

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

November 19, 1997

NOC-AE-0017

File No.: G03.03

10CFR50

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
Results of Control Rod Testing in Response to NRC Bulletin 96-01

References: 1) NRC Bulletin 96-01 dated March 8, 1996, "Control Rod Insertion Problems"
2) Letter from T. H. Cloninger to the U. S. Regulatory Commission dated April 4, 1996, "Response to Nuclear Regulatory Commission Bulletin 96-01," (ST-HI-AE-5333)

Attached are the South Texas Project's results for:

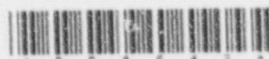
- Unit 1 end of Cycle 7 (hot, full flow) rod drop testing performed on September 13, 1997 (Attachment 1);
- Unit 1 beginning of Cycle 8 (cold) rod drop testing performed on September 28, 1997 (Attachment 2);
- Unit 1 beginning of Cycle 8 (hot, full flow) rod drop testing performed on October 3, 1997 (Attachment 3); and
- Unit 1 Spent Fuel Pool fuel assembly drag testing performed in July 1997 (Attachment 4).

Unit 1 tripped from full power on November 10, 1997 with a cycle burnup of 1220 MWD/MTU. All control and shutdown rods fully inserted to rod bottom following the reactor trip.

A core map is provided in Attachment 5 to assist in understanding the test data provided. In addition, Attachment 6 is provided to show the current Unit 1 specific core design data.

Attachment 7 is the South Texas Project's Units 1 and 2 restart evaluation criteria for any rod drop testing performed from now until the end of June, 1998.

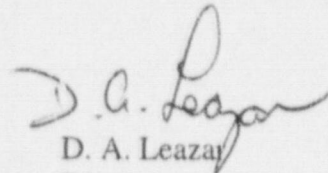
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A chronological history of correspondence regarding NRC Bulletin 96-01 and subsequent testing between the South Texas Project and the Nuclear Regulatory Commission is provided in Attachment 8.

If you have any questions regarding this subject, please contact Mr. R. F. Dunn at (512) 972-7743 or me at (512) 972-7795.



D. A. Leazar
Director,
Nuclear Fuel and Analysis

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Attachments:

1. Unit 1 September 13, 1997, End of Cycle 7, Hot Rod Drop Test Results
2. Unit 1 September 28, 1997, Beginning of Cycle 8, Cold Rod Drop Test Results
3. Unit 1 October 3, 1997, Beginning of Cycle 8, Hot Rod Drop Test Results
4. Unit 1 Fuel Assembly Drag Test Results
5. Core Map of Control Rod Locations
6. Unit 1 Cycle 8 Core Design Data
7. Units 1 and 2 Incomplete RCCA Insertion Evaluation Criteria
8. NRC Bulletin 96-01 Correspondence Table

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Unit 1 September 13, 1997 End of Cycle 7, Hot Rod Drop Test Results

Rod drop time testing was performed on all 57 control rods. The plant was in Mode 3 with the Reactor Coolant System temperature greater than 561°F and four reactor coolant pumps running. Three rods stopped at 6 steps from rod bottom based on Digital Rod Position Indication (N-9, M-8, and F-10)*, three rods stopped at 12 steps from rod bottom (C-9, F-8, and K-8)**, one rod stopped between 23 and 30 steps from rod bottom (C-7)***, and all other rods fully inserted. The average rod drop time was slightly higher than previous testing performed this cycle, and the test data showed a notable dashpot entry time increase of 0.22 seconds at core location C-7 since the last rod drop test performed on June 28, 1997. Test results satisfied all Technical Specification and safety evaluation limits during the test.

| Core Loc | Fuel ID | B/U 9/13/97 (GWD/MTU) | DE Time (sec) | Recoils | Core Loc | Fuel ID | B/U 9/13/97 (GWD/MTU) | DE Time (sec) | Recoils |
|-------------|---------|-----------------------------|---------------------|---------|-------------|---------|-----------------------------|---------------------|---------|
| Cycle B/U → | | 16.46 | | | Cycle B/U → | | 16.46 | | |
| | SA | | | | | A | | | |
| D-2 | G04 | 37.8 | 1.581 | 2 | E-5 | H34 | 35.4 | 1.616 | 0 |
| B-12 | G13 | 37.9 | 1.581 | 2 | E-11 | H31 | 35.5 | 1.600 | 0 |
| M-14 | G11 | 37.8 | 1.612 | 2 | L-11 | H35 | 35.5 | 1.578 | 0 |
| P-4 | G21 | 37.7 | 1.579 | 2 | L-5 | H30 | 35.4 | 1.616 | 0 |
| B-4 | G28 | 37.4 | 1.600 | 3 | H-6 | H45 | 36.7 | 1.730 | 0 |
| D-14 | G03 | 38.1 | 1.592 | 2 | F-8** | H46 | 36.7 | 1.746 | 0 |
| P-12 | G09 | 37.5 | 1.590 | 2 | H-10 | H48 | 36.7 | 1.616 | 0 |
| M-2 | G34 | 37.7 | 1.617 | 2 | K-8** | H47 | 36.7 | 1.745 | 0 |
| | SB | | | | | B | | | |
| G-3 | H08 | 34.9 | 1.595 | 2 | F-2 | J40 | 20.2 | 1.575 | 2 |
| C-9** | H05 | 34.9 | 1.794 | 0 | B-10 | J45 | 20.2 | 1.678 | 1 |
| J-13 | H12 | 35.0 | 1.594 | 2 | K-14 | J42 | 20.2 | 1.592 | 2 |
| N-7 | H09 | 34.8 | 1.656 | 1 | P-6 | J41 | 20.2 | 1.563 | 2 |
| C-7*** | H10 | 35.0 | 2.099 | 0 | B-6 | J46 | 20.1 | 1.642 | 1 |
| G-13 | H07 | 35.0 | 1.649 | 1 | F-14 | J43 | 20.2 | 1.578 | 2 |
| N-9* | H11 | 35.0 | 1.560 | 0 | P-10 | J44 | 20.2 | 1.561 | 2 |
| J-3 | H06 | 34.9 | 1.580 | 1 | K-2 | J38 | 20.1 | 1.595 | 2 |
| | SC | | | | | C | | | |
| E-3 | H13 | 35.8 | 1.595 | 2 | H-2 | T57 | 34.0 | 1.615 | 2 |
| C-11 | H28 | 35.7 | 1.698 | 0 | B-8 | T59 | 34.0 | 1.629 | 0 |
| L-13 | H18 | 35.7 | 1.576 | 2 | H-14 | T60 | 34.0 | 1.634 | 1 |
| N-5 | H24 | 35.7 | 1.611 | 3 | P-8 | T58 | 34.0 | 1.666 | 0 |
| | SD | | | | F-6 | H32 | 35.0 | 1.710 | 0 |
| C-5 | H23 | 35.8 | 1.631 | 0 | F-10* | H29 | 35.0 | 1.663 | 0 |
| E-13 | H15 | 35.8 | 1.606 | 2 | K-10 | H36 | 35.1 | 1.584 | 0 |
| N-11 | H16 | 35.8 | 1.581 | 1 | K-6 | H33 | 35.1 | 1.615 | 1 |
| L-3 | H25 | 35.8 | 1.607 | 3 | | D | | | |
| | SE | | | | D-4 | C34 | 37.6 | 1.588 | 1 |
| H-4 | H01 | 32.7 | 1.580 | 2 | M-12 | C14 | 38.0 | 1.583 | 1 |
| D-8 | H02 | 32.7 | 1.560 | 0 | D-12 | C24 | 37.8 | 1.584 | 0 |
| H-12 | H04 | 32.8 | 1.590 | 1 | M-4 | C16 | 37.9 | 1.555 | 1 |
| M-8* | H03 | 32.8 | 1.616 | 0 | H-8 | C62 | 36.4 | 1.572 | 0 |

Unit 1 September 28, 1997 Beginning of Cycle 8, Cold Rod Drop Test Results

Rod drop time testing was performed on all 57 control rods. The plant was in Mode 6 with the Reactor Coolant System temperature approximately 100°F, no reactor coolant pumps running, and the Reactor Coolant System water level at the vessel flange. All rods fully inserted to rod bottom. Rod drop times were comparable to last cycle's testing performed at this condition. Test results satisfied all Technical Specification and safety evaluation limits during the test.

| Core Loc | Fuel ID | B/U 9/28/97 (GWD/MTU) | DE Time (sec) | Recoils | | Core Loc | Fuel ID | B/U 9/28/97 (GWD/MTU) | DE Time (sec) | Recoils |
|-------------|---------|-----------------------------|---------------------|---------|--|-------------|---------|-----------------------------|---------------------|---------|
| Cycle B/U → | | 0.0 | | | | Cycle B/U → | | 0.0 | | |
| | SA | | | | | | A | | | |
| D-2 | K40 | 0.0 | 1.064 | 5 | | E-5 | K18 | 0.0 | 1.059 | 5 |
| B-12 | K37 | 0.0 | 1.061 | 5 | | E-11 | K31 | 0.0 | 1.063 | 5 |
| M-14 | K44 | 0.0 | 1.052 | 5 | | L-11 | K17 | 0.0 | 1.066 | 5 |
| P-4 | K41 | 0.0 | 1.063 | 5 | | L-5 | K33 | 0.0 | 1.061 | 5 |
| B-4 | K42 | 0.0 | 1.064 | 5 | | H-6 | A40 | 11.5 | 1.044 | 4 |
| D-14 | K39 | 0.0 | 1.047 | 5 | | F-8 | A06 | 11.5 | 1.044 | 4 |
| P-12 | K43 | 0.0 | 1.058 | 5 | | H-10 | A02 | 11.5 | 1.046 | 3 |
| M-2 | K38 | 0.0 | 1.071 | 6 | | K-8 | A33 | 11.5 | 1.037 | 4 |
| | SB | | | | | | B | | | |
| G-3 | K24 | 0.0 | 1.056 | 6 | | F-2 | K63 | 0.0 | 1.048 | 5 |
| C-9 | K28 | 0.0 | 1.060 | 5 | | B-10 | K62 | 0.0 | 1.053 | 4 |
| J-13 | K35 | 0.0 | 1.051 | 5 | | K-14 | K61 | 0.0 | 1.053 | 5 |
| N-7 | K29 | 0.0 | 1.046 | 4 | | P-6 | K58 | 0.0 | 1.039 | 6 |
| C-7 | K30 | 0.0 | 1.062 | 6 | | B-6 | K59 | 0.0 | 1.053 | 4 |
| G-13 | K34 | 0.0 | 1.066 | 6 | | F-14 | K57 | 0.0 | 1.046 | 5 |
| N-9 | K27 | 0.0 | 1.066 | 6 | | P-10 | K45 | 0.0 | 1.056 | 4 |
| J-3 | K19 | 0.0 | 1.070 | 5 | | K-2 | K47 | 0.0 | 1.061 | 5 |
| | SC | | | | | | C | | | |
| E-3 | K72 | 0.0 | 1.048 | 5 | | H-2 | K02 | 0.0 | 1.057 | 5 |
| C-11 | K76 | 0.0 | 1.056 | 5 | | B-8 | K07 | 0.0 | 1.056 | 5 |
| L-13 | K74 | 0.0 | 1.055 | 4 | | H-14 | K03 | 0.0 | 1.060 | 5 |
| N-5 | K78 | 0.0 | 1.060 | 4 | | P-8 | K06 | 0.0 | 1.055 | 5 |
| | SD | | | | | F-6 | K82 | 0.0 | 1.063 | 5 |
| C-5 | K79 | 0.0 | 1.044 | 6 | | F-10 | K84 | 0.0 | 1.055 | 5 |
| E-13 | K75 | 0.0 | 1.047 | 4 | | K-10 | K83 | 0.0 | 1.046 | 5 |
| N-11 | K71 | 0.0 | 1.053 | 6 | | K-6 | K81 | 0.0 | 1.048 | 5 |
| L-3 | K70 | 0.0 | 1.047 | 5 | | | D | | | |
| | SE | | | | | D-4 | A01 | 11.4 | 1.047 | 4 |
| H-4 | K73 | 0.0 | 1.051 | 6 | | M-12 | A08 | 11.4 | 1.049 | 4 |
| D-8 | K80 | 0.0 | 1.049 | 5 | | D-12 | A58 | 11.4 | 1.056 | 4 |
| H-12 | K77 | 0.0 | 1.047 | 5 | | M-4 | A38 | 11.4 | 1.055 | 4 |
| M-8 | K69 | 0.0 | 1.051 | 5 | | H-8 | A13 | 11.5 | 1.054 | 5 |

Unit 1 October 3, 1997 Beginning of Cycle 8, Hot Rod Drop Test Results

Rod drop time testing was performed on all 57 control rods. The plant was in Mode 3 with the Reactor Coolant System temperature greater than 561°F and four reactor coolant pumps running. All rods fully inserted to rod bottom. Rod drop times were comparable to last cycle's testing performed at this condition. Test results satisfied all Technical Specification and safety evaluation limits during the test.

| Core Loc | Fuel ID | B/U 10/3/97 (GWD/MTU) | DE Time (sec) | Recoils | Core Loc | Fuel ID | B/U 10/3/97 (GWD/MTU) | DE Time (sec) | Recoils |
|-------------|---------|-----------------------------|---------------------|---------|-------------|---------|-----------------------------|---------------------|---------|
| Cycle B/U → | | 0.0 | | | Cycle B/U → | | 0.0 | | |
| | SA | | | | | A | | | |
| D-2 | K40 | 0.0 | 1.625 | 4 | E-5 | K18 | 0.0 | 1.590 | 4 |
| B-12 | K37 | 0.0 | 1.632 | 6 | E-11 | K31 | 0.0 | 1.579 | 4 |
| M-14 | K44 | 0.0 | 1.665 | 5 | L-11 | K17 | 0.0 | 1.575 | 4 |
| P-4 | K41 | 0.0 | 1.610 | 5 | L-5 | K33 | 0.0 | 1.589 | 5 |
| B-4 | K42 | 0.0 | 1.624 | 5 | H-6 | A40 | 11.5 | 1.606 | 3 |
| D-14 | K39 | 0.0 | 1.537 | 5 | F-8 | A06 | 11.5 | 1.590 | 3 |
| P-12 | K43 | 0.0 | 1.631 | 5 | H-10 | A02 | 11.5 | 1.574 | 3 |
| M-2 | K38 | 0.0 | 1.664 | 5 | K-8 | A33 | 11.5 | 1.593 | 3 |
| | SB | | | | | B | | | |
| G-3 | K24 | 0.0 | 1.583 | 5 | F-2 | K63 | 0.0 | 1.594 | 5 |
| C-9 | K28 | 0.0 | 1.559 | 5 | B-10 | K62 | 0.0 | 1.583 | 5 |
| J-13 | K35 | 0.0 | 1.592 | 5 | K-14 | K61 | 0.0 | 1.609 | 5 |
| N-7 | K29 | 0.0 | 1.586 | 5 | P-6 | K58 | 0.0 | 1.587 | 5 |
| C-7 | K30 | 0.0 | 1.582 | 5 | B-6 | K59 | 0.0 | 1.600 | 5 |
| G-13 | K34 | 0.0 | 1.604 | 6 | F-14 | K57 | 0.0 | 1.591 | 5 |
| N-9 | K27 | 0.0 | 1.574 | 5 | P-10 | K45 | 0.0 | 1.593 | 5 |
| J-3 | K19 | 0.0 | 1.587 | 5 | K-2 | K47 | 0.0 | 1.617 | 5 |
| | SC | | | | | C | | | |
| E-3 | K72 | 0.0 | 1.605 | 5 | H-2 | K02 | 0.0 | 1.587 | 5 |
| C-11 | K76 | 0.0 | 1.587 | 5 | B-8 | K07 | 0.0 | 1.588 | 5 |
| L-13 | K74 | 0.0 | 1.605 | 5 | H-14 | K03 | 0.0 | 1.619 | 5 |
| N-5 | K78 | 0.0 | 1.609 | 5 | P-8 | K06 | 0.0 | 1.578 | 5 |
| | SD | | | | F-6 | K82 | 0.0 | 1.586 | 4 |
| C-5 | K79 | 0.0 | 1.604 | 5 | F-10 | K84 | 0.0 | 1.584 | 4 |
| E-13 | K75 | 0.0 | 1.584 | 4 | K-10 | K83 | 0.0 | 1.592 | 5 |
| N-11 | K71 | 0.0 | 1.603 | 5 | K-6 | K81 | 0.0 | 1.622 | 4 |
| L-3 | K70 | 0.0 | 1.620 | 5 | | D | | | |
| | SE | | | | D-4 | A01 | 11.4 | 1.590 | 3 |
| H-4 | K73 | 0.0 | 1.577 | 5 | M-12 | A08 | 11.4 | 1.604 | 3 |
| D-8 | K80 | 0.0 | 1.554 | 5 | D-12 | A58 | 11.4 | 1.607 | 3 |
| H-12 | K77 | 0.0 | 1.578 | 4 | M-4 | A38 | 11.4 | 1.603 | 3 |
| M-8 | K69 | 0.0 | 1.555 | 5 | H-8 | A13 | 11.5 | 1.584 | 4 |

Unit 1 Fuel Assembly Drag Test Results

Drag testing of once-burned Unit 1 Cycle 8 rodged fuel assemblies was performed in the Spent Fuel Pool prior to the 1RE07 refueling outage in July 1997. Drag testing was performed using a new control rod with the control rod being inserted and withdrawn in the host assembly while recording drag data from a calibrated load cell. For the assemblies below, there was minimal drag above the dashpot. The drag force data was transmitted to Westinghouse for a cycle-specific drag-work analysis. The results of the analysis are shown below. The criteria used for excessive drag w. 2500 inch-pounds, and is based on fuel vendor recommendations (reference WCAP 14802, "GroBow, F/A Growth, and Guide Thimble Bow Model").

| Unit 1 Thimble Tube Drag Testing in Spent Fuel Pool | | | |
|--|--------------------|---------------------------|----------------|
| Fuel Assembly | Drag-Work (in-lbs) | | |
| | Measured BOC-8 | Expected Cycle 8 increase | Expected EOC-8 |
| A01 | 845 | 452 | 1297 |
| A02 | 1015 | 376 | 1391 |
| A06 | 1270 | 376 | 1646 |
| A08 | 1357 | 452 | 1809 |
| A13 | 845 | 866 | 1711 |
| A33 | 1440 | 376 | 1816 |
| A38 | 713 | 452 | 1165 |
| A40 | 1015 | 376 | 1391 |
| A58 | 1098 | 452 | 1550 |
| A52* | 930 | 772 | 1702 |
| A53* | 1100 | 772 | 1872 |
| A57* | 1100 | 772 | 1872 |
| A64* | 1100 | 772 | 1872 |

*Not loaded in the Unit 1 Cycle 8 core

Core Map of Control Red Locations

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

SA - Shutdown Bank A
SB - Shutdown Bank B
SC - Shutdown Bank C
SD - Shutdown Bank D
SE - Shutdown Bank E

A - Control Bank A
B - Control Bank B
C - Control Bank C
D - Control Bank D

Unit 1 Core Design Data

| Unit 1 Cycle 8 Fuel Burnup Data | | | | | | | | |
|---------------------------------|---------|------------------|--------------------|--|-------------|---------|------------------|--------------------|
| Core Loc | Fuel ID | B/U BOC | B/U EOC | | Core Loc | Fuel ID | B/U BOC | B/U EOC |
| Cycle B/U → | | 0.0 (GWD/MTU) | 18.5* (GWD/MTU) | | Cycle B/U → | | 0.0 (GWD/MTU) | 18.5* (GWD/MTU) |
| SA | | | | | A | | | |
| D-2 | K40 | 0.0 | 15.8 | | E-5 | K18 | 0.0 | 24.3 |
| B-12 | K37 | 0.0 | 15.9 | | E-11 | K31 | 0.0 | 24.3 |
| M-14 | K44 | 0.0 | 15.9 | | L-11 | K17 | 0.0 | 24.3 |
| P-4 | K41 | 0.0 | 15.9 | | L-5 | K33 | 0.0 | 24.3 |
| B-4 | K42 | 0.0 | 15.9 | | H-6 | A40 | 11.5 | 25.9 |
| D-14 | K39 | 0.0 | 15.7 | | F-8 | A06 | 11.5 | 25.9 |
| P-12 | K43 | 0.0 | 15.8 | | H-10 | A02 | 11.5 | 25.9 |
| M-2 | K38 | 0.0 | 15.9 | | K-8 | A33 | 11.5 | 25.9 |
| SB | | | | | B | | | |
| G-3 | K24 | 0.0 | 24.3 | | F-2 | K63 | 0.0 | 21.0 |
| C-9 | K28 | 0.0 | 24.3 | | B-10 | K62 | 0.0 | 21.0 |
| J-13 | K35 | 0.0 | 24.3 | | K-14 | K61 | 0.0 | 20.9 |
| N-7 | K29 | 0.0 | 24.3 | | P-6 | K58 | 0.0 | 21.0 |
| C-7 | K30 | 0.0 | 24.3 | | D-6 | K59 | 0.0 | 20.9 |
| G-13 | K34 | 0.0 | 24.3 | | F-14 | K57 | 0.0 | 20.9 |
| N-9 | K27 | 0.0 | 24.3 | | P-10 | K45 | 0.0 | 20.9 |
| J-3 | K19 | 0.0 | 24.3 | | K-2 | K47 | 0.0 | 20.9 |
| SC | | | | | C | | | |
| E-3 | K72 | 0.0 | 24.1 | | H-2 | K02 | 0.0 | 21.3 |
| C-11 | K76 | 0.0 | 24.1 | | B-8 | K07 | 0.0 | 21.3 |
| L-13 | K74 | 0.0 | 24.1 | | H-14 | K03 | 0.0 | 21.3 |
| N-5 | K78 | 0.0 | 24.2 | | P-8 | K06 | 0.0 | 21.3 |
| SD | | | | | F-6 | K82 | 0.0 | 24.5 |
| C-5 | K79 | 0.0 | 24.1 | | F-10 | K84 | 0.0 | 24.5 |
| E-13 | K75 | 0.0 | 24.1 | | K-10 | K83 | 0.0 | 24.5 |
| N-11 | K71 | 0.0 | 24.1 | | K-6 | K81 | 0.0 | 24.5 |
| L-3 | K70 | 0.0 | 24.1 | | D | | | |
| SE | | | | | D-4 | A01 | 11.4 | 26.6 |
| H-4 | K73 | 0.0 | 24.9 | | M-12 | A08 | 11.4 | 26.6 |
| D-8 | K80 | 0.0 | 24.9 | | D-12 | A58 | 11.4 | 26.6 |
| H-12 | K77 | 0.0 | 24.9 | | M-4 | A38 | 11.4 | 26.7 |
| M-8 | K69 | 0.0 | 24.9 | | H-8 | A13 | 11.5 | 27.8 |

* EOC burnup assumes no coastdown operations

| Unit 1 Cycle 8 Rodded Fuel Assembly Data (14 foot active fuel) | |
|--|--|
| "A" Region Standard Assemblies | "K" Region V+ P+ Assemblies |
| 10 Inconel grids | 2 Inconel top/bottom grids, 1 Inconel debris protection, bottom grid, 8 ZIRLO™ mid grids |
| Zircaloy-4 guide tubes | ZIRLO™ guide tubes |
| Guide tube ID (above dashpot) = 0.450 inches | Guide tube ID (above dashpot) = 0.442 inches |
| Guide tube ID (dashpot) = 0.397 inches | Guide tube ID (dashpot) = 0.397 inches |

**Units 1 and 2 Incomplete RCCA Insertion (IRI) Evaluation Criteria
 for
 Rod Drop Testing Performed through June 1998**

Delta Rod Drop Time (Rod Drop Time Increase Since Last Test)

| | Tech Spec Limit | Review Limit | Immediate Restart Limit |
|--|-----------------|----------------|-------------------------|
| | not applicable | ≤ 0.3 sec | ≤ 0.1 sec |

Rod Drop Time (Technical Specification 3.1.3.4)

| | Tech Spec Limit | Review Limit | Immediate Restart Limit |
|--|-----------------|----------------|-------------------------|
| | ≤ 2.8 sec | ≤ 2.0 sec | ≤ 1.8 sec |

Shutdown Margin (Technical Specification 3.1.1.1) - Applicable for no-load Tavg*

| | Safety Evaluation (SE) Limit | Review Limit | Immediate Restart Limit |
|------------|------------------------------|---|-------------------------|
| Category 1 | 56 RCCAs ≤ 11 steps | 12 RCCAs ≤ 6 steps | No IRI |
| Category 2 | 20 RCCAs ≤ 16 steps | 3 RCCAs ≤ 12 steps plus 6 RCCAs ≤ 6 steps | No IRI |
| Category 3 | 12 RCCAs ≤ 22 steps | 1 RCCA ≤ 18 steps plus 6 RCCAs ≤ 6 steps | No IRI |

*All Shutdown Margin limits assume the highest reactivity worth rod is fully withdrawn. Refer to USQEs 97-0033 (Unit 1 Cycle 8) and 97-0102 (Unit 2 Cycle 6) for further category details. Rod positions for the Review and Immediate Restart limits are based on DRPI indication and account for DRPI system uncertainty (± 4 steps).

Actions Based on Incomplete RCCA Insertion Condition

| | Criteria*** | Actions |
|--------|---|---|
| Case 1 | <u>ALL</u> Immediate Restart Limits met. | <ol style="list-style-type: none"> 1. Startup Unit 2. No additional short term actions 3. Communicate results to the NRC |
| Case 2 | <u>ANY</u> Immediate Restart Limit <u>NOT</u> met, but <u>ALL</u> Review Limits met | <ol style="list-style-type: none"> 1. Startup Unit 2. Review data and evaluate reducing the burnup interval prior to the next rod drop test. Evaluate revision of shutdown margin calculations. Complete within 2 weeks after startup. 3. Communicate results to the NRC |
| Case 3 | <u>ANY</u> Review Limit <u>NOT</u> met, but <u>ALL</u> Safety Evaluation Limits met | <ol style="list-style-type: none"> 1. Brief NRC of test results and any planned actions prior to restart 2. Startup Unit |
| Case 4 | <u>ANY</u> Safety Evaluation Limit <u>NOT</u> met | <ol style="list-style-type: none"> 1. Evaluate data and revise the Safety Evaluation or reconfigure reactor core 2. Inform NRC |

***Criteria applies to Rod Drop Time limits and a single Category of Shutdown Margin limits.

NRC Bulletin 96-01 Correspondence Table

| DATE | TO | FROM | SUBJECT | LETTER # |
|-------------------|---------------|--------------------------|--|---------------|
| March 8, 1996 | All Licensees | NRC | NRC Bulletin 96-01 "Control Rod Insertion Problems" | |
| April 4, 1996 | NRC | STP (T. H. Cloninger) | Response to NRC Bulletin 96-01 - Control Rod Insertion Problems | ST-HL-AE-5333 |
| June 5, 1996 | STP | NRC | Public Meeting to Discuss Incomplete Control Rod Insertion | |
| July 3, 1996 | NRC | STP (D. A. Leazar) | Results of Control Rod Testing in Response to NRC Bulletin 96-01 | ST-HL-AE-5408 |
| November 27, 1996 | NRC | STP (D. A. Leazar) | Results of Fuel Assembly Testing In Response To NRC Bulletin 96-01 | ST-HL-AE-5516 |
| April 23, 1997 | NRC | STP (M. A. McBurnett) | Results of Control Rod Testing In Response To NRC Bulletin 96-01 | ST-HL-AE-5605 |
| June 11, 1997 | NRC | STP (D. A. Leazar) | Results of Unit 2 Control Rod Drop Testing Performed on May 1, 1997 in Response to NRC Bulletin 96-01 | ST-HL-AE-5654 |
| July 23, 1997 | NRC | STP (D. A. Leazar) | Results of Unit 1 Control Rod Drop Testing Performed on June 28, 1997, in Response to NRC Bulletin 96-01 | ST-HL-AE-5697 |
| November 19, 1997 | NRC | STP (D. A. Leazar) | Results of Control Rod Testing In Response To NRC Bulletin 96-01 | NOC-AE-0017 |