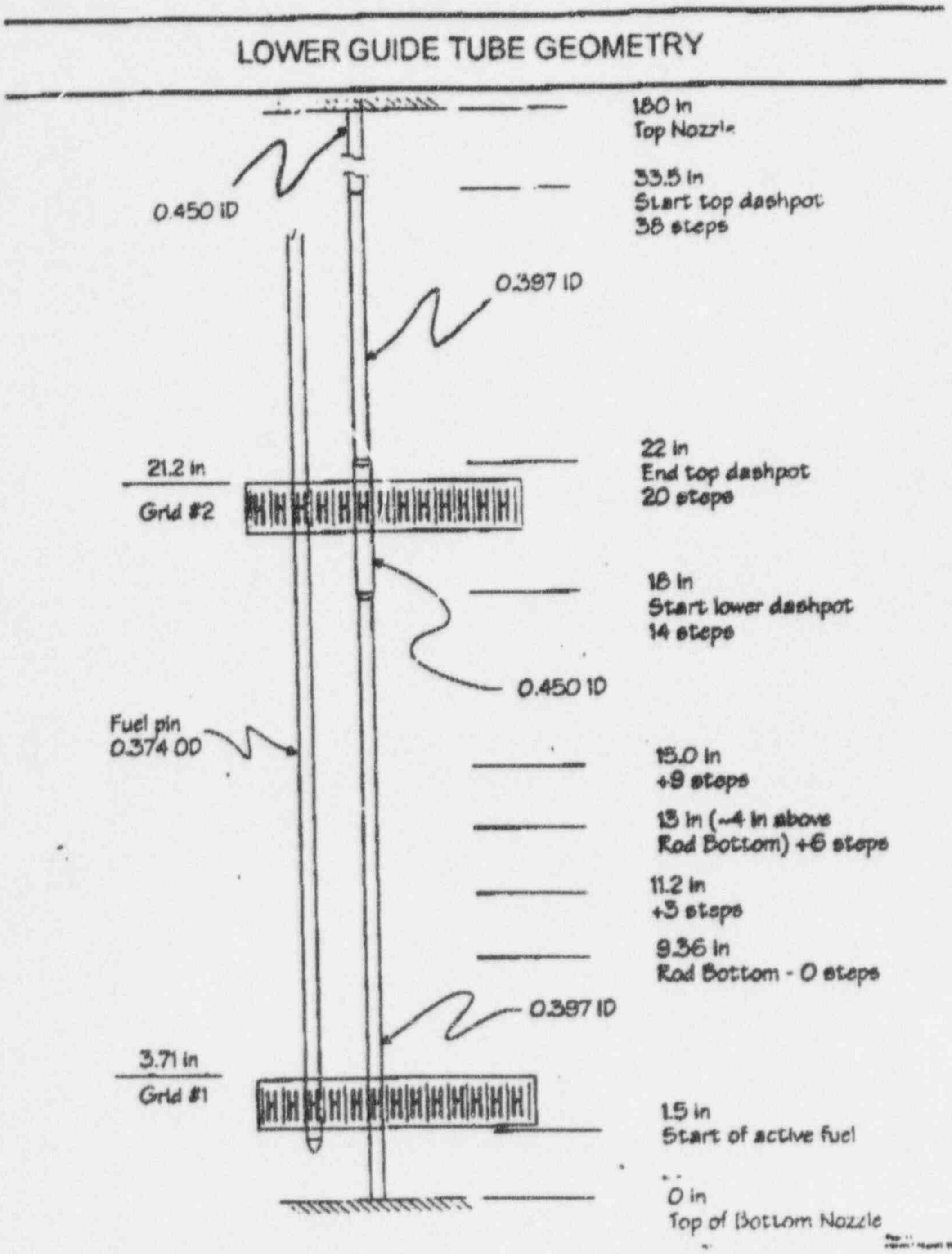
* The trip reactivity calculations were performed assuming all inserted rods at 28 steps without a post-trip cooldown, or 22 steps with a post-trip cooldown.

** The cycle burnup of 150 MWD/MTU corresponds to BOC conditions. The cycle burnup of 22,100 MWD/MTU corresponds to EOC conditions (i.e. the end of hot full power (555 EFPD) plus a 52 EFPD coastdown).

The RCCAs incompletely inserted in this analysis were selected to minimize the inserted rod worth. The listed shutdown margin values are therefore representative for any group containing the indicated number of RCCAs stuck at the indicated number or fewer steps withdrawn, including the highest stuck rod fully withdrawn. The shutdown margin and trip reactivity RSAC limits are 1.3% and 2.0% $\Delta\rho$, respectively.

In addition, the analysis results indicate that the case of all 21 RCCAs in non-feed (Region 1) assemblies in the Cycle 6 core become stuck at 14 steps or fewer withdrawn would result in no RSAC violations.

8.2 Figure 1, Fuel Assembly Dashpot Region



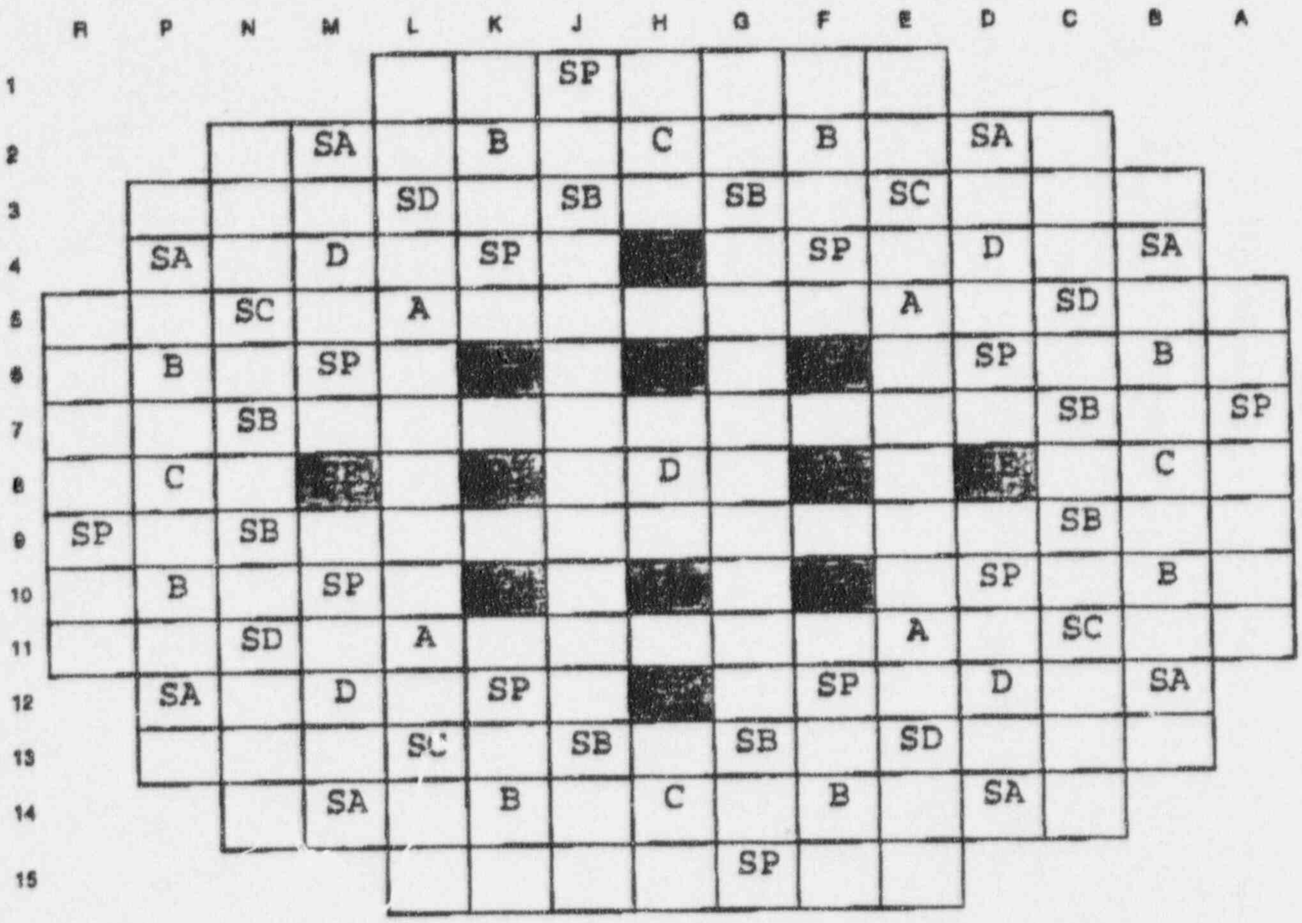
8.3 Figure 2, 20 RCCAs Stuck at 16 Steps

	R	P	N	M	L	K	J	H	G	F	E	D	C	B	A
1							SP								
2				SA		B		C		B		SA			
3					SD		SB		SB		SC				
4		SA				SP				SP				SA	
5			SC										SD		
6		B		SP								SP		B	
7			SB										SB		SP
8		C						D						C	
9	SP		SB										SB		
10		B		SP								SP		B	
11			SD										SC		
12		SA				SP				SP				SA	
13					SC		SB		SB		SD				
14				SA		B		C		B		SA			
15									SP						

Bank Identifier	# of Locations
A	8
B	8
C	8
D	5
SA	8
SB	8
SC	4
SD	4
SE	4
SP (Spare)	12

Shaded locations indicate stuck RCCAs at 16 steps; RCCA H8 is assumed to be stuck fully withdrawn.

8.4 Figure 3, 12 RCCAs Stuck at 22 Steps



Bank Identifier	# of Locations
A	8
B	8
C	8
D	5
SA	8
SB	8
SC	4
SD	4
SE	4
SP (Spare)	12

Shaded locations indicate stuck RCCAs at 22 steps; RCCA H8 is assumed to be stuck fully withdrawn.

STP Response to NRC Questions on Incomplete Rod Insertion Anomaly at 2RE05 (02/11/1997)

1. Are there any plans to perform rod drop testing prior to operation of Unit 2 Cycle 6?

    Yes, rod drop time testing is required prior to reactor startup following core alterations, and performed when RCS Tavg is greater than 561°F with four reactor coolant pumps running. In addition, we plan to collect rod drop data at cold, no flow conditions when the control rods are tripped into the core from the rapid refueling position.

2. How are you going to demonstrate that the control rods will provide adequate shutdown margin and trip reactivity through end of core life? How do you assure that the control rods are trippable?

    Following the Unit 1 January 25, 1997 rod drop testing, a core loading pattern revision for Unit 2 Cycle 6 was initiated. The new pattern limits rodded core locations to fresh V5H or once-burned non-V5H fuel with end-of-cycle burnups at approximately 26.6 and 32.1 gwd/mtu, respectively. A rod drop test several months before end-of-cycle (corresponding to the lowest fuel burnups observed in V5H and non-V5H fuel) may be necessary to ensure safety limits are met. We will evaluate the results of Unit 1 Cycle 7 rod drop testing to confirm that adequate safety margin exists, and determine the schedule for additional rod drop testing (if any) by mid-November 1997.

    Core design calculations will be performed prior to startup to demonstrate that a bounding number of controls rods, independent of fuel assembly burnup, which stick at 10 steps, 16 steps, or 22 steps, assuming the most reactive stuck rod fully withdrawn, will meet shutdown margin and trip reactivity safety analysis requirements through end of core life. STP will make these calculations available to the NRC. These results will be used in a documented safety evaluation, and will be completed prior to reactor startup of Unit 2, which is currently scheduled to occur on February 24, 1997. This safety evaluation will also be provided to the NRC upon STP management approval.

    Rod drop testing performed during Unit 2 Cycle 5 demonstrated that rod drop times and shutdown margin will remain within Technical Specification limits, and that the rods are free to insert into the dashpot region with the IRI condition. During reactor operation, a monthly rod exercise test is performed to assure that the rods are movable, and thus assumed to be trippable.

3. What will you do if rod drop tests prior to startup indicate no recoil?

    Recoil data from Unit 1 Cycle 6 and Unit 2 Cycle 5 initial startup testing demonstrated that low recoil (0 or 1) at BOC did not impede the affected control rod locations to perform their safety function through EOC. This will be one of the factors used to consider additional rod drop testing described in Question #2's response.

4. Provide an overview of fuel examinations during the 2RE05 refueling outage.

Due to a high drag condition observed during Spent Fuel Pool shuffling of old, discharged hafnium control rods from one of the once-burned reload assemblies, control rod drag testing of all rodded once-burned reload assemblies will be completed prior to core reload. A drag criteria of 100 lbs in the dashpot and 40 lbs above the dashpot will be used to evaluate rod insertion capability.

During the core offload, each reload fuel assembly will be visually inspected with binoculars. In addition, relative fuel assembly axial growth will be measured during the offload, as indicated by the refueling machine zz-tape when the assembly is full down in the containment upender.

5. Compare appropriate parameters of std, XLR, and V-5H for 14ft core. These parameters are: (a) thimble tube and dashpot outside diameter; (b) wall thickness; (c) clearance; (d) type of material.

	XL std	*XLR*	*XL V5H*
Thimble Tube OD(in)	*0.484*	*0.484*	*0.476*
Dashpot OD (in)	*0.421*	*0.421*	*0.421*
Wall Thickness (in)	*0.017*	*0.017*	*0.017*
Clearance (in)			
above dashpot	*0.035*	*0.035*	*0.031*
dashpot	*0.006*	*0.006*	*0.006*
Materials			
Mid grids	*Inconel*	*Inconel*	*Zirc*
Top/Bottom grids	*Inconel*	*Inconel*	*Inconel*
Thimble tubes	*Zirc*	*Zirc*	*Zirc*

Comprehensive information is also provided in NRC Accession number 96 02 01 02 30, "Meeting Summary" filed by Tom Alexion in the NRC Public Document Room, January 29, 1996.

6. Provide the overall fuel length for std, XLR and V-5H fuel.

	XL std	*XLR*	*XL V5H*
Length(in)			
Top pad/Bot pad	*188.795*	*188.795*	*188.795*

STEAM GENERATOR BACKGROUND DATA
SOUTH TEXAS PROJECT

Unit 2 Background Information

5.2 EFPY
Last cycle 439 EFPD
Model E SGs - Alloy 600 MA tubing - Hydraulically expanded
Stainless TSP with drilled holes
Thot 620 degrees
Shot peened after first cycle (HL) and second cycle (CL)
U Bend Heat Treatment R1 and 2 prior to operation

Previous plugging less than .5%

2RE04 (100% TTS RPC and 22% Bobbin Coil
   11 tubes were plugged (No circ cracks and 8 were DSIs confirmed to be SAIs)

Unit 1 Background Information and Differences From Unit 2

4.9 EFPY at last inspection Fall, 1996
Last cycle 387 EFPD
Mechanical Hard Rolled Tubing
Carbon Steel drilled hole TSP
Roto Peened prior to operation
U Bend Heat Treatment R1 and 2 at first refueling
1 Volt APC licensed

Total plugging less than 1.5%

1RE06 (100% TTS RPC, 100% Bobbin Coil, Row 1 and 3 +Point)
   95 tubes were plugged (56 were OD TTS Circ indications, 10 TTS axial indications, 885 DSIs with 6 $\geq$ 1 Volt)

ATTACHMENT 2

SCOPE OF EXAMINATIONS
2RE05

- All four steam generators were examined.
- Bobbin coil examination of all in-service tubes over their full length using a EB 610/590-LLMC (Westinghouse long life) probe.
- MRPC of all bobbin coil detected DSI (distorted support indications), NQI (non-quantifiable indications), all other I-codes, and all inner diameter reductions at tube support plates with signal greater than 5.0 Volts using a 0.115MRPC-610/580-3C-52PH (Zetec 3-coil MRPC) probe.
- MRPC examination of all in-service tubes at the hot leg top of tubesheet using a 0.115MRPC-610-3C-52PH (Zetec 3-coil MRPC) probe.
- Approximately 100 selected tube locations (ie.; preheater baffle plate expansions, previously detected indications, etc.) were examined by MRPC using various probe designs suitable for the location geometry.

Tubes Plugged During 2RE05 Outage

Steam Generator	DSI/(SAI or MAI) < = 1 Volt	DSI/(SAI or MAI) > 1 Volt	Other Axial Indications	Circumferential Indications	Volumetric Indications	Preventative	Total
A	113	7	2	0	0	3	125
B	154	4	0	0	10	1	169
C	143	1	0	0	2	0	146
D	159	0	0	0	2	0	161
							601

South Texas Project Unit 2
2RE05 Eddy Current Daily Status Report
FINAL

COLD LEG BOBBIN PROGRAM

	A	B	C	D	TOTAL
1. PLANNED TESTS	4843	4847	4840	4845	19375
2. ACQUIRED TESTS	4843	4847	4840	4845	19375
3. RESOLVED TESTS	4843	4847	4840	4845	19375

HOT LEG BOBBIN PROGRAM

1. PLANNED TESTS	240	240	240	239	959
2. ACQUIRED TESTS	240	240	240	239	959
3. RESOLVED TESTS	240	240	240	239	959

HOT LEG TUBESHEET RPC PROGRAM

1. PLANNED TESTS	4843	4847	4840	4845	19375
2. ACQUIRED TESTS	4843	4847	4840	4845	19375
3. RESOLVED TESTS	4843	4847	4840	4845	19375

HOT LEG SPECIAL INTEREST RPC PROGRAM

1. PLANNED TESTS	220	377	278	278	1153
2. ACQUIRED TESTS	220	377	278	278	1153
3. RESOLVED TESTS	220	377	278	278	1153

COLD LEG SPECIAL INTEREST RPC PROGRAM

1. PLANNED TESTS	46	60	49	35	190
2. ACQUIRED TESTS	46	60	49	35	190
3. RESOLVED TESTS	46	60	49	35	190

Distribution:

Chet McIntyre, Houston Lighting And Power
Kevin Miller/Ed Belizar, Westinghouse
Copy to Data Management files

Status as of February 19, 1997 at 0200

South Texas Project Unit 2
2RE05 Eddy Current Daily Status Report
FINAL

BOBBIN PROGRAM - BOTH LEGS	A	B	C	D	TOTAL
1. TUBES W/INDS 1-19% TW	7	6	6	9	28
2. TUBES W/INDS 20-39% TW	0	1	0	1	2
3. TUBES W/INDS > = 40% TW	0	0	0	0	0
4. TUBES W/DSI < = 1.0 VOLTS	165	283	219	227	894
5. TUBES W/DSI 1.0-2.85 VOLTS	7	4	1	0	12
6. TUBES W/DSI > 2.85 VOLTS	0	0	0	0	0
7. TUBES W/OTHER I-CODE INDS	12	36	10	6	64

HOT LEG TUBESHEET RPC	A	B	C	D	TOTAL
1. TUBES W/AXIAL INDS	0	0	0	0	0
2. TUBES WITH CIRC & MMI INDS	0	0	0	0	0
3. TUBES WITH VOLUMETRIC INDS	0	2	0	0	2

HOT LEG SPECIAL INTEREST RPC	A	B	C	D	TOTAL
1. TUBES W/AXIAL INDS	121	158	144	159	582
2. TUBES WITH CIRC & MMI INDS	0	0	0	0	0
3. TUBES WITH VOLUMETRIC INDS	0	4	0	0	4

COLD LEG SPECIAL INTEREST RPC	A	B	C	D	TOTAL
1. TUBES W/AXIAL INDS	2	0	0	0	2
2. TUBES WITH CIRC & MMI INDS	0	0	0	0	0
3. TUBES WITH VOLUMETRIC INDS	1	4	2	2	9

Status as of February 19, 1997 at 0200

Steam Generator Tube Inspection Results

Licensees' steam generator (SG) tube eddy current (EC) inspections play a vital role in the management of SG tube degradation. The results are used to demonstrate adequate structural and leakage integrity of the SG tubes for both condition monitoring (i.e., the as-found condition of the tubes demonstrate adequate integrity was maintained during the previous cycle) and operational assessment (i.e., the projected condition of the tubes is such that adequate integrity will be maintained during the upcoming operational cycle).

Specific information that facilitates staff reviews of licensees' condition monitoring and operational assessments includes:

Primary to secondary leakage prior to shutdown

Results of secondary side hydro

For each steam generator, provide a general description of areas examined; include expansion criteria and specify type of probe used in each area

For analyzed EC results, describe bobbin indications (those not examined with RPC) and RPC/Plus Point/Cecco indications. Include the following information: location, number, degradation mode, disposition, and voltages/depths/lengths of most significant indications.

Describe repair/plugging plans

Discuss previous history; "look backs" performed

Discuss new inspection findings

Describe in-situ pressure test plans and results, if available; include tube selection criteria

Describe tube pull plans and preliminary results, if available; include tube selection criteria

Assessment of tube integrity for previous operating cycle (condition monitoring)

Assessment of tube integrity for next operating cycle (operational assessment)

Provide schedule for steam generator-related activities during remainder of current outage

Note: Licensees should be prepared to respond to the above information during the teleconference. The staff prefers to receive responses (e.g., simple tables and figures) to the above information prior to the teleconference.

ATTACHMENT 3