

August 8, 2003

LICENSEE: STP Nuclear Operating Company

FACILITY: South Texas Project, Unit 1

SUBJECT: SUMMARY OF U. S. NUCLEAR REGULATORY COMMISSION HEADQUARTERS AND REGION IV STAFF, AND STP NUCLEAR OPERATING COMPANY STAFF TELEPHONE CONVERSATION ON MAY 22, 2003, REGARDING SOUTH TEXAS PROJECT, UNIT 1, BOTTOM-MOUNTED INSTRUMENTATION PENETRATION LEAKAGE ISSUE; STATUS OF ACTIVITIES (TAC NO. MB8435)

On May 22, 2003, the U. S. Nuclear Regulatory Commission Headquarters and Region IV staff held a telephone conference with STP Nuclear Operating Company (STPNOC) staff, the licensee for South Texas Project, Unit 1. The conference call was a continuation of the ongoing discussions and was a follow up of the licensee's activities following the discovery of an apparent leakage at the interface of reactor vessel bottom-mounted instrumentation penetrations 1 and 46. Enclosure 1 is a list of conference participants. Enclosure 2 is the telephone conference agenda.

At this phone call the licensee summarized its overall Unit 1 activities and discussed the nondestructive examination (NDE) status, root cause assessment activities, repair design activities, and status of the schedule.

#### Overall Status of Unit 1

The STPNOC issued a press release. All Unit 1 fuel is offloaded to the fuel pool.

#### NDE Status

The STPNOC performed enhanced visual examination of the J-groove at 0.5 mil resolution and performed ultrasonic testing of the tube inside diameter at 2" above the weld through-vessel thickness. Testing included circumferential/axial/0° scans. NDE was completed on penetrations 1 and 46. A total of 57 out of 58 penetrations have been examined circumferentially and axially. Visual examination has been completed on 57 out of 58 penetrations. Penetration 31 has a stuck thimble and could not be currently examined by NDE.

The licensee has completed analysis of penetrations 1 and 46. Penetration 1 has three axial indications. One of the three is a through-wall indication. There were no visual indications of cracks in the weld. Grinding marks were noted on the tube outside diameter.

Penetration 46 has two axial indications. One of the two was a through-wall crack. Again, no indications were visible on the weld.

An earlier visual testing indication on penetration 33 was questionable. The indication has now been determined to be non-crack-like.

The licensee expects that NDE will be completed by Saturday morning.

### Root Cause evaluation

The licensee had speculated that the worst case scenarios were that: (1) they could not find any cracks, (2) they find a large number of cracks in many tubes. Neither of the scenarios were consistent with the observations to date. Also, for primary water stress corrosion cracking (PWSCC) of the inside diameter to be feasible, one would see more than 2 through-wall cracks. The licensee thinks that PWSCC is not the root cause.

Penetration 1 has 3 cracks. One large through-wall crack is 1.38" long which starts from the top of the J-groove and traverses to just below the J-groove. The other two cracks are embedded inside the tube wall, are less than 1/4" below the J-groove, and do not contact either the inside or outside of the tube wall and do not breach the annulus space.

Penetration 46 has 2 cracks. A crack that is 0.98" long extends from just above the J-groove to just below the J-groove. It is likely to be through-wall. The second crack is a 0.95" long axial crack embedded by J-groove and does not penetrate any wetted surface.

Both penetrations 1 and 46, as well as 5 other tubes, show discontinuities. They may be weld inclusions, porosity, or lack of fusion. The licensee preliminarily thinks that the discontinuities are indications of weld repairs at the tube weld interface.

STPNOC will proceed to implement the following additional tests to obtain additional insights for root cause analyses:

- Helium Pressure Test;
- Once the tube is plugged, will use a boroscope to look inside the tube and the annulus;
- Eddy Current profilometry to compare the residual stresses;
- Examine half-nozzle remnant for PWSCC by looking at the micro-structure and grain boundary;
- Will do two additional Eddy Current Test (ECT) examinations of penetrations 1 and 46;
  - ECT of inside diameter surface characterization on cracks that penetrate the inside diameter,
  - ECT surface of the J-groove for penetrations 1, 33, and 46; and
- Will obtain boat samples from at least penetration 1. The licensee thinks that it can do boat samples for penetration 46 also. It will determine the importance of getting 0.95" non-wetted crack.

STPNOC will research the fabrication records of the original construction to determine what documentation is available to help analyze the root cause. STP believes that there was

minimal cold-working during fabrication, and that any cold-working might actually help relieve the residual fabrication/welding stresses.

Repair Activities

- At the June 5, 2003, meeting, STPNOC will detail its analyses and repair designs that will be completed by mid-June.
- Qualification of tooling for repairs will be complete by May 26, 2003.
- Training on the mockup and welder qualification was started on May 19, 2003.
- Lynchburg tooling, training, and qualification will be completed on a full size mockup.
- Licensee will pursue permanent code relief based on presumption that the root cause is known.
- STPNOC has just let a contract for boat samples. It has not completed the details on what sample configuration they will obtain.
- Fatigue analyses are available at the site. The licensee does not intend to submit docketed detailed analyses at this time. The analyses will be made available at the site.

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Office of Nuclear Reactor Regulation

Docket No. 50-498

Enclosures: 1. List of Participants  
2. Telephone Conference Agenda

cc: See next page

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MAY 22, 2003

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AGENDA

MAY 22, 2003

NRC/STPNOC TELEPHONE CONFERENCE

- |    |  |           |
|----|--|-----------|
| 1. | Desired outcomes & agenda  | McBurnett |
| 2. | Overall status of Unit 1   | Bowman    |
| 3. | NDE status   | Lashley   |
| 4. | Root cause effort and related examination activities                   | Thomas    |
| 5. | Staus of repair design activities                                      | Thomas    |
| 6. | Schedule status  | McBurnett |
| 7. | Schedule for next call or other communications<br>and feedback on call | McBurnett |

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