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

January 27, 2005

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

SUBJECT: BROWNS FERRY NUCLEAR PLANT - INSPECTION REPORT
05000259/2004012, 05000260/2004012, AND 05000296/2004012

Dear Mr. Singer:

On December 17, 2004, the NRC completed an inspection regarding the application for license renewal for your Browns Ferry facility. The enclosed report documents the inspection findings, which were discussed on December 17, 2004, with members of your staff in an exit meeting open for public observation at the Browns Ferry Nuclear Site Training Center Auditorium, Room 201, Shaw Road and Nuclear Plant Road, Athens AL 35611

The purpose of this inspection was an examination of activities that support the application for a renewed license for the Browns Ferry facility. The inspection consisted of a selected examination of procedures and representative records, and interviews with personnel regarding implementation of your aging management programs to support license renewal. For a sample of plant systems, inspectors performed visual examination of accessible portions of the systems to observe any effects of equipment aging.

The inspection concluded that your license renewal activities were generally conducted as described in your License Renewal Application. The inspectors observed during this inspection that your staff had not yet begun the implementation process for new and enhanced Aging Management Programs (AMPs) and that the AMP procedures have yet to be defined and composed. Also for existing programs, the identification and selection of which particular existing procedures constitute the AMP had yet to be done. Therefore conclusions could not be reached on the acceptability of most AMPs. The inspectors concluded that NRC will perform another inspection when you have progressed further with AMP implementation.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room (PDR) or from the Publicly Available Records (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Should you have any questions concerning this meeting, please contact Caudle A. Julian at (404) 562-4603.

Sincerely,

/RA/

Harold O. Christensen, Deputy Director
Division of Reactor Safety

Docket Nos. 50-259, 50-260, 50-296
License Nos. DPR-33, DPR-52, DPR-68

Enclosure: Inspection Report

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-259, 50-260, 50-296
License Nos.:	DPR-33, DPR-52, DPR-68
Report Nos.:	05000259/2004012, 05000260/2004012, and 05000296/2004012,
Licensee:	Tennessee Valley Authority
Facility:	Browns Ferry Nuclear Plant
Location:	10833 Shaw Road Athens, AL 35611
Dates:	November 29 - December 17, 2004
Inspectors:	C. Julian, Team Leader R. Moore, Senior Reactor Inspector T. Nazario, Reactor Inspector M. Scott, Senior Reactor Inspector K. VanDoorn, Senior Reactor Inspector
Approved by:	Harold O. Christensen, Deputy Director Division of Reactor Safety

Enclosure

INSPECTION SUMMARY

IR 05000259/2004-012,05000260/2004-012,05000296/2004-012; 11/29-12/17/2004; Browns Ferry Nuclear Plant; License Renewal Inspection Program, Aging Management Programs.

This inspection of License Renewal (LR) activities was performed by five regional office engineering inspectors. The inspection program followed was NRC Manual Chapter 2516 and NRC Inspection Procedure 71002. This inspection did not identify any "findings" as defined in NRC Manual Chapter 0612.

The inspection concluded that LR activities were conducted as described in the License Renewal Application (LRA). The inspection also concluded that existing programs to be credited as aging management programs (AMPs) for license renewal are generally functioning well.

The inspectors observed during this inspection that the applicant had not yet begun the implementation process for new and enhanced AMPs and that the AMP procedures have yet to be defined and composed. Also for existing programs, the identification and selection of which particular existing procedures constitute the AMP had yet to be done. Therefore conclusions could not be reached on the acceptability of most AMPs. The inspectors concluded that NRC will perform another inspection when the applicant has progressed further with AMP implementation.

In walking down plant systems and examining plant equipment the inspectors found no significant adverse conditions and it appears plant equipment was being maintained adequately. One degraded condition was identified by NRC where unit 1 construction activities led to obstruction of units 2 and 3 Emergency Equipment Cooling Water discharge catch basins as described in paragraph II.C.12. The applicant took prompt action to clear the obstructions.

Attachment 1 to this report contains a partial list of persons contacted and a list of documents reviewed. The Aging Management Programs selected for review during this inspection are listed in Attachment 2 to this report. Attachment 3 is a list of acronyms used in this report.

Report Details

I. Inspection Scope

This inspection was conducted by NRC Region II inspectors to interview applicant personnel and to examine a sample of documentation which supports the license renewal application (LRA). This inspection reviewed the implementation of the applicant's Aging Management Programs (AMPs). The inspectors reviewed supporting documentation to confirm the accuracy of the LRA conclusions. For a sample of plant systems, inspectors performed visual examination of accessible portions of the systems to observe any effects of equipment aging. Attachment 1 of this report lists the applicant personnel contacted and the documents reviewed. The Aging Management Programs selected for review during this inspection are listed in Attachment 2 to this report. A list of acronyms used in this report is provided in Attachment 3.

II. Findings

A. Status of TVA implementation of LR activities

In 1985, TVA shut down all three units at BFN to address management and technical issues. Upon successful resolution of these issues, Unit 2 was restarted in 1991. Unit 3 was restarted in 1995. TVA has stated that it will not restart Unit 1 without prior approval from the NRC. With the exception of Unit 1 systems and components that are required to be in-service to support the current defueled status of Unit 1 or to support the operation of Units 2 and 3, Unit 1 has remained shutdown with key systems and components placed in layup. TVA has initiated a restart plan to return Unit 1 to service. TVA has stated that the basic TVA principle for the Unit 1 Restart is that all three BFN units will be operationally identical upon completion of Unit 1 restart activities. To meet this principle, TVA plans for the Unit 1 current licensing basis (CLB) at restart to be the same as the CLB of Units 2 and 3. The LRA states that the Unit 1 restart program will result in three operationally identical BFN units, providing assurance that the Unit 1 CLB changes implemented prior to restart will result in the same AMPs for each unit. BFN has a single Updated Final Safety Analysis Report (UFSAR) and the LRA UFSAR Supplement, Appendix A, identifies and describes the AMPs that are required for all three units. No AMPs, unique to Unit 1, will be required for Unit 1 during the period of twenty years extended operation. The BFN procedures for AMPs will be applicable site-wide. BFN procedures for new AMPs and existing AMP enhancements will be issued for all three units.

The inspectors learned during this inspection that the applicant had not yet begun the implementation process for new and enhanced AMPs. The AMP procedures have yet to be defined and composed. Also for existing programs, the identification and selection of which particular existing procedures constitute the AMP had yet to be done. A tracking system had yet to be developed for License Renewal (LR) open items and commitments for future applicant actions related to LR. An implementation plan had yet to be developed to transition the responsibility for implementing LR programs to the plant operating staff. The inspectors concluded that NRC will perform another inspection when the applicant has progressed further with AMP implementation.

During this inspection for existing programs that will be credited as AMPs, the inspectors reviewed a sample of the records of past results. The existing programs such as inservice inspection (ISI) and Flow Assisted Corrosion (FAC) are functioning well but are in the process of being reimplemented on Unit 1.

An exception is the Buried Piping and Tanks Inspection Program. Although the LRA states this is an existing program, there did not appear to be an actual existing program. There was no specific direction in existing procedures that would cause buried pipe to be examined for the affects of aging when it is excavated. The applicant stated they will take action to correct this issue.

B. Visual Observation of Plant Equipment

During this inspection, the inspectors performed walkdown inspections of portions of plant systems, structures, and components (SSCs) to determine their current condition and to attempt to observe aging effects. Overall the material condition at Browns Ferry was good and no significant aging management issues were identified. The following SSCs were observed:

High Pressure Coolant Injection
Reactor Core Isolation Cooling
Reactor Building Closed Cooling Water
Diesel Generators and buildings
Various Cranes in the scope of LR
Spent Fuel Pool
Torus area
Unit 1 Reactor Building and drywell
Service Water Intake Structure
RHR service water tunnels.
Electrical Transformer Area
Switchyard

C. Review of Mechanical Aging Management Programs

The following group of AMPs will require further review during a future NRC inspection:

1. Fire Protection

The applicant credits two AMPs to support the LRA. The inspectors reviewed documents B44 040105 052 Fire Protection Aging Management Program, Rev. 0 and B44 040105 054 Fire Water System Aging Management Program, Rev. 0 which the applicant offered as a technical document supporting the LRA. The documents contained a repetition of the LRA text describing the AMP and a comparison of the applicant program to the comparable AMP description in the Generic Aging Lessons Learned (GALL) document, which the NRC has endorsed as an acceptable standard for AMPs. It also contained an extensive list of documents pertinent to fire protection ranging from the LRA, the GALL document, to a list of Browns Ferry site specific fire protection surveillance and test procedures. The purpose of the document was not included in the text but the applicant stated that the document was intended to

demonstrate the similarity of the Browns Ferry AMPs to the GALL content and to list any and all documents that were reviewed in preparing the LRA. The inspectors observed that there was no designation of which existing plant procedures from the list would be credited to constitute the fire protection AMPs. The applicant stated that those decisions had not been made yet, but would be made as part of the implementation phase of the AMPs. The inspectors concluded that, without knowing what procedures constitute the fire protection AMPs, one could not conclude that the AMPs will be adequate to manage aging effects in the period of extended operation. The inspectors concluded that further inspection will be needed for these AMPs when the applicant has progressed further in defining the program.

The inspectors encountered a similar situation for several other AMPs in which the program is not yet clearly defined and so further inspection will be needed to conclude that the AMP is acceptable for aging management in the period of extended operation.

Inspectors reviewed a group of untitled documents related to the various AMPs which the applicant presented as supporting information for the LRA. They were referred to as the B44 documents because they are untitled and the sequential number for loading them into the Electronic Data Management System (EDMS) all began with B44. The inspectors observed that the B44 fire protection documents were not all complete as records in the EDMS system. The text was truncated in the midst of the document where the document list began. The applicant stated they have corrected this problem and it was caused by inadequate file space while loading the documents into EDMS. They stated that the fire protection documents were the largest ones and the only ones that were incomplete.

In order to confirm that the applicant's fire protection program is functioning correctly, the inspectors reviewed a sample of past Mechanical Preventative Instruction (MPI) and Surveillance Instruction (SI) record documents. The two most recent inspections were reviewed for fourteen MPI and SI periodic tests. The inspectors found the records satisfactory.

2. ASME Section XI Subsections IWB, IWC, and IWD Inservice Inspection Program [Including Reactor Vessel Inside Diameter Attachment Welds Program, Feedwater Nozzle Program, Control Rod Drive (CRD) Return Line Nozzle Program, Stress Corrosion Cracking Program, and Penetrations Program]

The ISI Program, including the above subsets of this program, is an existing program, subject to regular NRC inspections. In order to address industry issues, the Boiling Water Reactor (BWR) owners group established the Vessel and Internals Project (VIP) to provide a generic response to the various BWR industry issues. A number of VIP documents have been issued covering the various subsets of the ISI program listed above. These VIP documents have served to provide for additional inspections and/or modifications of ASME ISI requirements. The applicant has maintained Units 2 and 3 up to date for the latest Code and VIP requirements. In addition, the applicant plans to enhance the Unit 1 program to include the VIP requirements. The applicant also indicated that improvement modifications and cracking mitigation actions similar to those implemented on Units 2 and 3 were planned for Unit 1 prior to restart. The applicant has committed to submit a report to the NRC detailing the mitigation activities for Unit 1.

The applicant also plans to reinspect selected welds prior to startup and perform baseline inspections of all new welds on Unit 1.

The inspectors reviewed the LR program documentation, site procedures, Unit 1 modification information for feedwater and control rod drive return line nozzles, and previous inspection results and discussed the program with applicant personnel. The inspectors concluded that the ISI Program was in place and included elements described in the LRA for Units 2 and 3. Enhancements for Unit 1 were ongoing. However, the applicant had not yet specifically identified procedures to be credited for LR and had not established a tracking mechanism for assurance of completion of required actions such as providing LR controls in applicable procedures. Further NRC inspection is warranted for this program.

3. Reactor Head Closure Studs Program

The applicant has maintained an ongoing periodically updated existing program for inspection of reactor vessel studs as part of the ISI program. The applicant plans to inspect the Unit 1 studs prior to startup. In addition, the applicant has implemented controls to assure use of approved lubricants via maintenance procedures.

The inspector reviewed the LR program documentation, site procedures, and previous inspection results and discussed the program with applicant personnel. The inspectors concluded that the Reactor Head Closure Studs Program was in place and included elements described in the LRA. However, the applicant had not yet specifically identified procedures to be credited for LR and had not established a tracking mechanism for assurance of completion of required actions. Further inspection is warranted for this program.

4. Reactor Vessel Internals Program (Including the Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel Program)

The Reactor Vessel Internals Program, which includes inspection of cast austenitic stainless steel components, is an existing program which has been maintained in accordance with the Code and the BWR VIP process for Units 2 and 3. The applicant plans to upgrade the Unit 1 program to the VIP requirements. In addition, the applicant plans to modify the Unit 1 internals similarly to the improvements which have been implemented on Units 2 and 3 during the Unit 1 shutdown period.

The inspector reviewed the LR program documentation, site procedures, and previous inspection results and discussed the program with applicant personnel. The inspectors concluded that the Reactor Vessel Internals Program was in place and included elements described in the LRA for Units 2 and 3. Enhancements for Unit 1 were ongoing. However, the applicant had not yet specifically identified procedures to be credited for LR and had not established a tracking mechanism for assurance of completion of required actions. Further inspection is warranted for this program.

5. Flow Accelerated Corrosion (FAC) Program

The FAC program is an existing program credited for management of flow accelerated corrosion which will be enhanced for Unit 1 to include the latest industry guidance. The applicant also plans to repair susceptible piping components for Unit 1 prior to startup and conduct baseline inspections. The applicant's program consists of periodic inspections and evaluation of the data to detect wall thinning and compare data to current requirements and historical data values to predict when and if minimum wall thickness will occur. Piping replacements are planned prior to wall thickness reaching minimum requirements. Inspection points and inspection periodicity are periodically adjusted dependant on inspection data, plant operations history, and industry information.

The inspectors reviewed LR program documentation, the FAC data base, selected plant inspection data, and site procedures and also discussed the program with responsible personnel. The program has functioned to assure timely piping replacements and appropriately adjust inspections according to plant and industry experience. The inspectors concluded that the FAC program was in place and included elements described in the LRA for Units 2 and 3. Enhancements for Unit 1 were ongoing. However, the applicant had not yet specifically identified procedures to be credited for LR and had not established a tracking mechanism for assurance of completion of required actions. Further inspection is warranted for this program.

6. Reactor Vessel Surveillance Program

The Reactor Vessel (RV) Surveillance Program is an existing program credited in the LRA as a program for managing RV irradiation embrittlement. The applicant's program consists of periodic testing of RV surveillance capsules and updating calculations for fracture toughness. The applicant has maintained the program for Units 2 and 3 in accordance with the BWR VIP process and the BWR Integrated Surveillance Program (ISP). The applicant was in process of updating Unit 1 into the ISP program. In addition, the applicant plans to conform to BWRVIP-116; BWR Vessel and Internals Project, Integrated Surveillance Program for License Renewal, which is currently under review by NRC, for all three vessels.

The inspector reviewed the LR program documentation and site procedures and discussed the program with applicant personnel. The inspectors concluded that the Reactor Vessel Surveillance Program was in place and included elements described in the LRA for Units 2 and 3. Enhancements for Unit 1 were ongoing. However, the applicant had not yet specifically identified procedures to be credited for LR and had not established a tracking mechanism for assurance of completion of required actions. Further inspection is warranted for this program.

7. Compressed Air Monitoring Program

This is an existing condition monitoring program that includes inspection and testing of the entire system, i.e. frequent leak testing of valves, piping, and other system components. The program also includes air quality monitoring for oil, water, rust, dirt and other contaminants. Program enhancements for aging management included

program and procedural upgrades to verify that industry air standards referenced in the NRC endorsed GALL report were incorporated into the station program and upgrade of Unit 1 procedures to fully implement the compressed air monitoring program on Unit 1. These enhancements will be implemented prior to the period of extended operation and are generally described in the LRA, section B.2.1.21, Compressed Air Monitoring Program. The inspectors reviewed the program implementing procedures, discussed the program with responsible station staff, and reviewed documentation of leak testing performance and monitoring of air quality. Additionally, the inspectors reviewed the historic station problems and resolutions related to the compressed air systems.

The inspectors concluded that additional inspection of this aging management program is required. As implemented on Unit 2 and 3, this aging management program will provide reasonable assurance that the intended function of the compressed air systems will be maintained through the period of extended operation. The applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed for Units 2 and 3. The GALL referenced air standards were verified to be in the station compressed air program. However, the procedures and actions to implement the compressed air monitoring program on Unit 1 had not been clearly identified.

8. One Time Inspection Program

This is a new program to perform one time inspections to verify that unacceptable degradation is not occurring or confirming that there is no need to manage aging-related degradation for the period of extended operations on systems structures and components (SSCs) identified in the aging management review. There is a large number of SSCs identified for one time inspections which include RCS pressure boundary piping, valves, and fittings, ventilation duct work, heat exchangers, and many other components. The program inspections will include a combination of Non Destructive Examinations (NDE) by qualified personnel following procedures consistent with ASME Code and 10 CFR 50, Appendix B. The required program elements and general statement of scope are identified in the LRA, section B.2.1.29, One-Time Inspection Program. This scope of one time inspection SSCs is specifically identified in the Browns Ferry License Renewal Data Base. Inspection procedures, sample size, sample expansion criteria, and acceptance criteria have not yet been developed. The applicant stated these will be developed and the program completed prior to the period of extended operation. The inspectors reviewed the program description in the application, the scope identification in the Browns Ferry License Renewal Data Base, and discussed the program development and implementation with the responsible station staff.

The inspectors concluded that additional inspection of this aging management program is required. The inspectors were unable to determine that aging effects will be appropriately assessed and managed for the SSCs identified in the program scope because the applicant had not yet provided adequate guidance to ensure development and implementation of this program. Although the LRA section B.2.1.29 established the elements required for program development and the responsible staff was familiar with the scope and intent of the program there was no proceduralized process for accomplishing these elements or implementation of the inspections.

9. Selective Leaching of Materials Program

This is a new program that will perform one time visual inspections and hardness measurements of representative components identified in the LRA's aging management review results. Components susceptible to selective leaching include cast iron, brass, bronze, or aluminum bronze and may be exposed to raw water, treated water, or ground water environment. The program will perform one time visual or hardness measurements of representative components from those components identified in the LRA's aging management review results. The required program elements and general statement of scope are identified in the LRA, section B.2.1.30, Selective Leaching of Materials Program. Inspection procedures, sample size, sample expansion criteria, and acceptance criteria have not yet been developed. The applicant stated these will be developed and the program completed prior to the period of extended operation. The inspectors reviewed the program description in the application, the scope identification in the Browns Ferry License Renewal Data Base, and discussed the program development and implementation with the responsible station staff.

The inspectors concluded that additional inspection of this aging management program is required. The inspectors were unable to determine that aging effects will be appropriately assessed and managed for the SSCs identified in the program scope because the applicant had not yet provided adequate guidance to ensure development and implementation of this program. The LRA section B.2.1.30 provided a description of the program and the responsible staff was familiar with the scope and intent of the program, however, there was no proceduralized process for program development and implementation.

10. Buried Piping and Tanks Inspection Program / Buried Piping and Tanks Surveillance Program

This program is categorized in the application as an existing program which is credited for aging management of external surfaces on buried piping. There are no buried tanks existing at Browns Ferry or included in the scope of this program. Buried components will be inspected when they are excavated for any reason. The inspectors reviewed the description of the program in LRA section B.2.1.31 which stated the criteria for the inspections and discussed the program with the assigned responsible staff. The inspectors reviewed station procedures 0-TI-346, Maintenance Rule Performance and Reporting, Rev. 24 and SPP-9.7, Corrosion Control Program, Rev. 8, which referenced inspection of underground piping. These procedures included inspection guidance for performing inspections of underground piping but did not provide a requirement that piping be inspected if excavated. Station Work Permit Procedure, 0-TI-412. Revision 11, provided an excavation permit document as attachment D, however, there was no "trigger" included in the work permit procedure or excavation permit document to initiate a piping inspection for piping that is excavated.

The inspectors concluded that additional inspection of this program is required. The applicant had yet to provided adequate guidance to ensure aging effects will be appropriately assessed and managed for the SSCs identified in the program scope because there were no specific requirement for piping inspections to be performed when excavation occurred. Following discussion, the applicant initiated an open item to

enhance this program to include a “trigger” in the excavation permit document to require notification of engineering and a piping inspection when piping is excavated.

11. Bolting Integrity Program

The Bolting Integrity Program, described in LRA Section B2.1.16 is an exiting program but is to be enhanced. The inspectors reviewed the AMP B44 040105 080, Revision 6, “Bolting Integrity Aging Management Program,” that is the basis and scope document for the program. This document listed several existing site documents that perform bolting or inspected bolting. Many of the instructions dealt with the ASME Code Sections’ requirements. The inspectors generally reviewed several of the instructions. The AMP listed two exceptions to the Gall (NUREG-1801) program that the applicant considered open items. The first exception was regarding structures bolting. The inspectors reviewed the “Structure Monitoring Program” and “Inspection of Water-Control Structures Associated with Nuclear Power Program” AMPs that are to be enhanced under the structural bolting program. They cited two maintenance rule (NRC’s 10CFR 50.65) procedures (0-TI-346 and LCEI-CI-C9) that were to be changed to enhance the program.

The second exception was that the bolting program does not completely address Class 1 NSSS component supports. Procedure SI-4.6 (ASME Section XI, Subsection IWF) was identified by the applicant as requiring enhancement. To date, none of the site procedures have been altered to reflect that they are license renewal documents nor have they been enhanced. This overall program will require additional inspection at a later date.

12. Open Cycle Cooling Water System Program (OCCW)

This is an existing program described in LRA Section B.2.1.17 that will be enhanced to implement [NRC] Generic Letter 89-13 for Unit 1 prior to the period of extended operation as stated in Section A.1.16 of the LRA. The inspectors reviewed the AMP B44 040105 055, Revision 0, “Open Cycle Cooling Water System Aging Management Program”. The existing program has been in effect for over 10 years as the implementation of the NRC Generic Letter 89-13 recommendations. On a sampling basis, the inspector checked that elements of the recommended program were in place. Review of corrective action documents (CAP) found in the AMP indicated that the carbon steel piping and its welds had experienced through wall leaks. Additionally, the CAP indicated that system components had experienced both debris and clams historically. The program elements had features in place to generally trend and address these problems.

The AMP listed a number of systems that were in scope. The inspectors concentrated on the Emergency Equipment Cooling Water (EECW) and Residual Heat Removal Service Water (RHRSW) systems. Except as noted below, walkdowns generally found the Units 2 and 3 systems to be in good visual condition. The Unit 1 systems will have to be brought to operational readiness prior to that unit being returned to service.

The three RHRSW/EECW suction pipes that are mounted in the intake structure connect the water path from near the front of the structure to a rear enclosed bay that

contains the pumps' suction bells. Suction water for the 12 pumps travels through the three pipes. To their recollection, the applicant has not inspected the three pipes. The applicant has agreed to perform a one time inspection of these pipes. Similarly, the 12 RHRSW system discharge lines exit the reactor building going underground and into the intake canal and through the enclosing dike between the canal and the river. The applicant has agreed to perform a one time inspection of these pipes. The EECW system discharges via other means that does require a one time inspection.

During walk downs, the inspectors attempted to locate the EECW catch basins that receive the system discharge. The basins, which are similar to in-ground storm drains with about 3 by 4 foot cast iron grates, are outside of the reactor building with the grates at ground level. Should a seismic event block flow from the non-seismic pipe down stream of the basin, the system discharge could flow up out the grate and across the yard with no loss of system function. Since they have sample lines leading through the grates, the applicant's chemistry personnel were able to locate the basins for the inspectors. The grates on Units 2 ands 3 basins were covered with rock, mud, debris, and erosion retention fencing fabric. They appeared to have become covered as a result of installation of temporary construction trailers for unit 1 work. The unit 3 basin was covered by a construction trailer. The Unit 1 basin was uncovered as it should be even though the system was not in use. The applicant wrote a Problem Evaluation Report (PER) 73662 document to evaluate the conditions found. Additionally, the applicant immediately removed the material covering the grates.

Following the inspection, the applicant provided the inspectors a copy of a document titled Functional Evaluation 40826 for PER 73662, EECW Discharge Flow Path into Yard Catch Basins. The document evaluated the as found condition and concluded that even if a seismic event blocked the drain path from the basin to the canal, the resulting EECW discharge pressure would be sufficient to dislodge the debris and the EECW would still be capable of performing its intended function. After reviewing the document the inspectors agreed with that conclusion. The inspectors concluded that this was a minor issue and would not be pursued for enforcement because it had no actual safety consequences, little or no potential to impact safety, no impact on the regulatory process, and was not willful.

Based on the above, the OCCW AMP license renewal updates will be reviewed again during a future inspection.

The following group of AMPs are existing programs requiring no enhancement, are functioning acceptably, and require no further inspection related to LR.

13. Water Chemistry Control Program

This is an existing program to minimize loss of material due to general, crevice, and pitting corrosion and crack initiation and growth caused by stress corrosion cracking. This is provided by periodic monitoring, control, and mitigation of known detrimental contaminants. The enhancements to this program due to the LRA apply to Unit 1 and are related to controlling chemistry in the extended shutdown unit consistent with the operating units. The inspectors reviewed the program documentation, discussed the program with responsible station staff, and reviewed existing procedures which

implemented the scope and actions of this program as applied to Units 2 and 3. Additionally, the inspectors reviewed the identification and resolution of past identified conditions in which parameter limits were exceeded.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience to determine aging effects. The applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, and when implemented on Unit 1, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

14. Fuel Oil Chemistry Program

This is an existing program credited for managing the conditions that cause general, pitting, and micro biologically influenced corrosion (MIC) of the diesel fuel tank internal surfaces by monitoring and controlling fuel oil contamination. Activities include verification of oil quality before its introduction into the tanks, and a 10 year interval tank cleaning and inspection. Additionally, the applicant states that a one-time inspection measurement of the tanks' bottom surface will be performed prior to entering the period of extended operation. The inspectors reviewed the program documentation, discussed the program with responsible applicant personnel, and reviewed existing procedures which implemented the scope and actions of this program. The inspectors reviewed documentation which verified that the monitoring of fuel oil parameters and tank inspection activities were performed as credited in the aging management program description of the application, section B.2.1.27, Fuel Oil Chemistry Program. Additionally, the inspectors verified that the one-time inspections credited as enhancements were entered into scope of the One-Time Inspection aging management program as described in the Browns Ferry License Renewal Data Base.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience to determine aging effects. The applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

15. Diesel Starting Air Program

This is an existing program credited for managing the aging effects of loss of material due to general corrosion in the emergency diesel generators' starting air systems. The program includes preventive actions and condition monitoring implemented by the station Preventive Maintenance (PM) program. There is one enhancement credited in the application for this program which is to perform a one-time inspection to detect any loss of material of the air piping and receivers and will be performed prior to the period of extended operation. The inspectors reviewed the program documentation, including procedures which accomplished the preventive and monitoring actions credited for aging management in this program and discussed the program with the responsible station staff. Additionally, the inspectors reviewed trend data of air quality monitoring, the resolution of air system problems identified in the late 1980s time period, and the scheduling and performance of air system component PM tasks. The inspectors verified

the one-time inspections credited as enhancements were entered into scope of the One-Time Inspection aging management program as described in the Browns Ferry License Renewal Data Base.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience to determine aging effects. The applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

16. Above Ground Carbon Steel Tanks Program

This existing program is credited for managing the aging effect of loss of material due to general corrosion on above ground carbon steel tanks within the LR scope. The only tanks in the scope of this program are the condensate storage tanks. The program includes prevention (coatings), condition monitoring (periodic inspections), and a one time inspection of the tanks' bottom surface. The inspectors reviewed the program documentation which included periodic inspections performed in accordance with the maintenance rule program and quarterly inspections performed in accordance with the system monitoring program. Additionally the inspectors reviewed documentation which demonstrated performance of these inspections and verified the one-time inspections were included in the scope of the One-Time Inspection aging management program in the Browns Ferry License Renewal Data Base.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience to determine aging effects. The applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

17. Systems Monitoring Program

This is an existing condition monitoring program that includes periodic visual inspections, performed by System Engineers, on surfaces of systems and components to identify degraded conditions prior to the loss of intended function. Corrective maintenance or corrective action documents are initiated to ensure identified deficiencies are tracked, trended, and corrected. The inspectors reviewed the program documentation that provided the requirement for system monitoring via system engineer field walk downs and the attributes to be included in these periodic visual inspections. The inspectors reviewed the documentation which demonstrated the performance of the visual inspections and the process for resolution of identified deficiencies.

The inspectors concluded that the applicant had conducted adequate historic reviews of plant specific and industry experience to determine aging effects. The applicant had provided adequate guidance to ensure aging effects will be appropriately assessed and managed. As implemented, there is reasonable assurance that the intended function of the SSCs will be maintained through the period of extended operation.

18. Closed Cycle Cooling Water Program (CCCW)

This program described in LRA Section B2.1.18 is an existing program that will not be enhanced. The inspectors reviewed the AMP B44 040105 066, Revision 2, "Closed Cycle Cooling Water System Aging Management Program". The existing program has been in effect for a number of years having been based an Electrical Power Research Institute document TR-107396, "Closed Cycle Cooling Water Chemistry Guideline", October 1997. The primary systems included in this broad program category are such as the emergency diesel skid coolers, the control bay chillers, and the reactor building closed cooling water system. On a sampling basis, the inspectors checked that elements of the recommended program were in place in site program documents. Review of corrective action documents (CAP) found in the AMP indicated that very few problems were found in these systems. The inspectors cross checked the corrective action searches and performed a walk down on available piping. Industry operating experience has demonstrated that monitoring and maintenance of corrosion inhibitors is effective in mitigating loss of material, cracks, and reduction of heat transfer. Implementation of the CCCW program provides reasonable assurance that the aging effects will be managed such that the equipment will continue to perform its intended function.

19. Inspection of Overhead Heavy Load and Light Load Handling Systems Program

This program is described in LRA Section B.2.1.20 and is an existing program that will not be enhanced. The inspectors reviewed: AMPs B44 040105 043, BFN Units 1, 2, and 3 Fuel Handling and Storage, Revision 0; B44 040105 051, BFN Units 1, 2, and 3 Cranes, Revision 0; and B44 040105 064, Inspection of Overhead Heavy Load and Light Load Handling Systems Program, Revision 0. The Brown's Ferry Crane program has been in existence for a number of years. Review of CAP issues on crane problems showed very limited findings. Program instructions follow industry guidance (NUREG-0612 and ASME B30.2) and have incorporated industry operational history. A recent problem at another TVA plant caused inspections at all other TVA sites, including Brown's Ferry, by corporate Power Services. The inspectors toured and inspected the major available cranes at the site finding them in relatively good condition. For license renewal, the primary crane components of interest are the structural components that make up the bridge, trolley, and rails. Implementation of the crane and hoist programs provide reasonable assurance that the aging effects will be managed such that the equipment will continue to perform its intended function.

20. BWR Reactor Water Cleanup System (RWCUS) Program

This program is described in LRA Section B2.1,22 and is an existing program that will not require enhancement. The inspectors reviewed AMP B44 040105 060, Revision 4, BWR Reactor Water Cleanup System Program. This program includes inservice inspection and monitoring and control of reactor coolant chemistry to manage the effects of stress corrosion cracking or intergranular stress corrosion cracking on stainless steel in the subject system. The inspectors examined the existing program for performing non-destructive inspection of the system piping. The inspectors determined that Unit 2 has a short section of piping in the drywell that has not been changed from 304 to 316NG stainless. The 316 stainless is less susceptible to corrosion. Unit 3 has all 316NG piping. Unit 1 RWCUS has a modification planned for the replacement of its

304 stainless prior to the unit startup. This modification's number is 068/51045. The inservice inspection program on the new Unit 1 piping will have to resume prior to restart. A review of the applicant's CAP findings revealed no stress corrosion instances. Implementation of the AMP provides reasonable assurance that the aging effects will be managed such that the equipment will continue to perform its intended function.

21. 10 CFR Part 50, Appendix J Program

This program is described in LRA Section B.2.1.34 and is an existing program not requiring enhancements. The inspectors reviewed AMP B44 040105 122, 10 CFR Part 50. Appendix J Program, Revison 3. This existing program monitors leakage rates through the containment pressure boundary, including the drywell and torus, penetrations, and access openings, in order to detect degradation of containment pressure boundary. This program has been in existence for the life of the plant. Inspector review of the CAP finding revealed no program deficiencies. The program instructions appear to be sound. As indicated in the AMP, prior to restart during unit 1 recovery preservice period, 100 percent of the required examinations will be performed before restart. Implementation of the Appendix J Program provides reasonable assurance that the aging effects will be managed such that the equipment will continue to perform its intended function.

22. Fatigue Monitoring Program

This program is described in LRA Section B3.2 and is an existing program requiring no enhancements. The inspectors reviewed AMP B44 040105 002, Metal Fatigue of Reactor Coolant Pressure Boundary, Revision 1. This AMP monitors and tracks the number of critical thermal and pressure transients for the selected reactor coolant system components as required by 10 CFR 54.21. By tracking the cycles, the applicant assure that component failure probability will be limited. The inspectors reviewed the final safety analysis report list against those components in the technical implementation procedure and against the GE time limited aging analysis. The inspectors examined the tracking system and annual reports that handle the process. For Unit 1, on its restart the applicant is prepared to re-initiate their tracking process. Implementation of the Cyclic Fatigue Program will provide reasonable assurance that the aging effects will be managed such that the equipment will continue to perform its intended function.

D. <u>Review of Electrical Aging Management Programs</u>

The Browns Ferry LRA concluded that the only electrical components that require an aging management program are electrical cables and connectors and electrical busses.

The AMPs proposed by the applicant are as follows:

Environmental Qualification Program

Accessible Non-Environmental Qualification Cables and Connections Inspection Program

Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49

Environmental Qualification Requirements Program

Bus Inspection Program

Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program

Electrical equipment, including cables, that are already subject to the 10 CFR 50.49 environmental qualification (EQ) program are aging managed by that program. The applicant considers the EQ program subject to a Time Limited Aging Analysis (TLAA) to demonstrate that EQ components' qualified life can be extended an additional 20 years or to ensure that they will be replaced at the appropriate time.

The Accessible Non-Environmental Qualification Cables and Connections Inspection Program is a new program that will visually inspect a sample of all types of cables that are located in an adverse localized environment. This program is to be implemented prior to the period of extended operation.

The Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program concerns inaccessible medium voltage cables which may be water submerged while energized. The AMP specifies that a test will be developed to provide an indication of the condition of the conductor insulation. This program is to be implemented prior to the period of extended operation.

The Bus Inspection Program is a new program to be developed to inspect isolated and nonsegregated phase electrical switchyard busses for deterioration from heat cycling and loosening of fasteners. This program is to be implemented prior to the period of extended operation.

The Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program is described in the LRA as an existing program. It credits the periodic calibration of local power range monitors required by Technical Specification. The LRA states that when a local power range monitor is found to be out of calibration, evaluations that consider the possibility of cable degradation will be performed and appropriate corrective actions will be taken if cable degradation is determined to exist. This program is to be implemented prior to the period of extended operation.

No more technical information was available for the inspectors review other than the brief description in the LRA. These programs will be inspected again when the applicant has developed them further to determine their acceptability.

The inspectors asked if periodic actions are being taken such as inspection for and removal of water collected in cable manholes and conduits containing normally energized safety related cables. The inspectors were told that, in support of the LRA, two electrical pull boxes on site containing safety related cables had been opened and inspected. Neither were found to have a water accumulation. The inspectors examined applicant pictures of the boxes. In the past numerous boxes have been reinspected as a preventive maintenance repetitive task. The inspector examined records of a sample

of the past inspections and found them satisfactory.

Applicant representatives stated that in response to an NRC question, they have responded that for inaccessible in-scope medium voltage cables exposed to significant moisture the cables will be tested at least once every 10 years to provide an indication of the condition of the insulation. The specific type of test and acceptance criteria has yet to be determined.

E. Review of Structural Aging Management Programs

1. Structures Monitoring, Water-Control Structures, and Masonry Wall Programs

The Structures Monitoring Program (SMP) is an existing program which the LRA states will be enhanced to identify all structures and structural components within the scope of license renewal and all aging effects and associated mechanisms for inspection. The applicant's existing program consists of periodic inspections and monitoring of accessible areas of structures. The applicant also states that the SMP will be enhanced to include examinations of representative samples of below grade concrete structures when excavated for any reason and to include the guidance of American Concrete Institute (ACI) 349.3R-96, "Evaluation of Existing Nuclear Safety-Related Concrete."

The inspectors reviewed AMP documents for the SMP, selected past plant inspection data, site procedures, drawings, and Maintenance Rule Structural Inspection Reports and also discussed the program with responsible personnel. The applicant performed a baseline inspection in 1997 of all in-scope structures in accordance with the requirements and guidance in the NRC Maintenance Rule 10 CFR 50.65 and Regulatory Guide (RG) 1.160, Revision 2, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." A second inspection was performed in 2003 as part of the SMP Maintenance Rule inspections. BFN Technical Instruction (TI) 0-TI-346, "Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting-10CFR50.65, Revision 22" and Procedure LCEI-CI-C9, "Procedure for Walkdown of Structures for Maintenance Rule, Revision 4" specify an inspection frequency of every five years consistent with ACI 349.3R-96.

The inspectors also conducted general walkdowns of the site, including reactor buildings, switchyards, Residual Heat Removal Service Water tunnels, Diesel Generator buildings, and any applicable structures, systems or components related to the SMP. The inspectors verified that areas where signs of degradation such as spalling, cracking, leakage through concrete walls, corrosion of steel members, deterioration of structural materials and other aging effects had appeared they been previously identified and addressed adequately by the SMP and/or the Corrective Action Program (CAP). The applicant maintains a Structural Monitoring database which captures and dispositions observations about structures and components identified during previous inspections.

The Water-Control Structures Program includes inservice inspection and surveillance activities for dams, slopes, canals, and other water-control structures. The applicant is not committed to NRC RG 1.127, Revision 1, "Inspection of Water-Control Structures Associated with Nuclear Power Plants," therefore aging management of water-control structures is included in the SMP. The LRA states that the program will be enhanced to

ensure that required structures and structural components within the scope of license renewal are identified, and enhanced to include special inspections following the occurrence of large floods, earthquakes, tornadoes, and intense rainfall.

The inspectors conducted a walkdown of the dike, gate structures and intake channel. There were no signs of abnormal seepage, erosion, unusual settlement or displacement of the areas inspected. During the walkdown of the gate structure the inspectors identified minor concrete spalling and some visible corrosion of the sheet piling at gate structure #3. Work Order 04-725027-000 was written to address this issue. There were no apparent signs of significant degradation of the gate structure. The existing SMP does not include steps for inspecting submerged concrete structures; however, the applicant stated that they plan to include provisions to conduct inspections by divers during a one-time inspection of the intake structure including RHR Service Water piping to determine the actual conditions that may be present.

The inspectors reviewed 0-TI-246, “Inspection of Ponds, Dikes, and Channels-Rev. 1" which specifies the method, frequency, and criteria for the periodic inspection of water-control structures. Currently, 0-TI-246 and 0-TI-346 inspections are performed independent of each other by different organizations; however, the applicant stated that procedures will be revised to ensure that better coordination will be in place before the period of extended operation.

The Masonry Wall Program is also included in the SMP. The inspectors reviewed BFN-50-C-7100, Attachment B, Revision 14, “Design and Evaluation Criteria for Masonry Walls.” The applicant will continue to address masonry wall considerations consistent with NRC IE Bulletin (IEB) 80-11, “Masonry Wall Design” and NRC Information Notice (IN) 87-67, “Lessons Learned from Regional Inspections of Licensee Actions in Response to IE Bulletin 80-11,” as referenced in the applicant’s AMP evaluation for Masonry Wall. The program is implemented as part of the five-year SMP periodic inspections and appeared to be functioning adequately to address masonry wall considerations.

The inspectors concluded that when the enhancements are made there is reasonable assurance that the SMP will adequately monitor the condition of structures and structural components through the period of extended operation. In addition, the inspectors will reinspect to verify procedural implementation commitments and review the progress of Unit 1's integration into the AMP.

2. ASME Section XI, Subsection IWE/IWF Inservice Inspection Program

The Browns Ferry Nuclear (BFN) ASME Section XI, Subsection IWE, Containment Inservice Inspection (ISI) Program was developed in response to the requirements of 10 CFR 50.55a and the ASME Code. The program is an existing program which includes visual examinations of steel containment (MC) shells and their integral attachments; containment hatches and airlocks; seals, gaskets, and moisture barriers; and pressure-retaining bolting. In response to NRC Generic Letter (GL) 97-05, “Request for Additional Information Assessment of Licensee Measures to Mitigate and/or Identify Potential Degradation of Mark I Drywells,” the applicant also performed ultrasonic testing to show that the nominal thickness was maintained on each drywell.

This existing program has been in place and functioning for the life of the plant.

The inspectors reviewed AMP evaluation documents for ASME Section XI programs, selected past plant inspection data, site procedures, drawings and discussed the program with responsible personnel. The inspectors reviewed Procedure SPP 9.1, " ASME Section XI," and 0-TI-376, "ASME Section XI Containment Inservice Inspection Program Units 1, 2 and 3," which provides administrative Technical Instructions used to implement the ISI provisions of SPP-9.1 related to Class MC components. The inspectors also reviewed surveillance instruction 3-SI-4.6.G, "Inservice Inspection and Risk-Informed Inservice Inspection Program Unit 3," utilized to obtain data through nondestructive examinations required by ASME Section XI.

The inspectors also reviewed Problem Evaluation Report (PER) 971516 which identified several questionable sections of the Unit 2 drywell liner plate. The applicant performed an evaluation of the area and documented the results in CD-Q0303-970088, Revision 4, "Evaluation of the reduction in the thickness of the drywell liner plate due to minor surface corrosion". The results met the minimum plate thickness and were therefore acceptable. The applicant plans to continue to monitor the liner plate as part of ASME Section XI requirements to minimize any aging effects associated with degradation of moisture barriers. The applicant conducts augmented examinations of surfaces that are likely to experience accelerated degradation and aging in accordance with Examination Categories, Table IWE-2500-1, such as the torus waterline region. Unit 1 will complete 100% of the examinations required in Table IWE-2500-1 for the First Inspection Interval as pre-service exams before Unit 1 restarts.

The ASME Section XI, Subsection IWF program is part of the overall ISI programs for BFN. BFN surveillance instructions 1-SI-4.6.G, 2-SI-4.6.G and 3-SI-4.6.G direct the visual examination of ASME Section XI Class 1, 2, and 3 component supports in accordance with the requirements of ASME Section XI, Subsection IWF and Code Case N–491. The Structural Monitoring Program will monitor supports for the drywell, torus and vent system for all units. A one-time inspection of supports submerged in suppression pool water will be performed for chemistry verification.

The inspectors concluded that the ASME Section XI, Subsections IWE/IWF Inservice Inspection Programs were in place, had been implemented, and included the elements identified in the LRA. When implemented as described, there is reasonable assurance that adequate inspections required by ASME will be performed through the period of extended operation.

III. Conclusions

The inspection concluded that LR activities were conducted as described in the License Renewal Application. The inspection also concluded that existing aging management programs are generally functioning well.

The inspectors observed during this inspection that the applicant had not yet begun the implementation process for new and enhanced AMPs and that the AMP procedures have yet to be defined and composed. Also for existing programs, the identification and selection of which particular existing procedures constitute the AMP had yet to be done.

Therefore conclusions could not be reached on the acceptability of most AMPs. The inspectors concluded that NRC will perform another inspection when the applicant has progressed further with AMP implementation.

Exit Meeting Summary

The results of this inspection were discussed on December 17, 2004, with members of the applicant staff in an exit meeting open for public observation at the Browns Ferry Nuclear Site Training Center Auditorium, Room 201, Shaw Road and Nuclear Plant Road, Athens AL 35611. The applicant acknowledged the results presented and presented no dissenting comments. The inspectors asked if any of the applicant materials reviewed were proprietary and were told certain documents were proprietary. Those documents were returned to the applicant and no proprietary information is included in this report.

PARTIAL LIST OF PERSONS CONTACTED

Applicant

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J. Burton, Design Engineering Manager
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E. Fleischauer, Reporter Decatur Daily
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S. Cahill, Branch Chief, DRP, RII
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LIST OF DOCUMENTS REVIEWED

Licensing Documents

Browns Ferry Nuclear Plant License Renewal Application dated December 31, 2003 and related Requests for Additional Information
Browns Ferry Updated Final Safety Analysis Report

License Renewal Documents

B44 040105 075, ASME Section XI Subsections IWB, IWC, and IWD Inservice Inspection Aging Management Program, Rev. 0
B44 040105 070, Boiling Water Reactor Penetrations Aging Management Program, Rev. 0
B44 040105 069, Boiling Water Reactor Stress Corrosion Cracking Aging Management Program, Rev. 0
B44 040105 077, Boiling Water Reactor Vessel Inside Diameter Attachment Welds Aging Management Program, Rev. 0

B44 040105 072, Boiling Water Reactor Feedwater Nozzle Aging Management Program, Rev. 0
B44 040105 068, Boiling Water Reactor Control Rod Drive Return Nozzle Aging Management Program, Rev. 0
B44 040105 076, Reactor Head Closure Studs Aging Management Program, Rev. 0
B44 040105 071, Boiling Water Reactor Vessel Internals Aging Management Program, Rev. 0
B44 040105 073, Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel Aging Management Program, Rev. 0
B44 040105 074, Flow-Accelerated Corrosion Aging Management Program, Rev. 0
B44 040105 059, Reactor Vessel Surveillance Aging Management Program, Rev. 0
B44 040105 065 Compressed Air Monitoring AMP, dated 12/31/03
B44 040105 058 Buried Piping and Tanks Inspection AMP, dated 12/31/03
B44 040105 062 Diesel Starting Air AMP, dated 12/31/03
B44 040105 053 One Time Inspection AMP, dated 12/31/03
B44 040105 061 Fuel Oil Chemistry AMP, dated 12/31/03
B44 040105 063 Above Ground Carbon Steel Tanks AMP, dated 12/31/03
B44 040105 056 Systems Monitoring AMP, dated 12/31/03
B44 040105 057 Selective Leaching of Materials AMP, dated 12/31/03
B44 040105 078 Water Chemistry Control AMP, dated 12/31/03
B44 040105 052 Fire Protection Aging Management Program, Rev. 0
B44 040105 054 Fire Water System Aging Management Program, Rev. 0
B44 040105 080, Bolting Integrity Aging Management Program, Rev. 6
B44 040105 055, Open Cycle Cooling Water System Aging Management Program, Rev. 0
B44 040105 066, Closed Cycle Cooling Water System Aging Management Program, Rev. 2
B44 040105 034, RBCCW System, Rev. 0
B44 040105 043, BFN Units 1, 2, and 3 Fuel Handling and Storage, Rev. 0
B44 040105 051, BFN Units 1, 2, and 3 Cranes, Rev. 0
B44 040105 064, Inspection of Overhead Heavy Load and Light Load Handling Systems Program, Rev. 0
B44 040105 060, BWR Reactor Water Cleanup System Program, Rev. 4
B44 040105 122, 10 CFR Part 50 Appendix J Program, Rev. 3
B44 040105 002, Metal Fatigue of Reactor Coolant Pressure Boundary, Rev. 1
B44040105117, Aging Management Program, Structural Monitoring Program, Rev. 0
B44040105118, Aging Management Program, RG 1.127, Inspection of Water-Control Structures Associated with Nuclear Power Program, Rev. 0
B44040105119, Aging Management Program, Masonry Wall Program, Rev. 0
B44040105120 Aging Management Program, ASME Section XI, Subsection IWE Program, Rev. 0
B44040105121, Aging Management Program, ASME Section XI, Subsection IWF Program, Rev. 0

Existing Procedures and Programs

1-SI-4.6.G, Inservice Inspection Program Unit 1, Rev. 5
2-SI-4.6.G, Inservice Inspection Program Unit 2, Rev. 25
3-SI-4.6.G, Inservice Inspection Program Unit 3, Rev. 17
0-TI-75, Feedwater Nozzle Thermal Sleeve Leak Detection and Monitoring Program, Rev. 6
SSP-9.1, ASME Section XI, Rev. 5

MSI-0-001-VSL001, Reactor Vessel Disassembly and Reassembly, Rev. 75
NEDP-23, BWR Pressure Vessel Internals Inspections (RPVII), Rev. 0
0-TI-365; Reactor Pressure Vessel Internals Inspection (RPVII) Units 1, 2, and 3; Rev. 13
SPP-9.7, Corrosion Control Program, Rev. 8
DS-M4.2.1, Flow-Accelerated Corrosion Program Methods, Rev. 2
DS-C1.2.5, Structural Evaluation of Wall Thinning in Pipe due to Flow-Accelerated Corrosion, Rev. 1
0-TI-381, Reactor Vessel Test Specimens, Rev. 3
0-TI-140, Monitoring Program for Flow-Accelerated Corrosion, Rev. 1
2-OI-3, Reactor Feedwater System, Rev. 107
3-OI-3, Reactor Feedwater System, Rev. 63
CI-13.1, Chemistry Instruction, Chemistry Program, Rev. 21
SPP-5.3, Radiological and Chemistry Control, Rev. 2
NEDP-20, Conduct of engineering Organization, Rev. 4
NEDP-12, System Component Health, Equipment Failure Trending, Rev. 3
0-SR-3.8.3.3, Quarterly Fuel Oil Quality Determination of Diesel Generator 7-Day storage Tank Supply, Rev. 4
0-TI-158, Representative Bottom Sampling of DG 7-Day Tank Fuel Oil, Rev. 14
CI-130, Diesel Fuel Oil & Lube Oil Monitoring Program, Rev. 21
CI-404, Miscellaneous sampling and Chemical Addition Procedures, Rev. 60
0-TI-346, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting - 10 CFR 50.65, Rev. 24
0-TI-412. Station Work Permit, Rev. 11
SPP-9.7, Corrosion Control, rev. 8
MPI-0--82-INS002, Standby Diesel Engine 24 Month Inspection, Rev.28
CI-673, Sediment and Water Determination in Petroleum Products, Rev. 3
CI-800, Bulk Chemical Control Sampling and Preparation, Rev. 25
MPI-0-086-Dry001, Diesel Starting Air Maintenance. Rev. 15
0-TI-34, Monthly Control Air System Dryer Dew Point Test and Purge Control, Rev. 7
0-TI-175, Control Air Sampling, Rev. 9
MAI-5.2, Bolting and Structural Connections, Rev. 15
N-VT-9, Visual Examination of ASME III Bolts, Studs, and Nuts, Rev. 1
N-UT-37, Ultrasonic Examination of Bolts and Studs Greater than 2" Diameter and RPV Flange Ligaments, Rev. 8
N-VT-4, System Pressure Test Visual Examination Procedure, Rev. 19
1-SI-4.6G, Inservice Inspection Program Unit 1, Rev. 4
2,3-SI-4.6G, Inservice Inspection and Risk Informed Inservice Inspection Program Units 2 and 3 Rev.s 22 and 14, respectively
0-TI-389, Raw Water Fouling and Corrosion Control, Rev. 5
0-TI-246, Inspection of Ponds, Dikes, and Channels, Rev. 1
0-TI-154, Coupons and Monitoring for Corrosion and Deposit Control, Rev. 8
CI-13.1, Chemistry Program, revision 21
CI-576, RBCCW System Water Chemistry, Rev. 7
CI-578, Diesel Generator Coolant Inhibitor Logsheet, Rev. 5
CI-580, Control Bay Chiller Water Chemistry, Rev. 0
MCI-0-070-HEX001, Reactor Building Closed Cooling Water Heat Exchanger Maintenance, Rev. 4
CI-628, Nalco-39 Rust Inhibitor, Rev. 5
MPI-0-026-INS003, Inside/outside Loop Bi-annual Diesel Fire Pump Inspection, Rev. 10

MSI-0-000-LFT001, Lifting Instructions for the Control of Heavy Loads, Rev. 32
MSI-0-000-LFT002, Rigging Equipment and Portable Hoist Control, Inspection, and Testing, Rev. 14
MPI-0-111-CRA001, Reactor Building Overhead Crane Inspection, Testing, and Preventive Maintenance, Rev. 20
MPI-0-000-CRA001, Maintenance of Monorail Systems, Underhung Cranes and Overhead Hoist, Rev. 18
NEDP-14, Contain Leak Rate Programs, Rev. 5
0-TI-376, ASME Section XI Containment Inservice Inspection Program Units 1, 2, and 3, Rev. 4
0-TI-360, Containment Leak Rate Programs, Rev. 19
0-TI-19, Reactor Vessel Fatigue Usage Factor Evaluation Monitoring, Recording, Evaluating, and Reporting, Rev. 5
MPI-0-026-INS003: Inside/Outside Loop Bi-Annual Diesel Fire Pump Inspection, Rev. 9 and Rev. 10
MPI-0-026-INS010: Inside/Outside Loop 6-year Diesel Fire Pump Inspection, Rev. 2 and Rev. 8
MPI-0-026-INS002: Perform the Annual Inspection of Diesel Driven Fire Pump Engine, Rev. 12
3-SI-4.11.G.1.a: Visual Inspection of Fire Rated Barriers (Unit 3 Steam Tunnel Floors, Walls, and Ceilings), Rev. 0
0-SI-4.11.G.1.a: Visual Inspection of Fire Rated Barriers (Floors, Walls, and Ceilings), Rev. 15
0-SI-4.11.B.1.F(3): Diesel Driven Fire Pump Capability Test, Rev. 24
2-SI-4.11.G.1.a: Visual Inspection of Fire Rated Barriers (Unit 2 Steam Tunnel Floors, Walls, and Ceilings), Rev. 0
0-Si-4.11.B.2.a: Diesel Driven Fire Pump Operability Test, Rev. 30
0-SI-4.11.G.1.a(1): Visual Inspection of Fire Wraps, Rev. 7
0-SI-4.11.B.1.a: Electric Fire Pump Operability Test, Rev. 15
0-SI-4.11.G.2: Semi-Annual Fire Door Inspection, Rev. 20
0-SI-4.11.G.1.b(6): Visual Inspection of Third Period Appendix R Fire Dampers, Rev. 3
0-SI-4.11.B.1.c: HPFP System Flushes, Rev. 30
0-SI-4.11.B.1.g: HPFP System Flow Test, Rev. 22
0-TI-346, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting-0CFR50.65, Rev. 22
LCEI-CI-C9, Procedure for Walkdown of Structures for Maintenance Rule, Rev. 4
0-TI-246, Inspection of Ponds, Dikes, and Channels, Rev. 1
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3-SI-4.6.G, Inservice Inspection and Risk-Informed Inservice Inspection Program Unit 3

Plant Data and Test Results

Unit 2 Cycle 12, NIS-1, Owner's Report for Inservice Inspection
Unit 3 Cycle 11, NIS-1, Owner's Report for Inservice Inspection
Results of Inservice Inspection of Browns Ferry Nuclear Plant Unit 1 dated 03/18/1976
Unit 1 RPV Closure Stud inspection results for 1983
Unit 2 RPV Closure Stud inspection results for 1993, 1997, and 1999
Unit 3 RPV Closure Stud inspection results for 1997, 2000, 2002, and 2004

Unit 1 Feedwater Nozzle inspection results for 1981
Unit 2 Feedwater Nozzle inspection results for 2003
Unit 3 Feedwater Nozzle inspection results for 2004
Unit 1 CRD piping inspection results for 1980, 1981, 1983, and 1985
Unit 1 CRD mixing tee inspection results for 1980, 1981, 1983, and 1985
Unit 2 CRD mixing tee inspection results for 1999
Unit 3 CRD mixing tee inspection results for 2000
Raw Water Treatment Program, Nalco November 2004 Report (corrosion coupon)
Unit 3 Cycle 11 Containment Leak Rate Program Post Outage Report, June 29, 2004
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2002 Maintenance Rule Structures Inspection Summary, Rev. 0, CDQ0-303-2003-0260
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Audits and Self-Assessments

Audit Report No. SSA 0304, Browns Ferry, Sequoyah, Watts Bar quality Programs Audit, dated 10/17/03
Self-Assessment BFN-CEM-04-001, Chemistry Laboratory Radiation Worker Practices, dated 2/18/04
Self-Assessment BFN-CEM-04-003, Water Chemistry Controls, dated 6/21/04
Self-Assessment BFN-CEM-04-006, Reactor Coolant Sulfate Concentration Increases (focused), dated 7/26/04
BPER 02-43237 (CAP finding), Sulfate Levels

Work Orders

02-007570-000, Disassemble, Inspect, Clean Moisture Traps, Check Valves, Pilot Valve and Solenoid valves on DG 3D Right Bank, dated 10/24/02
02-000676-000, Perform Starting Air Maintenance on DG 1D Right Bank, dated 7/23/02
02-007568-000, Perform Right Bank Starting Air Maintenance on DG 3D, dated 10/23/02
01-005424-000, Intake Structure Inspection
97-003913-000, RHR heat Exchanger 2C

Miscellaneous Documents

GE-NE-523-A71-0594, BWR Owners' Group Licensing Topical Report, Alternate BWR Feedwater Nozzle Inspection Requirements, Rev. 1
ECN L22072, Unit 1 Feedwater Nozzle Modification, dated10/06/1977
ECN P0052, Unit 2 Feedwater Nozzle Modification, dated 04/05/1978
ECN P0116, Unit 3 Feedwater Nozzle Modification, dated 09/05/1979
Drawing 1-47E820-2, Unit 1 Flow Diagram control Rod Drive Hydraulic System, Rev. 2
Drawing 1-47E810-1, Unit 1 Flow Diagram Reactor Water Cleanup System, Rev. 10
Calculation CDQO-303-2003-0260, 2002 MR Structure Inspection, dated 2/10/03
NUREG-0313, Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping, Rev. 2F
BWR Vessel and Internals Project Technical Basis for Revision to Generic Letter 88-01 Inspection Schedules (BWRVIP-75), TR-113932, Final Report, dated October 1999
Calculation BFN-NTB-NDN2-999-2002-0036, Unit 2 Risk-Informed Inservice Inspection Quantified Element Section

GE Nuclear Energy Time Limited Aging Analyses, Reactor Vessel and Internals, BFN 1, 2, and 3 GE-NE-0000-0016-2112-02, dated December 2003
CD-Q0303-970088, Rev. 4, Evaluation of the reduction in the thickness of the drywell liner plate due to minor surface corrosion

Plant Drawings

2-ISI-0272-C, Unit 2 RWCU Weld Identification, Rev. 7

Problem Evaluation Reports

971516, Reduction in thickness of the drywell liner plate due to minor corrosion
73662, EECW Catch Basin Blockage

BROWNS FERRY NUCLEAR PLANT

AGING MANAGEMENT PROGRAMS SELECTED FOR INSPECTION

Section - Title	New or Existing	Consistent with GALL?
B.2.1.1 - Accessible Non-Environmental Qualification Cables and Connections Inspection Program	New	Yes
B.2.1.2 - Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program	Existing	No
B.2.1.3 - Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Program	New	Yes
B.2.1.40 - Bus Inspection Program	New	N/A
B.3.1 - Environmental Qualification Program	Existing	Yes
B.2.1.23 - Fire Protection Program	Existing	No
B.2.1.24 - Fire Water System Program	Existing	No
B.2.1.4 - ASME Section XI Subsections IWB, IWC, and IWD Inservice Inspection Program	Existing	Yes
B.2.1.6 - Reactor Head Closure Studs Program	Existing	Yes
B.2.1.7 - Boiling Water Reactor Vessel Inside Diameter Attachment Welds Program	Existing	Yes
B.2.1.8 - Boiling Water Reactor Feedwater Nozzle Program	Existing	Yes
B.2.1.9 - Boiling Water Reactor Control Rod Drive Return Line Nozzle Program	Existing	Yes
B.2.1.10 - Boiling Water Reactor Stress Corrosion Cracking Program	Existing	Yes
B.2.1.11 - Boiling Water Reactor Penetrations Program	Existing	Yes
B.2.1.12 - Boiling Water Reactor Vessel Internals Program	Existing	Yes

B.2.1.14 - Thermal Aging and Neutron Irradiation Embrittlement of Cast Austenitic Stainless Steel Program	Existing	Yes
B.2.1.15 - Flow-Accelerated Corrosion Program	Existing	Yes
B.2.1.28 - Reactor Vessel Surveillance Program	Existing	Yes
B.2.1.16 - Bolting Integrity Program	Existing	No
B.2.1.17 - Open-Cycle Cooling Water Program	Existing	Yes
B.2.1.18 - Closed-Cycle Cooling Water System Program	Existing	Yes
B.2.1.20 - Inspection of Overhead Heavy Load and Light Load Handling Systems Program	Existing	No
B.2.1.22 - BWR Reactor Water Cleanup System Program	Existing	Yes
B.2.1.34 - 10 CFR 50 Appendix J Program	Existing	Yes
B.3.2 - Fatigue Monitoring Program	Existing	Yes
B.2.1.5 - Chemistry Control Program	Existing	No
B.2.1.21 - Compressed Air Monitoring Program	Existing	Yes
B.2.1.26 - Above ground Carbon Steel Tanks Program	Existing	Yes
B.2.1.27 - Fuel Oil Chemistry Program	Existing	No
B.2.1.29 - One-Time Inspection Program	New	Yes
B.2.1.30 - Selective Leaching of Materials Program	New	Yes
B.2.1.31 - Buried Piping and Tanks Inspection Program	Existing	Yes
B.2.1.39 - Systems Monitoring Program	Existing	N/A
B.2.1.41 - Diesel Starting Air Program	Existing	N/A
B.2.1.32 - ASME Section XI Subsection IWE Program	Existing	No
B.2.1.33 - ASME Section XI Subsection IWF Program	Existing	No
B.2.1.35 - Masonry Wall Program	Existing	Yes

B.2.1.36 - Structures Monitoring Program	Existing	Yes
B.2.1.37 - Inspection of Water-Control Structures Program	Existing	Yes

LIST OF ACRONYMS USED

AMP	Aging Management Program
BFNP	Browns Ferry Nuclear Plant
BWR	Boiling Water Reactor
CAP	Corrective Action Program
CRD	Control Rod Drive System
ECCS	Emergency Core Cooling Systems
EDG	Emergency Diesel Generator
EDMS	Electronic Data Management System
EECW	Emergency Equipment Cooling Water System
EQ	Environmental Qualification Program
FAC	Flow Assisted Corrosion
FP	Fire Protection
GALL	Generic Aging Lessons Learned
GL	Generic Letter
ISI	Inservice Inspection
LR	License Renewal
LRA	License Renewal Application
NDE	Non Destructive Examination
NRR	NRC Office of Nuclear Reactor Regulation
PER	Problem Evaluation Report
RAI	Request for Additional Information
RCS	Reactor Coolant System
RG	Regulatory Guide
RHR	Residual Heat Removal System
RHRSW	Residual Heat Removal Service Water System
RV	Reactor Vessel
RWMS	Reactor Water Makeup System
RWST	Refueling Water Storage Tank
SBO	Station Blackout Event
SFP	Spent Fuel Pool
SI	Surveillance Instruction
SR	Safety Related
SSC	Systems, Structures, and Components
TI	Technical Instruction
TLAA	Time Limited Aging Analysis
UFSAR	Updated Final Safety Analysis Report