



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001

September 14, 2005

MEMORANDUM TO: ACRS Members  
Graham Leitch, Consultant  
John Barton, Consultant

FROM: Cayetano Santos Jr., Senior Staff Engineer */RA/*  
Technical Support Branch, ACRS

SUBJECT: STATUS REPORT FOR THE JOINT MEETING OF THE PLANT  
OPERATIONS AND PLANT LICENSE RENEWAL SUBCOMMITTEES  
ON BROWNS FERRY UNIT 1

The Subcommittees on Plant Operations and Plant License Renewal will hold a joint meeting on September 21, 2005, to gather information regarding the current status and condition of Browns Ferry Unit 1. The Subcommittees will hear presentations by and hold discussions with representatives of the staff and the Tennessee Valley Authority.

To prepare for this meeting the following documents are attached:

- A. Draft Agenda
- B. Status Report

The final agenda will be issued at a later date. Additional review materials were provided in a memorandum from John Lamb dated August 18, 2005.

If you have any questions, please contact me at 301-415-7270 or [cxs3@nrc.gov](mailto:cxs3@nrc.gov).

Attachments: As stated

cc w/o Attachment: J. Larkins  
A. Thadani  
M. Scott  
M. Snodderly  
S. Duraiswamy  
J. Lamb

**Advisory Committee on Reactor Safeguards**  
**Joint Meeting of the Plant License Renewal and Plant Operations Subcommittees**  
**Browns Ferry Unit 1**  
September 21, 2005

-PROPOSED SCHEDULE-

Cognizant Staff Engineers: Cayetano Santos Jr. [CXS3@NRC.GOV](mailto:CXS3@NRC.GOV) (301) 415-7270  
John Lamb [JGL1@NRC.GOV](mailto:JGL1@NRC.GOV) (301) 415-6855

Topics	Presenters	Time	Questions to be Addressed
Opening Remarks	Bonaca and Sieber, ACRS	8:30am - 8:35am (5 min)	
Regulatory Status A. License Renewal B. Startup C. Extended Power Uprate	???, NRR	8:35am - 9:00am  (25 min)	11
Modifications and Replacements	???, TVA	9:00am - 10:30am  (1.5 hr)	1, 2, 6, 8, 15
Break		10:30am - 10:45am (15 min)	
Modifications and Replacements (Continued)	???, TVA	10:45am - 12:45pm (2 hr)	1, 2, 6, 8, 15
Lunch		12:45pm - 1:45pm (1 hr)	
Comparison of Operating Experience between Unit 1 and Units 2 and 3	???, TVA	1:45pm - 2:15pm  (30 min)	13
Inspections	???, NRR?  ???, TVA	2:15pm - 3:15pm  (1 hr)	14, 16
Break		3:15pm - 3:30pm	
Lay-up		3:30pm - 4:00pm (30 minutes)	3, 4, 5
Testing		4:00pm - 4:30pm (30 minutes)	10,12
Other Issues		4:30pm - 5:00pm (30 minutes)	7, 9
Subcommittee Discussion	Bonaca and Sieber, ACRS	5:00pm - 5:30pm (30 minutes)	

**NOTE:**

- Presentation time should not exceed 50 percent of the total time allocated for a specific item. The remaining 50 percent of the time is reserved for discussion.
- 50 copies of the presentation materials to be provided.

## **QUESTIONS REGARDING BROWNS FERRY UNIT 1 START-UP AND LICENSE RENEWAL**

1. Which systems were replaced entirely? Why were they replaced? Which systems were left intact? Which systems were partially replaced? What was the logic/basis for only partially replacing these systems? What is the schedule for future replacements? How much has been completed? How much still needs to be done? Regarding system replacements or partial system replacements, are there firm commitments or just plans? What are the criteria for replacement?
2. Which components were replaced? Why were they replaced? What was the logic and basis for the component replacement? How much has been completed? How much still needs to be done? Are there firm commitments or just plans? What are the criteria for replacement?
3. Discuss maintenance of Unit 1 equipment during the shutdown period. Any unusual aging of systems, structures, and components (SSCs) during the shutdown period? What criteria were used for evaluation? What standards were used?
4. Which equipment was in lay-up? How was the lay-up performed? What standards were used? Were EPRI lay-up guidelines used? If so, what standards were used prior to the issuance of EPRI lay-up guidelines? What kind of inspection was performed on the laid-up equipment? What were the results? What criteria were used for evaluation?
5. What kinds of NDE were performed on equipment, cables, and piping that were not replaced? How did the equipment, cables, and piping fare since 1985? Is there a projection of when that equipment, cables, and piping would need to be replaced? Are the projections by analysis or engineering judgment?
6. Over the years since Unit 1 has been shut down, most of the BWR fleet has been modified in significant ways. Will Unit 1 be modified to incorporate these changes? (e.g., Materials? 316 L in recirc lines or MSIP or what? Core spray and RWCU system materials? Capping of CRD return line? Removal of LPCI loop selection logic? RWCU Pump and piping modifications? Will there be Hydrogen water chemistry? Noble metals?) Will there be Alternate rod injection? What work and/or inspections have been performed on the Shroud? Will Unit 1 implement the programs associated with the BWR Vessel and Internals Project (BWRVIP)? Explain the status of implementing BWRVIP programs.
7. How are the operators and other permanent staff being expanded to cover the additional requirements of a third unit (Unit 1)? How is the training for the additional crew members being provided? Is it a completely new crew or upgraded crew from Units 2 and 3? What are the major differences between Units 1, 2, and 3? EPGs are plant specific and were developed after Unit 1 was shut down. What EPGs are being used?
8. Is Unit 1 being modified in any significant way from Units 2 and 3? If so, will these modifications be incorporated into Units 2 and 3? When will the simulator be modified? Which unit will it replicate?
9. Is Unit 1 in a separate security/radiological area from 2 and 3? Do permanent plant staff have free access to that area?

10. Explain the pre-operation and start up test program for Unit 1.
11. What is the logic behind the sequencing of power uprates, license renewal and restart of Unit 1?
12. Will the licensee perform large transient testing for Unit 1? If not, what testing is planned to support the extended power uprate?
13. Explain in specific detail how Unit 1 meets the requirements of Part 54 regarding 20 years of operating experience.
14. We would like to hear from the staff about what construction type inspections are planned during the modification period. Which inspection modules will they use? What is their estimate of man-hours to be expended in inspections? What tests will be performed? What has the staff asked for? What is the staff requiring, as far as construction information and component information. What is the staff asking for related to construction inspections, ISI and IST? What does the staff already have? This project is like building a new plant, so the inspection effort should be similar.
15. We would like to see lists of piping and equipment to be replaced. A set of marked-up P&IDs would be helpful (but not required).
16. TVA stated that they are not taking credit for lay up. Does this mean that a full set of inspections to piping, systems, and components to remain in place for use in the rebuilt plant will have to undergo extensive inspections to declare that these piping, systems, and components are ready for service and will perform as designed. The regular ISI and IST programs may not be sufficient unless they are expanded and supplemented.

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
JOINT MEETING OF THE SUBCOMMITTEES ON  
PLANT LICENSE RENEWAL AND PLANT OPERATIONS  
LICENSE RENEWAL AND RESTART OF BROWNS FERRY UNIT 1  
SEPTEMBER 21, 2005  
ROCKVILLE, MARYLAND

**- STATUS REPORT -**

PURPOSE:

The purpose of this meeting is to gather information regarding the current status and condition of Browns Ferry (BF) Unit 1 to support ACRS reviews of the license renewal application for BF Units 1, 2, and 3 and the restart of BF Unit 1. The Subcommittee will hear presentations by and hold discussions with representatives of the staff and Tennessee Valley Authority (TVA).

BACKGROUND:

The Browns Ferry Nuclear Plant is located in Limestone County, Alabama. Each unit consists of a General Electric Type 4 boiling water reactor with a wet Mark I containment.

TVA voluntarily shut down all three units in March 1985 to correct a variety of issues. Units 2 and 3 were restarted in 1991 and 1995, respectively. TVA plans to restart Unit 1 in May 2007. In a letter dated August 14, 2003, the NRC issued the Regulatory Framework for the Restart of BF Unit 1. This letter lists the significant regulatory actions that require resolution before restart. Region II has been monitoring the Unit 1 recovery efforts.

On January 6, 2004, TVA submitted a license renewal application for BF Units 1, 2, and 3. The Commission is scheduled to make a decision regarding the license renewal application by May 2006, one year before the scheduled restart of Unit 1. The current operating license for BF Unit 1 expires on December 20, 2013.

On June 28, 2004, TVA submitted an application for a 20% extended power uprate for BF Unit 1. This would increase thermal power from 3293 MWt to 3952 MWt. TVA's intent is for Unit 1 to restart at the increased power level. However, the staff's review of the license renewal application is based on the currently authorized power level.

DISCUSSION:

Dr. Bonaca has met with the staff to discuss his concerns with the renewal of the Browns Ferry Unit 1 license. After a meeting with Mr. Gillespie, NRR, on June 14, 2005, it was decided that a Subcommittee meeting should be held in order for the staff and TVA to describe in detail all of the modifications and startup activities associated with Browns Ferry Unit 1. To assist the staff and TVA in preparing for this meeting, the Committee provided a list of questions to be answered at the meeting. A copy of these questions is given below:

In a letter dated March 4, 2004, the staff stated that the TVA application for BF Units 1, 2, and 3, is acceptable based on a commitment that the current licensing basis for Unit 1 at restart will

be the same as Units 2 and 3. TVA will apply the operating experience from Units 2 and 3 to Unit 1. Some Members question the applicability of this operating experience because Unit 1 has been shutdown for 20 years, Unit 1 is undergoing significant modifications, and TVA intends to restart Unit 1 at an uprated power level.

On August 23, 2005, the Committee visited the Browns Ferry Plant site. At this meeting TVA described the philosophy, schedule, and status of the Unit 1 restart. The Unit 1 restart project incorporates the same restart programs used for Units 2 and 3. At restart Unit 1 will have the same design and licensing basis as Units 2 and 3. TVA's intent is to keep all three units as operationally identical as practical. The project is on schedule for a startup by May 2007. TVA described some of the major equipment replacements that have been performed and some of the work still in progress. TVA is not taking any credit for the lay-up program in determining the acceptability of components for restart. TVA also discussed the license renewal application. Of the 39 aging management programs, 38 are common to all three units. The Unit 1 Periodic Inspection Program is unique to Unit 1. The objective of the Unit 1 Periodic Inspection Program is to verify the effectiveness of aging management programs and that no additional aging effects are occurring. The inspection locations will be a subset of non-replaced piping locations inspected for restart. The first inspection will be performed prior to the end of the current operating period. Appendix F of the license renewal application describes 13 differences between the current licensing basis of Unit 1 and Units 2 and 3. These differences will be resolved prior to the restart of Unit 1. The staff issued the draft Safety Evaluation report with Open Items on August 9, 2005. It contained two open items associated with corrosion of the drywell shell and stress relaxation of the core plate hold-down bolts. Unit 1 has approximately 10 years of operating experience but TVA stated that operating experience from Units 2 and 3 are applicable to Unit 1.

On August 24, 2005, the Committee visited Region II. One of the items discussed was the staff's monitoring of the Browns Ferry Unit 1 restart. In August 2003, the staff issued MC 2509 to govern the oversight of the recovery of Browns Ferry Unit 1. A Restart Oversight Panel will be established by October 1, 2005. A Recovery Issues List has been developed to track the closure of items. The staff also described the transition of Unit 1 to the Reactor Oversight Process. The staff described the results of some of the inspections associated with Browns Ferry Unit 1.

The information gathered at this meeting will support the Committee's review of the license renewal application for Units 1, 2, and 3 and the restart of Unit 1.

#### EXPECTED SUBCOMMITTEE ACTION

The Subcommittee Chairman will provide a report to the Full Committee during the October 2005 ACRS meeting.

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START-UP AND LICENSE RENEWAL**

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