UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

May 12, 2004

EA-04-063

Tennessee Valley Authority
ATTN: Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: NOTICE OF VIOLATION (BROWNS FERRY NUCLEAR PLANT UNIT 1 RECOVERY - NRC INSPECTION REPORT NO. 05000259/2004011)

Dear Mr. Scalice:

This refers to the inspection completed on February 13, 2004, involving recovery activities at Tennessee Valley Authority's (TVA) Browns Ferry 1 (BF1) reactor facility. The results of the inspection, including the identification of an apparent violation of 10 CFR 50, Appendix B, Criterion V, were forwarded to you by NRC letter dated April 6, 2004. Based on the results of the inspection, a pre-decisional enforcement conference was held on April 28, 2004, in the NRC's Region II Office in Atlanta, Georgia, with members of your staff to discuss the apparent violation, its significance, root causes, and your corrective actions. A listing of conference attendees, material presented by the NRC, and material presented by TVA are included as Enclosures 2, 3, and 4, respectively.

Based on the information developed during the inspection, and the information presented at the conference, the NRC has determined that a violation of NRC requirements occurred. The violation is cited in the enclosed Notice of Violation (Notice), and the circumstances surrounding it are described in detail in the subject inspection report. The violation involves four examples of a failure to adhere to the requirements of 10 CFR 50, Appendix B, Criterion V. All four examples were associated with the BF1 Long-Term Torus Integrity Program, and involved: failure to evaluate or incorporate numerous deficient welds into Deficiency Fix Requests sketches; failure to perform numerous repairs on the correct welds; omission of numerous welds requiring repair from Work Orders, and failure of Quality Control (QC) to independently verify the correct location of numerous weld repairs. At the conference, TVA acknowledged the errors, discussed its root cause and extent of condition reviews, and corrective actions.

As described in NRC Manual Chapter 2509, "Browns Ferry Unit 1 Restart Project Inspection Program", and explained during the conference, BF1 is not considered to fall within the scope of the Commission's current "General Statement of Policy and Procedures for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600, for commercially operating nuclear power plants. As such, traditional enforcement is in effect for the restart of BF1 for violations in those cornerstones which cannot be monitored under the Reactor Oversight Program. The significance of violations will be

evaluated in accordance with 10 CFR Part 2 and other applicable enforcement guidance, including Supplement II of the Enforcement Policy. In this case, the violation identified above involves TVA's Quality Assurance program for construction related to a single work activity (BF1 Long-Term Torus Integrity Program), and involves a failure to conduct adequate audits/reviews and take prompt corrective action on the basis of such audits/reviews. In addition, the errors were associated with multiple examples of deficient construction due to inadequate program implementation. As such, the NRC has concluded that the violation is appropriately characterized at Severity Level III.

In accordance with the Enforcement Policy, a base civil penalty in the amount of $60,000 is considered for a Severity Level III violation. Because your facility has not been the subject of escalated enforcement action within the last 2 years, the NRC considered whether credit was warranted for *Corrective Action* in accordance with the civil penalty assessment process in Section VI.C.2 of the Enforcement Policy. TVA's immediate corrective actions included the development and implementation of a plan to systematically verify the scope of torus weld problems. The plan consisted of training personnel on torus orientation and the proper use of sketches, independent review of the welds that were to be repaired to ensure they were identified in work documents, a walk-down of the torus welds that did not require repair to verify acceptability, and a determination of the cause of each example of the violation. Other corrective actions included the verification and revision of torus sketches, the placement of placards inside the torus to aid in orientation, revision of weld data sheets and weld maps, establishment of a single point of contact to control sketches, meetings with QC inspectors to stress the critical importance of independence, additional training for QC inspectors, increased Nuclear Assurance oversight of field activities, the assignment of dedicated resources for focused oversight of QC and other disciplines, and the conduct of a self-assessment of BF1 Nuclear Assurance oversight effectiveness. Based on these and other corrective actions discussed at the conference, the NRC concluded that credit was warranted for the factor of *Corrective Action*.

Therefore, to encourage prompt and comprehensive correction of violations and in recognition of the absence of previous escalated enforcement action, I have been authorized to propose that no civil penalty be assessed in this case. However, similar violations in the future could result in further escalated enforcement action. Issuance of this Notice constitutes escalated enforcement action, that may subject you to increased inspection effort.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), which is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, the response should not include any personal privacy, proprietary, classified, or safeguards information so that it can be made available to the Public without redaction. The

NRC also includes significant enforcement actions on its Web site at www.nrc.gov; select **What We Do**, **Enforcement**, then **Significant Enforcement Actions**.

Sincerely,

/RA/ LAR

Luis A. Reyes
Regional Administrator

Docket No. 50-259
License No. DPR-33

Enclosures:
1. Notice of Violation
2. List of Attendees
3. Information Presented by NRC
4. Information Presented by TVA

cc w/encls:
Karl W. Singer
Senior Vice President
Nuclear Operations
Tennessee Valley Authority
Electronic Mail Distribution

James E. Maddox, Vice President
Engineering and Technical Services
Tennessee Valley Authority
Electronic Mail Distribution

Ashok S. Bhatnagar
Site Vice President
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

General Counsel
Tennessee Valley Authority
Electronic Mail Distribution

Thomas Niessen, Acting General Manager
Nuclear Assurance
Tennessee Valley Authority
Electronic Mail Distribution

cc w/encls (cont):
Michael D. Skaggs, Plant Manager
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

Mark J. Burzynski, Manager
Nuclear Licensing
Tennessee Valley Authority
Electronic Mail Distribution

Timothy E. Abney, Manager
Licensing and Industry Affairs
Browns Ferry Nuclear Plant
Tennessee Valley Authority
Electronic Mail Distribution

State Health Officer
Alabama Dept. of Public Health
RSA Tower - Administration
Suite 1552
P. O. Box 303017
Montgomery, AL 36130-3017

Chairman
Limestone County Commission
310 West Washington Street
Athens, AL 35611

Jon R. Rupert, Vice President
Browns Ferry Unit 1 Restart
Browns Ferry Nuclear Plant
Tennessee Valley Authority
P. O. Box 2000
Decatur, AL 35609

Robert G. Jones, Restart Manager
Browns Ferry Unit 1 Restart
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Distribution w/encls:
W. Travers, EDO
S. Collins, NRR
W. Borchardt, NRR
L. Chandler, OGC
D. Dambly, OGC
E. Julian, SECY
B. Keeling, OCA
Enforcement Coordinators
RI, RIII, RIV
E. Hayden, OPA
G. Caputo, OI
H. Bell, OIG
C. Carpenter, NRR
M. Johnson, NRR
R. Franovich, NRR
K. Jabbour, NRR
F. Congel, OE
L. Plisco, RII
V. McCree, RII
L. Wert, RII
C. Casto, RII
H. Christensen, RII
M. Lesser, RII
S. Cahill, RII
W. Bearden, RII
S. Sparks, RII
C. Evans, RII
J. Lenahan, RII
R. Chou, RII
R. Hannah, RII
K. Clark, RII
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NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTY

Tennessee Valley Authority
Browns Ferry Unit 1

Docket No. 50-259
License No. DPR-33
EA-04-063

During an NRC inspection completed on February 13, 2004, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violation is listed below.

10 CFR 50, Appendix B, Criterion V, requires activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances, and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to the above, as of February 13, 2004, instructions, procedures, or drawings were inadequate or were not implemented for weld repairs to ECN P-0093 torus modifications as described below:

1. TVA procedure NEDP-5, Design Documents Review, Section 3.1.1 requires the preparer of design documents to provide an adequate and accurate solution for the problem, provide a quality product, and ensure that the design documents are complete. Section 3.1.2 requires the Checker (design verifier) to ensure that the design documents are adequate, complete and accurate.

   Deficiency Fix Request Sketches for the Long Term Torus Integrity Program were inadequate, in that approximately 50 examples of deficiencies requiring repairs were not identified on the sketches. In this regard, the preparer and design verifier failed to ensure that discrepancies identified during the torus walkdowns were adequately and accurately evaluated, failed to ensure that the discrepancies requiring repair were included in engineering output documents (Deficiency Fix Request Sketches), and failed to ensure the sketches were accurate and that required repairs were shown at the correct locations.

2. The drawings titled Deficiency Fix Requests, Sketches 4 through 38, detailing corrective actions for Problem Evaluation Report (PER) 03-017339, Unit 1 Torus, Differences Between As-Built and As-Designed Configurations, show locations for repairs to welds.

   Welds designated as weld numbers MS-1-WO 03017394016-008 in work order 03-017394-016, weld numbers PCI-1-WO 03017394002-029 and -30 in work order 03-017394-002, and weld numbers MS-1-WO 03017394006-047, -048, PCI-1-002-004, -005, and -006 in work order 03-017394-006, were repaired (welded) at the incorrect location. However, review of the work order documentation, specifically weld maps and data sheets, indicated the welds had been repaired. The deficient welds at these locations shown on Deficiency Fix Requests,

Sketches 31 and 36 were not repaired. Approximately 20 additional welds were identified by the licensee which were repaired in the incorrect location.

3. TVA Procedure VT-6, Visual Examination of Structural Welds Using the Criteria of NCIG-01, requires quality control inspectors to perform an independent inspection of completed work activities important to safety. A requirement of the inspection procedure is independent verification that the work was performed at the correct location.

   Quality Control (QC) inspection personnel failed to independently verify that welds designated as weld numbers MS-1-WO 03017394016-008 in work order 03-017394-016, weld numbers PCI-1-WO 03017394002-029 and -30 in work order 03-017394-002, and weld numbers MS-1-WO 03017394006-047, -048, PCI-1-002-004, -005, and -006 in work order 03-017394-006 were repaired at the correct location. However, review of the QC inspection documentation in the work orders indicated the welds had been repaired, inspected, and accepted by quality control inspectors. The deficient welds at these locations shown on Deficiency Fix Requests, Sketches 31 and 36 were not repaired.

4. TVA Procedure MMDP-1, Maintenance Management System, Paragraph 3.2, requires work orders to be developed to a level of detail appropriate for the circumstances which address the aspects of the work, including the scope of the work and work instructions. MMDP-1 requires that the work order specify that work is to be performed in accordance with approved procedures, when approved procedures are available. Paragraph 3.8.1 of TVA procedure MMDP-1 requires independent/technical review of the work order to insure the work order contains detailed work steps to perform the required work prior to approval and implementation of the work order.

   TVA procedure MMDP-10, Controlling Welding, Brazing, and Soldering Processes, Section 3.3, requires work implementing documents and weld data sheets be prepared and included in the work order for all welding activities.

   Work implementing documents and weld data sheets for six welds, which required restoration to the sizes shown on Deficiency Fix Request, Sketch Number 30, referenced in PER 03-017394, were omitted from Work Order 030017394-006. The independent/technical review of the work order did not identify the omission when performing the independent technical quality review. As followup, the licensee identified approximately 30 additional welds which were shown on the drawings as requiring repair but were not included in the work order instructions.

This is a Severity Level III Violation (Supplement II).

Pursuant to the provisions of 10 CFR 2.201, Tennessee Valley Authority is hereby required to submit a written statement or explanation to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, within 30 days of the date of this Notice of Violation and Proposed Imposition of Civil Penalty (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation; EA-04-063" and should include: (1) admission or denial of the alleged violation, (2) the

reasons for the violation if admitted, and if denied, the reasons why, (3) the corrective steps that have been taken and the results achieved, (4) the corrective steps that will be taken to avoid further violations, and (5) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked or why such other action as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 12th day of May 2004

LIST OF ATTENDEES

Nuclear Regulatory Commission:
L. Reyes, Regional Administrator, Region II (RII)
L. Plisco, Deputy Regional Administrator, RII
H. Christensen, Deputy Director, Division of Reactor Safety (DRS), RII
L. Wert, Deputy Director, Division of Reactor Projects (DRP), RII
M. Lesser, Chief, Engineering Branch 2, DRS, RII
W. Bearden, Senior Resident Inspector, DRP
S. Shaeffer, Senior Project Engineer, DRP
S. Cahill, Chief, DRP
K. Jabbour, Project Manager, Office of Nuclear Reactor Regulation
C. Evans, Enforcement Officer and Regional Counsel, RII
R. Chou, Reactor Inspector, DRS
J. Lenahan, Reactor Inspector, DRS

Tennessee Valley Authority:
K. Singer, Senior Vice President, Nuclear Operations
R. Beecken, Vice President, Nuclear Support
T. Niessen, Acting General Manager, Nuclear Assurance
J. Rupert, Vice President, Browns Ferry Unit 1 (BF1)
J. Valente, Engineering Manager, BF1
R. Drake, Maintenance and Modifications Manager, BF1
S. Tanner, Nuclear Assurance Manager, BF1
T. Abney, Licensing and Industry Affairs Manager
M. Burzynski, Manager, Nuclear Licensing
E. Vigluicci, Senior Licensing Counsel
C. Beasley, TVA C&GR

Members of the Public:
B. McDonald
H. Barnett
C. Beasley

PREDECISIONAL ENFORCEMENT CONFERENCE AGENDA
BROWNS FERRY NUCLEAR PLANT, UNIT 1 RECOVERY

APRIL 28, 2004, 1:30 P.M.
NRC REGION II OFFICE, ATLANTA, GEORGIA

I. OPENING REMARKS, INTRODUCTIONS, AND SUMMARY OF ISSUES
L. Reyes, Regional Administrator

II NRC ENFORCEMENT POLICY
C. Evans, Director, Enforcement and Investigation Coordination Staff

III STATEMENT OF CONCERNS / APPARENT VIOLATION
H. Christensen, Deputy Director, Division of Reactor Safety

IV LICENSEE PRESENTATION

IV. BREAK / NRC CAUCUS

V. NRC FOLLOWUP QUESTIONS

VI. CLOSING REMARKS
L. Reyes, Regional Administrator

Enclosure 3

Apparent Violation[1]

10 CFR 50, Appendix B, Criterion V, requires activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances, and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

As of February 13, 2004, instructions, procedures, or drawings were not implemented for weld repairs to the ECN P-0093 torus modifications as described below:

1. TVA procedure NEDP-5, Design Documents Review, Section 3.I.1 requires the preparer of design documents to provide an adequate and accurate solution for the problem, provide a quality product, and ensure that the design documents are complete. Section 3.1.2 requires the Checker (design verifier) to ensure that the design documents are adequate, complete and accurate.

   Deficiency Fix Request Sketches for the Long Term Torus Integrity Program were inadequate, in that approximately 50 examples of deficiencies requiring repairs were not identified on the sketches, because the preparer and design verifier failed to ensure that discrepancies identified during the torus walkdowns were adequately and accurately evaluated, failed to ensure that the discrepancies requiring repair were included in engineering output documents (deficiency fix request sketches), and failed to ensure the sketches were accurate and that required repairs were shown at the correct locations.

2. The drawings titled Deficiency Fix Requests, Sketches 4 through 38, detailing corrective actions for PER number 03-017339, Unit 1 Torus, Differences Between As-Built and As-Designed Configurations, show locations for repairs to welds.

   Welds designated as weld numbers MS-1-WO 03017394016-008 in work order 03-017394-016, weld numbers PCI-1-WO 03017394002-029 and -30 in work order 03-017394-002, and weld numbers MS-1-WO 03017394006-047, -048, PCI-1-002-004, -005, and -006 in work order 03-017394-006 were repaired (welded) at the incorrect location. However review of the work order documentation, specifically weld maps and data sheets, indicated the welds had

[1] Apparent violations discussed at this conference are pre-decisional and are subject to change.

been repaired. The deficient welds at these locations shown on Deficiency Fix Requests, Sketches 31 and 36 were not repaired. Approximately 20 additional welds were identified by the licensee which were repaired in the incorrect location.

3. TVA procedure VT-6, Visual Examination of Structural Welds Using the Criteria of NCIG-01, requires quality control inspectors to perform an independent inspection of completed work activities important to safety. A requirement of the inspection procedure is independent verification that the work was performed at the correct location.

   Quality Control (QC) inspection personnel failed to independently verify that welds designated as weld numbers MS-1-WO 03017394016-008 in work order 03-017394-016, weld numbers PCI-1-WO 03017394002-029 and -30 in work order 03-017394-002, and weld numbers MS-1-WO 03017394006-047, -048, PCI-1-002-004, -005, and -006 in work order 03-017394-006 were repaired at the correct location. However review of the QC inspection documentation in the work orders indicated the welds had been repaired, inspected and accepted by quality control inspectors. The deficient welds at these locations shown on Deficiency Fix Requests, Sketches 31 and 36 were not repaired.

4. TVA procedure MMDP-1, Maintenance Management System, Paragraph 3.2, requires work orders to be developed to a level of detail appropriate for the circumstances which addresses the aspects of the work, including the scope of the work and work instructions. MMDP-1 requires that the work order specify that work is to be performed in accordance with approved procedures, when approved procedures are available. Paragraph 3.8.1 of TVA procedure MMDP-1 requires independent/technical review of the work order to insure the work order contains detailed work steps to perform the required work prior to approval and implementation of the work order. TVA procedure MMDP-10, Controlling Welding, Brazing, and Soldering Processes, Section 3.3, requires work implementing documents and weld data sheets be prepared and included in the work order for all welding activities.

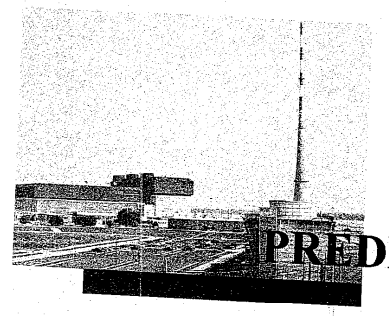
   Work implementing documents and weld data sheets for six welds which required restoration to the sizes shown on Deficiency Fix Request, Sketch Number 30, referenced in PER 03-017394, were omitted from Work Order 030017394-006. The independent/technical review of the work order did not

[1] Apparent violations discussed at this conference are pre-decisional and are subject to change.

identify the omission when performing the independent technical quality review. As followup, the licensee identified approximately 30 additional welds which were shown on the drawings as requiring repair but were not included in the work order instructions. That is, no work instructions or weld data sheets had been prepared for these welds and thus the welds had not been repaired.

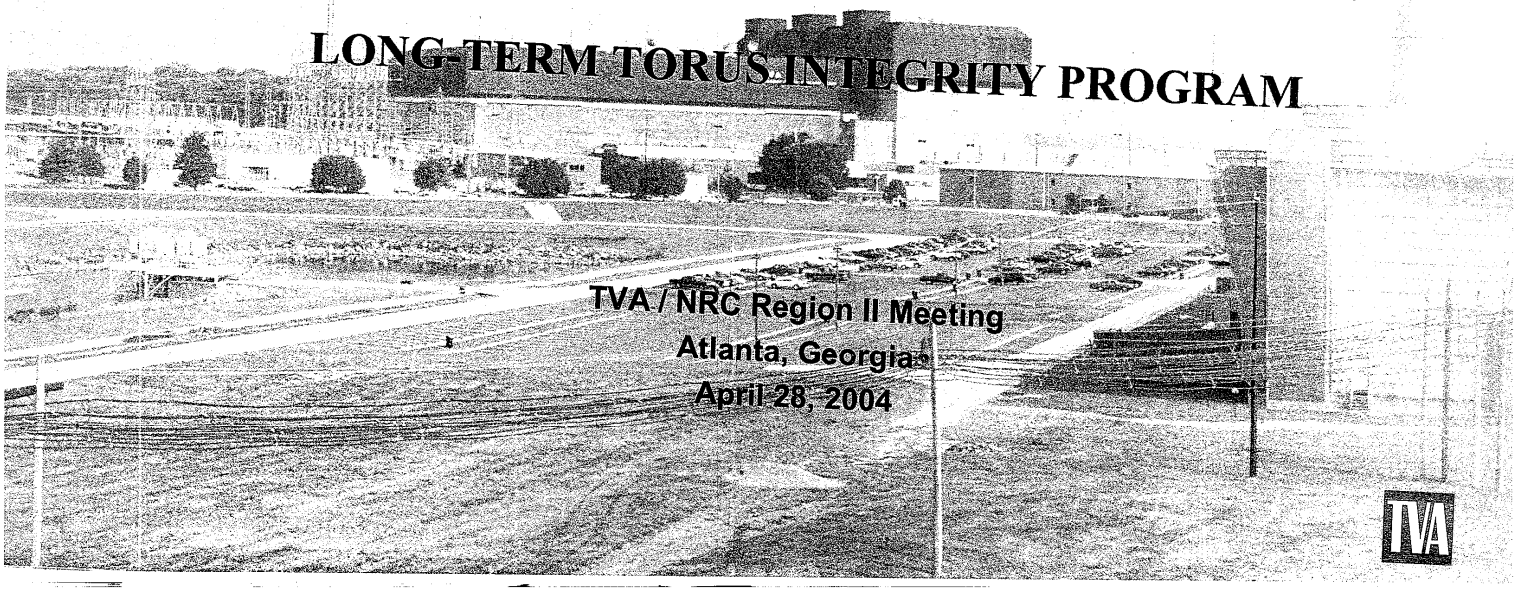
[1] Apparent violations discussed at this conference are pre-decisional and are subject to change.

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT
UNIT 1



PREDECISIONAL ENFORCEMENT CONFERENCE

LONG-TERM TORUS INTEGRITY PROGRAM



TVA / NRC Region II Meeting
Atlanta, Georgia
April 28, 2004

TVA

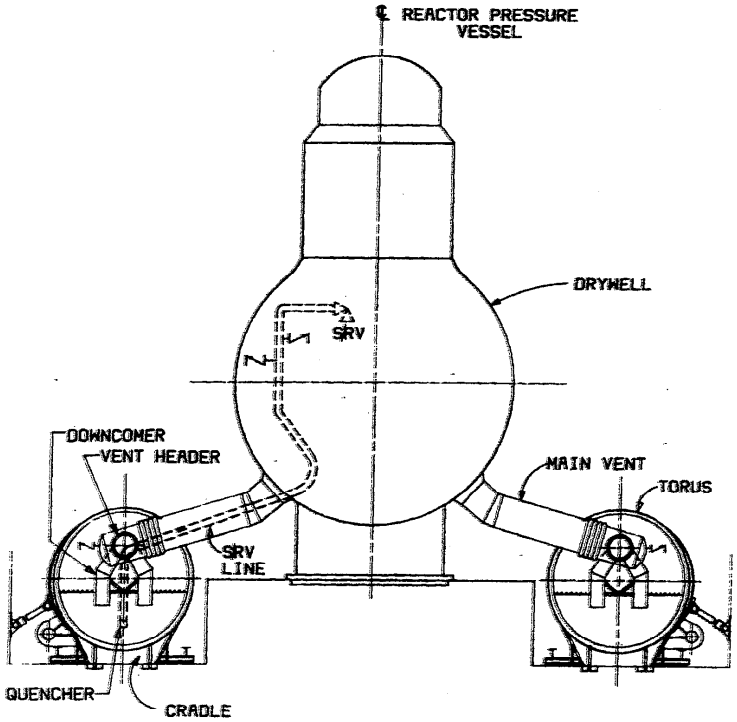
Agenda

1.0	Opening Remarks and Overview	K. Singer J. Rupert
2.0	Background	J. Valente
3.0	Immediate Actions	J. Valente
4.0	Causes and Corrective Actions for Each Cited Example	J. Valente R. Drake S. Tanner
5.0	Nuclear Assurance Oversight	S. Tanner
6.0	Summary of Actions Taken	J. Rupert
7.0	Application of Enforcement Policy	T. Abney
8.0	Concluding Remarks	K. Singer

Opening Remarks and Overview

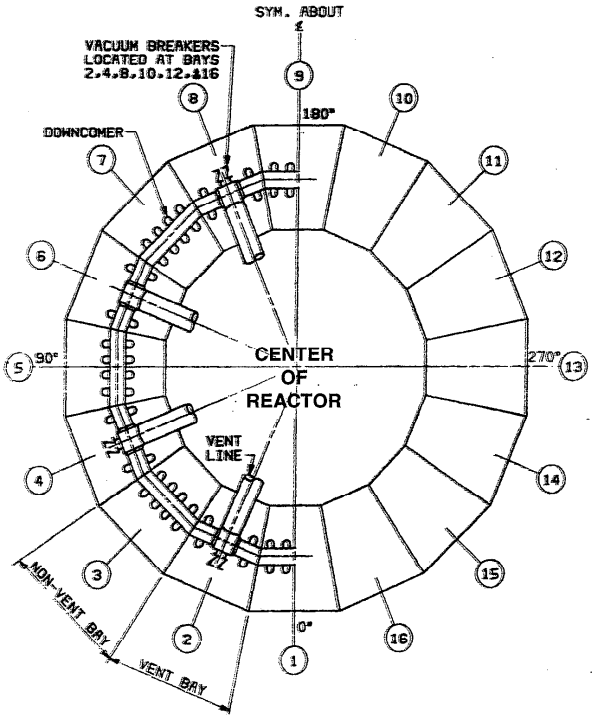
- TVA acknowledges:
  - The failure to evaluate or incorporate numerous deficient welds into Deficiency Fix Requests sketches
  - The failure to perform numerous repairs on the correct welds
  - The omission of numerous welds requiring repair from Work Orders
  - The failure of QC to independently verify the correct locations for numerous weld repairs
- TVA also acknowledges that these errors do not meet our procedures, standards, nor our expectations for quality of work
- TVA has evaluated the individual deficiencies identified during the NRC inspections, identified their causes, determined their extent, taken appropriate corrective actions, and strengthened our oversight to correct these issues and prevent the recurrence of similar events

Background
Long-Term Torus Integrity Program



BROWNS FERRY CONTAINMENT CONFIGURATION

Background
Long-Term Torus Integrity Program



PLAN VIEW OF THE VENT SYSTEM IN THE TORUS

Background
Long-Term Torus Integrity Program

- In 1984, TVA submitted the Long-Term Torus Integrity Program Plant Unique Analysis Report
  - Majority of modifications completed on Unit 1 prior to the shutdown in 1985
- In 1988, TVA issued Revision 2 to the Browns Ferry Nuclear Performance Plan
  - TVA committed to re-inspect torus internals prior to restart to ensure as-constructed plant matched as-designed plant
- In 2002, walkdown teams compared design drawings to installed configuration for steel configuration, dimensions, and attributes for the welds in the torus

Background
Long-Term Torus Integrity Program

- Differences between as-designed and as-installed configuration evaluated by Engineering and dispositioned
  - Weld repairs identified
- The scope of welds to be modified or repaired was identified by Engineering to Modifications using two processes
  - Design Change process
    - TVA had not completed all of the original Long-Term Torus Integrity modifications on Unit 1. The few remaining modifications were issued under the design change process.
  - Work Order process
    - Welds were to be repaired by implementing the existing design drawings. Engineering provided sketches to Modifications as an aid to identify this work.

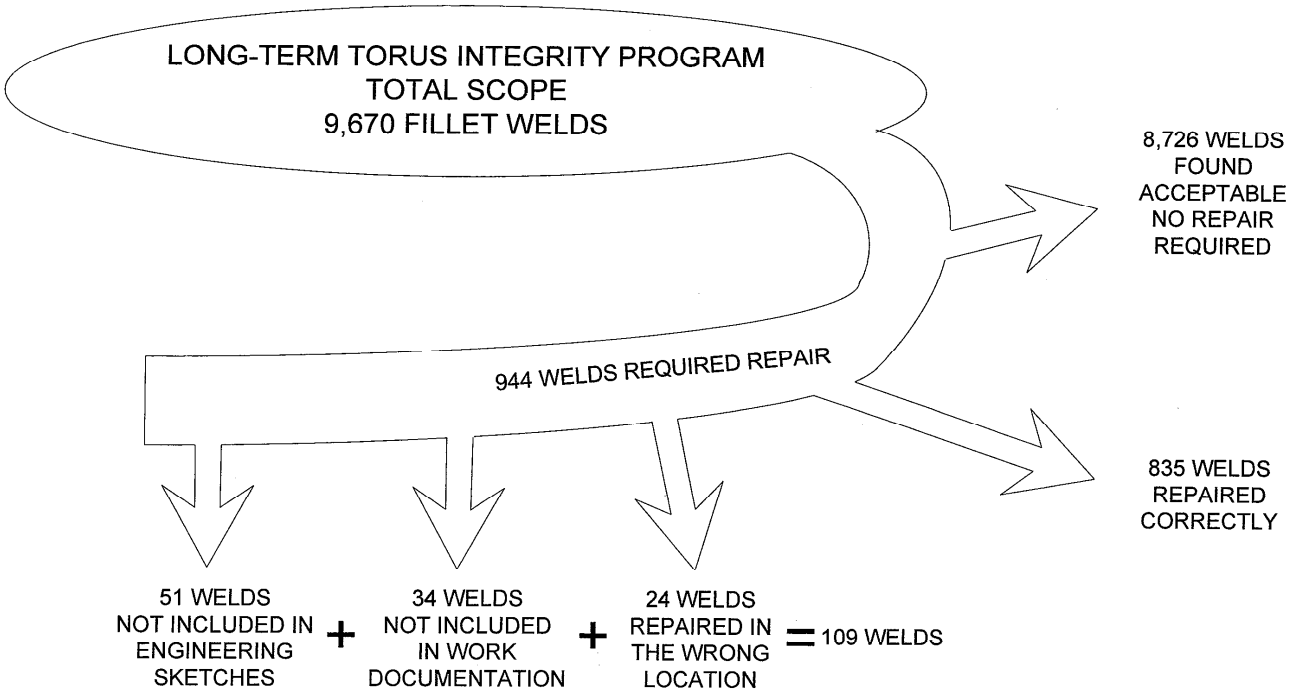
Background
Long-Term Torus Integrity Program

- In September 2003, Engineering issued sketches identifying weld modifications and repairs
- In September and October 2003, Modifications prepared work documents
- Torus welding began in November 2003
- November 17 - December 1, 2003, four Problem Evaluation Reports (PERs) identified welds being performed in the wrong location
  - Welds were corrected
  - TVA verified that the welds made in the torus before the issuance of these PERs were performed in the correct locations
  - Additional location information was added to sketches
  - Locations of remaining welds were identified in the torus

Background
Long-Term Torus Integrity Program

- January 26 - February 13, 2004, NRC inspections identified
  - Examples of welds being performed and QC accepted in the wrong location
  - Examples of required weld repairs not included in Work Order
  - Sketches were confusing
- PERs issued to determine extent of condition, causes and corrective actions as each issue was identified

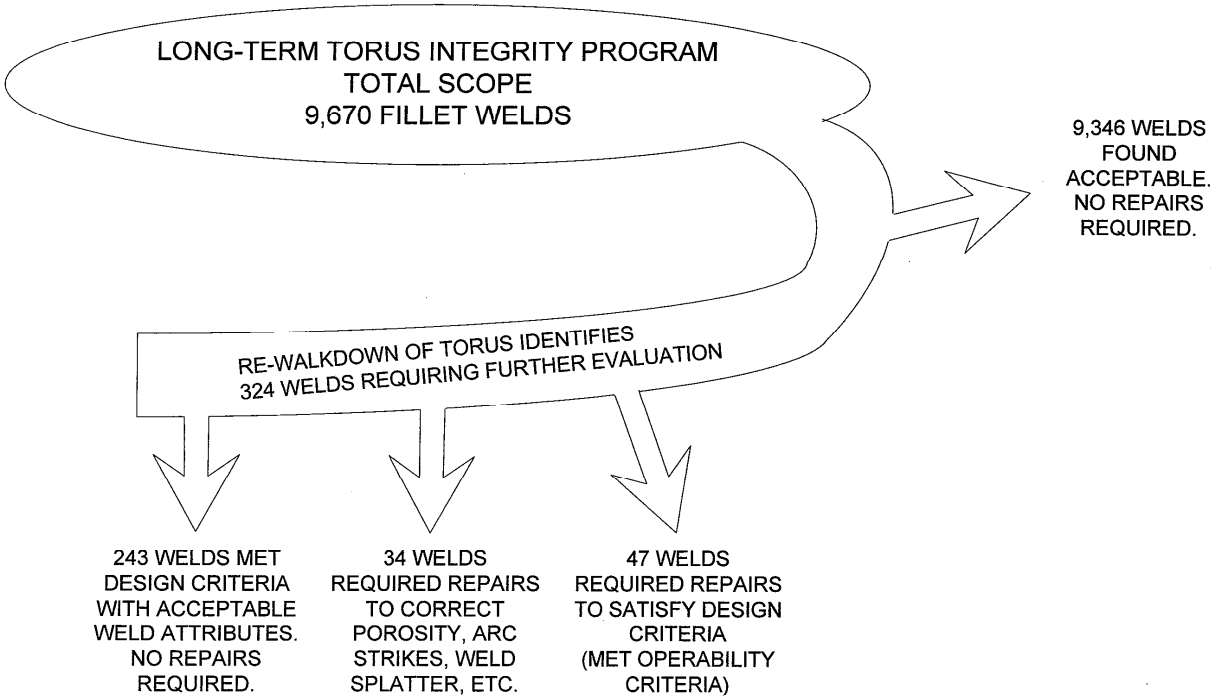
INITIAL PROGRAM IMPLEMENTATION FINDINGS



Immediate Actions Taken

- Developed and implemented a plan to systematically verify torus weld scope
  - Training was given to Engineering, Modifications and QC regarding torus orientation and proper use of the sketches
  - Both Modifications and Engineering-QC teams independently reviewed the welds that were to be repaired for proper location, size and attribute acceptability
  - Engineering and Modifications reviewed design output, sketches and Work Orders to ensure the required torus weld repairs were identified in the work documents
  - Engineering re-walked down the torus welds that did not require repair using conservative walkdown criteria that eliminated measurement tolerances

DISPOSITION OF TORUS WELD ISSUES



Results

- The full scope of all torus weld issues was identified
- The collective condition was analyzed
- The torus would have performed its design basis functions even if the weld deficiencies were not identified or corrected

Causes and Corrective Actions for Each Cited Example - Engineering

- Failure to evaluate or incorporate numerous deficient welds into Deficiency Fix Requests sketches
  - Extent of condition reviews
    - Other programs were reviewed to determine if scope was identified and issued to Modifications
  - Causes
    - Inadequate checking
  - Corrective actions
    - Conducted briefing with Unit 1 Engineering personnel to address importance of thoroughly checking work
    - Verified and revised torus sketches
    - Corrected limited omissions identified in other programs
      - 1 panel of fuses, 1 load fuse, 1 cable, and 1 miscellaneous steel weld
    - Took appropriate personnel action

PROGRAMS REVIEWED

Ampacity
Breakers
Bulletin 79-14 (large bore piping)
Cable installation issues
Cable separation
Containment coatings
Control rod drive hangers
Drywell platforms and misc. steel
Environmental qualification
EPU calculations
Fire protection and Appendix R
Flow accelerated corrosion
Fuses
IGSCC
Mech. and I&C design changes
Motor operated valve calculations
Sensing lines
Setpoint and scaling calculations
Small bore piping
USI A-46 and Seismic II over I
Voltage drop

Causes and Corrective Actions for Each Cited Example - Modifications

- Failure to perform numerous repairs on the correct welds
- Omission of numerous welds requiring repair from Work Orders
  - Extent of condition reviews
    - Walkdown of all welds performed in the torus with two independent teams
    - Reviewed involved planners' previous Work Orders and verified that the identified scope was incorporated
  - Results
    - 34 weld repairs omitted from Work Orders
    - 24 weld repairs performed in the wrong location
    - All other Engineering identified weld repairs were included
  - Causes
    - Sketches were confusing
    - Wrong revision of a sketch was used
    - Second party review or verification of scope not performed
    - Incorrect judgment and misinterpretation

Causes and Corrective Actions for Each Cited Example - Modifications

- Failure to perform numerous repairs on the correct welds
- Omission of numerous welds requiring repair from Work Orders
  - Corrective actions
    - Independent Qualified Review (IQR) checklist developed for Work Orders to verify work scope incorporated and reviewed the expectations for the review of work order scope with the IQR
    - Single point of contact established to control sketches
    - Work Orders, sketches, weld data sheets, and weld maps revised to ensure technical accuracy and completeness
      - Engineering verified
      - Craft reviewed to confirm documents are clear and useable
    - Briefing conducted with Planning / Field Engineering personnel to emphasize importance of accepting and issuing adequate and useable information and raising issues to management
    - Azimuths marked in torus
    - Appropriate personnel action taken

Causes and Corrective Actions for Each Cited Example - Quality Control

- QC failed to independently verify the correct location of numerous weld repairs

  Issue 1: QC inspector independence

  - Extent of condition reviews
    - One inspector relied on foreman to assist in finding weld location
    - Reviewed 100% of the torus weld inspections performed to date
    - Evaluated inspections performed outside torus
  - Corrective actions
    - Appropriate personnel action was taken
    - Met with QC inspectors and stressed critical importance of being totally independent, having a questioning attitude, and stopping their work if there are uncertainties
    - Provided training to QC inspectors on the use of the Human Performance Toolbox

Causes and Corrective Actions for Each Cited Example - Quality Control

- QC failed to independently verify the correct location of numerous weld repairs

  Issue 2: QC accepted welds at incorrect locations

  - Extent of condition reviews
    - Reviewed 100% of the torus weld inspections performed to date
      - Identified 24 incorrect weld locations
      - Seven inspectors involved
    - Conducted interviews
      - Inspectors indicated work documents were difficult to use
    - Evaluated other work performed outside the torus by QC
      - Inspected work
      - Reviewed performance indicators
      - No QC performance issues identified
    - Conclusion
      - Extent limited to QC verifying proper weld location inside the torus

Causes and Corrective Actions for Each Cited Example - Quality Control

- QC failed to independently verify the correct location of numerous weld repairs
  - Causes
    - Weld maps were confusing
    - Perceived time pressure
    - Inadequate monitoring of QC inspector performance
      - Tools for the job
      - Technical and management oversight
      - Lack of self-checking and questioning attitude
  - Interim corrective actions
    - Reviewed revised torus work documents with QC inspectors to confirm documents are clear and useable
    - Met with QC inspectors and stressed critical importance of being totally independent, having a questioning attitude, and stopping their work if there are uncertainties
    - Modified method of assigning inspectors

Causes and Corrective Actions for Each Cited Example - Quality Control

- QC failed to independently verify the correct location of numerous weld repairs
  - Ongoing corrective actions
    - Provided training to QC inspectors on the use of the Human Performance Toolbox
    - Assigned Level III inspectors to perform oversight of QC inspections
    - Took appropriate personnel action with QC inspectors
    - Put new QC management in place
    - Organized QC by functional area
    - Monitoring effectiveness of corrective actions

Nuclear Assurance Oversight

- Ineffective Nuclear Assurance oversight
  - Extent of condition reviews
    - Special Program implementation oversight
    - Oversight assignments
      - Non-Destructive Examination (NDE)
      - In-Service Inspection (ISI)
  - Causes
    - Lack of guidance for evaluation of Special Program implementation
    - Poor communication
  - Corrective actions
    - Established guidance for evaluating Special Program implementation and increased oversight of field activities
    - Assigned dedicated resource for focused oversight of QC, NDE and ISI
    - Conducted self-assessment of Unit 1 Nuclear Assurance oversight effectiveness

Summary of Actions Taken

- TVA has evaluated the individual deficiencies identified during the NRC inspections
  - Identified their causes
  - Reviewed the entire process from walkdowns, through Engineering evaluations and output, work document preparation and execution, and independent reviews
  - Taken appropriate corrective actions
- Comprehensive reviews performed by Engineering, Modifications, and QC demonstrate acceptability of project work performed to date

Application of Enforcement Policy

- Enforcement Policy criteria
  - Actual safety consequences
  - Potential safety consequences
  - Impact on NRC's ability to carry out its mission
  - Willfulness
- None of these criteria apply in this circumstance

Application of Enforcement Policy

- Other considerations
  - No previous escalated enforcement actions in the past two years
  - Since prompt and comprehensive corrective actions were taken, no civil penalty would normally be issued for a Level III Violation
  - The purpose of a civil penalty is to emphasize the importance of adherence to requirements and to reinforce prompt self-identification of problems and root causes and prompt and comprehensive correction of violations. TVA management fully understands these expectations and additional emphasis is not necessary.
  - Consideration of all the circumstances for this case demonstrates that no civil penalty would be warranted

Concluding Remarks