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

February 15, 2001
NOC-AE-01001001
File No.: G09.16
10CFR50.55a

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

South Texas Project
Unit 1
Docket No. STN 50-498
Response to NRC Safety Evaluation Regarding
Refueling Water Storage Tank Leak (Relief Request RR-ENG-33)

References:

1) "Request for Relief from ASME Boiler and Pressure Vessel Code Section XI Requirements (Relief Request RR-ENG-33)," T. J. Jordan to NRC Document Control Desk, dated November 29, 1999 (NOC-AE-000694)

2) "Evaluation Analysis for a Through-Wall Leak in the Unit 1 Refueling Water Storage Tank," T. J. Jordan to NRC Document Control Desk, dated December 16, 1999 (NOC-AE-000735)

3) "Supplement to Request for Relief from ASME Boiler and Pressure Vessel Code Section XI Requirements (Relief Request RR-ENG-33)," T. J. Jordan to NRC Document Control Desk, dated April 5, 2000 (NOC-AE-0000814)

4) "Request for Relief from ASME Code Requirements Regarding Repair of Refueling Water Storage Tank with Flaw Indication (Relief Request RR-ENG-33)," Robert A. Gramm to William T. Cottle, dated June 22, 2000 (AE-NOC-00000655)

The South Texas Project provides this submittal in response to the safety evaluation prepared by the Nuclear Regulatory Commission for the through-wall flaw in the Unit 1 Refueling Water Storage Tank. The South Texas Project has concluded that no additional analysis, inspection, or repair is necessary to support continued operability of the Refueling Water Storage Tank.

Reference 1 was submitted by the South Texas Project to request Nuclear Regulatory Commission approval to disposition a through-wall flaw in the Unit 1 Refueling Water Storage Tank based on an analytical evaluation in accordance with IWB-3142.4 of the 1989 Edition of the ASME Section XI code. The subject relief request was filed while the South Texas Project inservice inspection program code of record was the 1983 Edition of ASME Section XI with the

A047

Summer 1983 Addenda. This relief request was filed in order to use the rules for analytical evaluation of component leakage contained in the 1989 Edition of Section XI code. Moreover, when the request was submitted, the 1989 Section XI code had already been approved for use in the 10CFR50.55a regulation with no limitations or modifications on these rules for analytical evaluation. The South Texas Project has since begun the second inspection interval with the 1989 Edition of Section XI as the inservice inspection code of record. Therefore, the subject relief request is no longer applicable to the South Texas Project.

Additional information and analyses were provided in References 2 and 3. The NRC approved the subject relief request in Reference 4.

The NRC safety evaluation approved the analytical evaluation of the flaw after applying additional conservatisms to remote stress and baseplate fracture toughness values. Even with these conservatisms, the resulting critical flaw length provides considerable margin for the maximum possible length of the detected flaw. However, the NRC safety evaluation only approved the analytical evaluation for one fuel cycle with the recommendation that the South Texas Project determine the length of the detected flaw and inspect the remainder of the tank baseplate for similar flaws from inside the tank at the next Unit 1 refueling outage.

The South Texas Project has determined that the existing configuration, with appropriate monitoring, complies with current code requirements and is acceptable for operation. The additional inspections recommended in the safety evaluation are not necessary to assure the tank can perform its safety function. Performing these inspections would result in a significant hardship without a compensating increase in the level of quality or safety. Justifications in Attachment 1, with the monitoring activities described in Attachment 2, support continued operation of the Unit 1 RWST without performing additional non-destructive examination measurements of the detected flaw or inspections for similar flaws. Consequently, the South Texas Project intends to continue operating the Unit 1 RWST with no further action other than monitoring for leakage.

If there are any questions, please contact either Mr. M. S. Lashley at (361) 972-7523 or me at (361) 972-7902.

T. J. Jordan
Manager,
Nuclear Engineering

PLW/
Attachments:
1. Acceptability of the Refueling Water Storage Tank Without Additional Nondestructive Examination
2. Refueling Water Storage Tank Monitoring Plan

cc:

Ellis W. Merschoff
Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 400
Arlington, Texas 76011-8064

John A. Nakoski
Addressee Only
U. S. Nuclear Regulatory Commission
Project Manager, Mail Stop OWFN/7-D-1
Washington, DC 20555-0001

Mohan C. Thadani
Addressee Only
U. S. Nuclear Regulatory Commission
Project Manager, Mail Stop OWFN/7-D-1
Washington, DC 20555

Cornelius F. O'Keefe
c/o U. S. Nuclear Regulatory Commission
P. O. Box 910
Bay City, TX 77404-0910

A. H. Gutterman, Esquire
Morgan, Lewis & Bockius
1800 M. Street, N.W.
Washington, DC 20036-5869

M. T. Hardt/W. C. Gunst
City Public Service
P. O. Box 1771
San Antonio, TX 78296

A. Ramirez/C. M. Canady
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

Jon C. Wood
Matthews & Branscomb
112 East Pecan, Suite 1100
San Antonio, Texas 78205-3692

Institute of Nuclear Power
Operations - Records Center
700 Galleria Parkway
Atlanta, GA 30339-5957

Richard A. Ratliff
Bureau of Radiation Control
Texas Department of Health
1100 West 49th Street
Austin, TX 78756-3189

R. L. Balcom/D. G. Tees
Houston Lighting & Power Co.
P. O. Box 1700
Houston, TX 77251

C. A. Johnson/R. P. Powers
AEP - Central Power and Light Company
P. O. Box 289, Mail Code: N5012
Wadsworth, TX 77483

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

South Texas Project
Unit 1
Acceptability of the Refueling Water Storage Tank
Without Additional Nondestructive Examination

This attachment provides the technical and code justifications for the South Texas Project determination that the Unit 1 Refueling Water Storage Tank is acceptable for continued operation without performing the inspections recommended in the NRC safety evaluation (dated June 22, 2000):

- The South Texas Project has complied with the applicable requirements of the 1989 Section XI code in accordance with the referenced relief request. The structural stability of the detected RWST flaw has been demonstrated, and the South Texas Project continues to monitor the RWST and its detected leak area to assure the leak rate remains stable and to detect any additional leaks should they occur. The South Texas Project has already performed the VT-2 visual examinations for leakage required by the Section XI code and will continue to perform these VT-2 visual examinations each inspection period. The South Texas Project has complied with all Section XI requirements and demonstrated the Unit 1 RWST has an adequate level of quality and safety without repair of the detected flaw (subject to ongoing monitoring of the leakage). Therefore, confirmation of the flaw length using nondestructive examinations and inspections for similar flaws in the RWST baseplate are not necessary and represent a hardship without an increase in the level of quality and safety.

- The South Texas Project analysis does not require an actual measurement of the flaw size. Rather, the South Texas Project analysis is based on the maximum possible flaw size (13 inches) because the flaw length is limited by the size of the floor plate containing the flaw and the stress reduction due to the overlapping of plates where welded together. Because the critical flaw size is much larger than the maximum possible flaw size, the actual flaw size is not relevant to the South Texas Project flaw analysis.

- The NRC safety evaluation accepts the South Texas Project contention that the flaw will be limited in length by the floor fabrication technique (lap joint). The safety evaluation only takes issue with the selected seismic stress value and baseplate fracture toughness value. Even the more conservative values used in the NRC's independent calculation of critical flaw size yielded a value (63.6 inches) nearly five times the maximum possible flaw size. The safety evaluation states:

  > Based on the licensee's analytical evaluation and the staff's independent calculations, the staff has determined that the evaluation has demonstrated that the RWST would have an acceptable level of quality and safety.

Therefore, the detected flaw, even if it grew to the maximum possible length (13 inches), will remain acceptable for the remaining service life of the Unit1 RWST and need not be repaired or receive additional examinations, except those required by the code. As we indicated in our relief request letter, the South Texas Project will continue to monitor the Unit 1 RWST leak area for leakage or any change in the leakage rate. A description of the South Texas Project monitoring plan for the RWST is provided in Attachment 2.

- The South Texas Project believes that if any additional flaws in the RSWT baseplate were to occur, it is more likely to occur near the perimeter of the tank and be readily detected by Operator or Engineering walkdowns or other inspections. Stress Corrosion Cracking is more probable near the perimeter of the tank because of the higher stress levels in that region. Therefore, inspections for RWST leakage near the tank perimeter provide an adequate sampling for leak detection for the entire RWST baseplate. Even if part-wall cracking or through-wall cracking without detected leakage were to occur in the interior of the RWST baseplate, this does not pose a safety concern because the tank has a large tolerance for baseplate cracking. The previously submitted RWST flaw analysis was based on a conservative stress value that was appropriate for the unsupported perimeter of the tank baseplate. The value of critical flaw size is smaller at the tank perimeter where the stresses are higher; the value is larger in the interior of the tank where the stresses are lower because the baseplate is supported by the concrete floor. This results in a critical flaw length of over 300 inches for most of the tank baseplate.

- There are no other indications of leaking borated water around the perimeter of this tank or indications of water loss by tank level instrumentation. The South Texas Project monitoring plan cited above contains provisions to assure detection of leakage rates of 3 gpm or greater, as measured by consecutive readings taken every twelve hours. The makeup capacity to the RWST is approximately 200 gpm. Additionally, the local sump at the RWST will alarm when it collects approximately 100 gallons of leaking water.

- Performance of non-destructive examination from inside the RWST is a hardship without an increase in the level of quality or safety over that already provided by the analytical evaluation. To access the RWST inside baseplate, the tank must be pumped down and any radioactive sludge on the tank bottom removed and processed to allow access and clean conditions for non-destructive examination. Increased radiation exposure, as well as a probable extension of the refueling outage, to obtain the examination data is not justified because:

  (1) the largest possible length of the detected flaw has been accepted based on an analytical evaluation, and

  (2) the RWST can tolerate large flaws in the baseplate.

Conclusion

Based upon the referenced relief request and the above discussion, the South Texas Project believes it has demonstrated the structural integrity of the RWST and that no further analysis, inspection, or repair is needed to support continued operation of the RWST. The South Texas Project has complied with all applicable Section XI code requirements. Performance of the recommended NDE will be a hardship without increasing the level of quality and safety over that provided by the analytical evaluation.

In addition, the South Texas Project believes the RWST baseplate is analogous to a buried component in that it would be a significant hardship and extremely difficult to access either surface of this baseplate for non-destructive examination or alternative inspection techniques. IWA-5250(a)(1) of the Section XI code allows leaking buried components to remain in service without repair if the leakage rate is within acceptable limits. The Unit 1 RWST is acceptable for continued service based on all operational and safety function considerations.

South Texas Project
Unit 1
Refueling Water Storage Tank Monitoring Plan

The RWST is continuously monitored from the Main Control Room. Several indications are provided of RWST level in the Main Control Room:

- Level Recorder 0931 provides continuous indication of RWST level on Control Room Panel CP-018.
- RWST Level Indicators are provided for level channels 0931 and 0932 on Main Control Room Panel CP-001.
- Audible and visual alarms are provided by Level Channels 0931, 0932, and 0933 in the Main Control Room on the overhead annunciator panels above CP-001.
- RWST level alarms are duplicated on the computer system in the Main Control Room that has both audible and visual alerts.

Routine observation of the condition of the RWST is also provided by visual inspection when operator rounds are performed. Management expectations are for operators to walk down their assigned areas at least once per shift. Routine observation of the RWST condition enables determination of changing conditions in the flaw area.

Inspection of Unit 1 RWST is performed by the Safety Injection System Engineer on a quarterly basis. The inspection consists of a visual inspection to ascertain if changes in conditions or severity are occurring in the flaw area. The Safety Injection System Engineer is a VT-2 qualified visual examiner. A VT-2 certification is a qualification in accordance with ASME Section XI, IWA-2300, or Code Case N-546, "Alternative Requirements for Qualification of VT-2 Examination Personnel, Section XI, Division 1." VT-2 inspections consist of a visual examination to detect evidence of leakage from pressure-retaining components during a system pressure test. In accordance with IWC-5222(b), the nominal hydrostatic pressure in an atmospheric storage tank, with the tank filled to design capacity, is acceptable as the system pressure test.

A Safety Injection System Functional Pressure Test is performed every inspection period (approximately every three years) by a VT-2 qualified individual. This inspection provides coverage of all exposed wall and baseplate surfaces of the RWST, including the RWST flaw area.