830 Power Building
TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

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Mr. Norman C. Moseley, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region II - Suite 818
230 Peachtree Street, NW.
Atlanta, Georgia 30303

Dear Mr. Moseley:

This is in response to F. J. Long's October 13, 1976, letter, IE:II:RFS 50-259/76-18, 50-260/76-18, 50-296/76-16, which transmitted for our review an IE Inspection Report (same number). We have reviewed that report and do not consider any part of it to be proprietary.

Very truly yours,

J. E. Gilleland

J. E. Gilleland
Assistant Manager of Power

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
230 PEACHTREE STREET, N.W. SUITE 818
ATLANTA, GEORGIA 30303

OCT 13 1976

In Reply Refer To:
IE:II:RFS
50-259/76-18
50-260/76-18
50-296/76-16

Tennessee Valley Authority
Attn: Mr. Godwin Williams, Jr.
Manager of Power
830 Power Building
Chattanooga, Tennessee 37401

Gentlemen:

This refers to the inspection conducted by Messrs. Hufham, Economos and Sullivan of this office on August 5-6, 9-10, 12-13, 20 and 24-27, 1976, of activities authorized by NRC Operating License Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Units 1, 2 and 3, and to the discussion of our findings held with Mr. Green at the conclusion of the inspection.

Areas examined during the inspection and our findings are discussed in the enclosed report. Within these areas, the inspection consisted of selective examination of procedures and representative records, interviews with personnel, and observations by the inspector.

During the inspection, it was found that certain activities under your license appear to be in noncompliance with NRC requirements. These items and references to pertinent requirements are listed in Section I of the summary of the enclosed report. Corrective actions to prevent recurrence were completed prior to the conclusion of this inspection; therefore, a reply to these items of noncompliance is not requested.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you believe to be proprietary, it is necessary that you submit a written application to this office requesting that such information be withheld from public disclosure. If no proprietary information is identified, a written statement to that effect should be submitted. If an application is

submitted, it must fully identify the bases for which information is claimed to be proprietary. The application should be prepared so that information sought to be withheld is incorporated in a separate paper and referenced in the application since the application will be placed in the Public Document Room. Your application, or written statement, should be submitted to us within 20 days. If we are not contacted as specified, the enclosed report and this letter may then be placed in the Public Document Room.

Should you have any questions concerning this letter, we will be glad to discuss them with you.

Very truly yours,

for Norman C. Moseley

F. J. Long, Chief
Reactor Operations and Nuclear
Support Branch

Enclosure:
IE Inspection Report Nos.
50-259/76-18, 50-260/76-18
and 50-296/76-16

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
230 PEACHTREE STREET, N.W. SUITE 818
ATLANTA, GEORGIA 30303

IE Inspection Report Nos. 50-259/76-18, 50-260/76-18 and 50-296/76-16

Licensee: Tennessee Valley Authority
818 Power Building
Chattanooga, Tennessee 37401

Facility Name: Browns Ferry 1, 2 and 3
Docket Nos.: 50-259, 50-260 and 50-296
License Nos.: DPR-33, DPR-52 and DPR-68

Location: Limestone County, Alabama

Type of License: 3923 Mwt, BWR (GE)

Type of Inspection: Routine, Unannounced

Dates of Inspection: August 5-6, 9-10, 12-13, 20, 24-27, 1976

Dates of Previous Inspection: July 7-9 and 20-21, 1976

Principal Inspector: R. F. Sullivan, Reactor Inspector
(August 24-27, 1976)

Inspectors-in-Charge: J. W. Hufham, Radiation Specialist
(August 5-6, 9-10, 12-13, 1976)

N. Economos, Reactor Inspector
(August 20, 1976)

Accompanying Inspectors: D. J. Burke, Reactor Inspector
(August 24-27; 1976)

H. C. Dance, Chief
(August 9, 1976)

Principal Inspector: RF Sullivan 10/6/76
R. F. Sullivan, Reactor Inspector — Date
Reactor Projects Section No. 1
Reactor Operations and Nuclear Support Branch

Reviewed by: HC Dance 10/7/76
H. C. Dance, Chief — Date
Reactor Projects Section No. 1
Reactor Operations and Nuclear Support Branch

SUMMARY OF FINDINGS

I. Enforcement Items

Infraction

Contrary to Technical Specification 3.5.B.1, the Residual Heat Removal System (RHRS) was not demonstrated to be operable prior to the Unit 2 reactor startup from a cold condition on August 27, 1976, in that the RHRS motor operated valve operability test, SI 4.5.B.1.c, was not performed. (Details IV, paragraph 2)

II. Licensee Action on Previously Identified Enforcement Matters

None

III. New Unresolved Items

None

IV. Status of Previously Reported Unresolved Items

Not inspected.

V. Unusual Occurrences

None

VI. Other Significant Findings

None

VII. Management Interview

A. Browns Ferry Site

The results of the inspection were discussed in separate meetings with Mr. Green and selected members of his staff on August 9, 10, 13 and 26, 1976.

B. TVA Chattanooga Office - DPP

The results of the inspection visit (Details II) at the Chattanooga office were discussed with Messrs. Daniel and McLaughlin on August 20, 1976.

IE Rpt. Nos. 50-259/76-18,
50-260/76-18 and 50-296/76-16

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DETAILS I

Prepared by: J. W. Hufham 9/20/76
J. W. Hufham, Radiation Specialist Date
Environmental and Special Projects
Section
Fuel Facility and Materials Safety Branch

Dates of Inspection: August 5-6, 9-10, 12-13, 1976

Reviewed by: R. L. Bangart 9/21/76
R. L. Bangart, Chief Date
Environmental and Special Projects
Section
Fuel Facility and Materials Safety Branch

1. Scope of Inspection

A special inspection to determine the completion status of the requirements in the Browns Ferry Nuclear Plant (BFNP) - Safety Evaluation Report (NUREG-0061) - Supplement Number 2.

2. Individuals Contacted

a. Tennessee Valley Authority (BFNP)

H. J. Green - Plant Superintendent
J. G. Dewease - Assistant Plant Superintendent
W. A. Roberts - Power Plant Maintenance Supervisor
J. D. Glover - Shift Engineer (Assigned to Operator Training)
J. R. Pittman - Instrument Engineer
J. P. Bryant - Safety Engineer
J. W. Morgan - Safety Engineer
J. Studdard - Operations Supervisor
R. Hunkapillar - Assistant Operations Supervisor

b. Division of Engineering Services

J. L. Currie - Supervisor, Safety Engineering Services
R. A. Westbrook - Safety Engineer

3. Status of Licensee Requirements In the BFNP Safety Evaluation Report - Supplement Number 2

a. Plant Procedures

(1) Preplanned Fire Control Strategies

Section 2.1.A of the SER - Supplement No. 2 required that preplanned fire control strategies be prepared that would include the following subjects:

(a) Identification of combustibles in each plant zone

(b) Fire extinguishants best suited for controlling fires in each zone

(c) Most favorable direction from which to attack a fire

(d) Location of local and remote controls for the management of fire systems

(e) Designation of initial heat sensitive system components that should be kept cool while fighting a local fire

(f) Organization of the fire brigade and the assignment of special duties

(g) Management of radiological hazards in fire zones with particular reference to fires in charcoal filters

(h) Ventilation system operation that assures desired plant distribution when the ventilation flow is modified

(i) Operations requiring control room and shift engineer coordination or authorization

(j) Instructions for general plant personnel

(k) Plans for operating with the offsite fire department

This section of the SER - Supplement No. 2 also required that the pre-planned strategies be tested by appropriate full scale drills to check the logic of the strategies.

To verify the pre-fire strategies, the inspector met with two representatives (fire safety engineers) of the licensee

who were responsible for developing the strategies. The inspector was informed that twelve strategies had been approved by the plant management. He was also informed that seven additional strategies had been written but not approved at the time of the inspection. The inspector did confirm that four of the seven non-approved fire strategies referenced the charcoal absorber vessels in the off-gas treatment building, the charcoal filters in the standby gas treatment building, and the charcoal filters in the control room emergency ventilation systems. The SER-Supplement No. 2 specifically required pre-fire strategies for fires in systems containing charcoal filters.

To verify that the strategies satisfied the requirements of the supplement, the inspector thoroughly reviewed the following two strategies with the fire safety engineers:

(a) Spreading Room Control Building - Units 1 and 2

(b) Standby Diesel Generator Building - Units 1 and 2

The inspector also reviewed the strategies for the following areas:

(a) Standby Diesel Generator Building - Unit 3

(b) 1A and 1B Recirculation Motor Generator Sets

(c) 2A and 2B Recirculation Motor Generator Sets

(d) 3A and 3B Recirculation Motor Generator Sets

(e) Pumping Station and Water Treatment Building - Units 1, 2 and 3

(f) HPCI Equipment room - Unit 1

(g) HPCI Equipment Room - Unit 2

(h) HPCI Equipment Room - Unit 3

(i) Pumping Station and Water Treatment Electrical Cable Tunnel

(j) Spreading Room Control Building - Unit 3

The following strategies were written at the time of this inspection but not approved:

(a) Off Gas Treatment Building - Charcoal Absorber Vessels

(b) Standby Gas Treatment Building - Charcoal Filters in the A, B, and C Trains

(c) Reactor Building Unit 1 - Primary Containment Purge System

(d) Reactor Building Unit 2 - Primary Containment Purge System

(e) Reactor Building Unit 3 - Primary Containment System

(f) Control Building Emergency Pressurization (Ventilation) System - Charcoal Filters (Train A)

(g) Control Building Emergency Pressurization (Ventilation) System - Charcoal Filters (Train B)

In the discussion with the Plant Superintendent, the inspector was informed that the strategies would be attached to the BFNP -"Fire, Explosion, and Natural Disaster Plan." After reviewing the strategies as well as the "Fire, Explosion and Natural Disaster Plan," the strategies appeared to adequately cover the areas required in the supplement. The inspector was informed that the strategies would be used as guides for drills to be conducted within the next 18-month period. This appeared to satisfy the requirement at this time.

(2) Housekeeping Procedures for Reduced Fire Risk

Section 2.1.B of the SER - Supplement No. 2 required that good housekeeping procedures be developed for reducing fire risks. The following procedures were required to be developed.

(a) Procedures for Proper Fire Proof Containers of Combustibles, Container Location, and Periodic Disposal

The inspector was informed by the Plant Superintendent that this coverage was provided in the Standard Practice BFS-35, "Solid Waste Control Program." By

reviewing the procedure the inspector confirmed that the procedure did include guidance for fire proof containers, periodic disposal, and designated locations for the containers. The procedure appeared to adequately satisfy the requirements.

(b) Procedures To Ensure That The Combustible Load Limits In Various Plant Zones Are Not Exceeded By The Temporary or Permanent Additions of Combustibles

The inspector was informed by the Plant Superintendent that this coverage was included in the Standard Practice BFS-3, Attachment B, "Procedure For Control of Transient Fire Loads at Nuclear Plants." The inspector reviewed the procedure and discussed it with the safety engineer who was responsible for calculating the transient fire loads. By reviewing the procedure, the inspector verified that the requirement was adequately satisfied.

(c) Procedures for Augmenting the Fire Protection of a Given Zone Whose Combustible Loads May Temporarily Exceed the Allowable Maximum

The inspector again reviewed Standard Practice - BFS-3, Attachment B, "Procedure for Control of Transient Fire Loads at Nuclear Plants," and verified that the procedure appeared to satisfactorily complete the requirement.

(d) Procedures for the Obstruction of Accessways to Fires and Fire Protection Equipment as Defined by the Preplanned Fire Strategies

The inspector discussed this procedure with the Plant Superintendent and was informed that Standard Practice BFA-62, "Authorization and Work Performance," provided this coverage for all preplanned fire strategies. By reviewing this procedure the inspector verified that the Operation's Supervisor was assigned the responsibility of assuring that unusual fire hazards and obstructions were brought to the attention of the shift engineer and the assistant shift engineer. The procedure appeared to adequately satisfy the requirement.

(e) Procedures for Regularly Scheduled Drain Sump Cleaning

To verify that this procedure had been developed, the inspector discussed the requirement with the Plant Superintendent who informed the inspector that Maintenance Procedure MMI-74, "Inspection and Cleaning of Floor Drains and Sumps" had been written to provide this coverage. The inspector reviewed the procedure and confirmed that the procedure specified the frequency and method for inspecting and cleaning the floor drains and sumps in the following locations:

(1) Diesel Generator Building

(2) Reactor Building

(3) Turbine Building

(4) Intake Plant

The procedures appeared to adequately satisfy the requirement.

(f) Procedures to Survey and Determine Whether Any Combination of Stored Materials Raise a Fire Risk

The inspector discussed this requirement thoroughly with the Plant Superintendent. The Plant Superintendent informed the inspector that Standard Practice BFS-36, "Storage of Materials In Safety Related Plant Areas," had been established. The inspector reviewed the procedure and verified that the procedure required that only specified materials could be stored in safety related areas of the plant. The storage of only the materials designated by this procedure would reduce the possibility of a fire originating from materials stored in these areas as well as any incompatibility of these materials. The materials authorized for storage by the procedure would not be subject to spontaneous combustion and present no particular hazard due to reactions which might arise from broken containers. The inspector also verified that the procedure required that materials brought into safety-related areas but not stored be removed at the end of each

shift. The responsibility for routine inspections of the stored materials was delegated in the procedure to the safety engineer through daily plant fire inspections and any violation of the procedure reported to the Plant Superintendent. After reviewing the BFS-36 and discussing it with the Plant Superintendent, the requirement appeared to be satisfactorily completed.

(3) Permits for Work Which Raise A Fire Risk

(a) Section 2.1.C of the SER-Supplement No. 2 required that procedures be established for screening all work requests to assess the fire risks and the adverse affects. During an earlier inspection, the inspector discussed and reviewed Standard Practice BFM-8, "Cutting Welding, and Open Flame Work Permit." The inspector confirmed that work permits designated the following requirements that were defined in the supplement:

(a) Designates the work location and time for the permit

(b) The requirement for a fire watch and concurrence by an SRO or Quality Control Inspector if a fire watch was not necessary.

(c) All necessary fire fighting equipment.

After reviewing the latest revision to the work permit procedure, the SER requirement appeared to be adequately satisfied.

(b) Section 2.1.C of the SER-Supplement No. 2 required that work permits contain clean-up requirements before and after work is completed. The inspector discussed this requirement with the Plant Superintendent who informed the inspector that the work permit and the associated procedure, BFM-8, did require clean-up activities before beginning work as well as some requirements after the work was completed. In addition to the requirements of the permit, the inspector was informed that Standard Practice BFA-2,

"Preparation and Use of Plant Instructions," specifically called for any unusual clean-up requirement needed before and after work. After reviewing both procedures, the requirement appeared to be adequately satisfied.

b. Fire Brigade Training

Section 2.2.1 of the SER-Supplement No. 2 required that Fire Brigade Training be provided in the following fire related areas:

(1) Fire Extinguishment of Deep-Seated Fires in Solid Combustibles

The inspector discussed this requirement with the Plant Superintendent and a representative of the Division of Engineering Services. The representative informed the inspector that the training of the fire brigade for fire extinguishment of deep-seated fires in solid combustibles had been added to the Fire Brigade Instructor's Guide which would be used for fire brigade training. The inspector reviewed a copy of the guide and confirmed that the training had been included in Part I (Lesson Plan III), Part II (Lesson Plan I), and Part III (Lesson Plan VIII). This additional training into the fire brigade training program appeared to satisfy the requirement.

(2) Proper Use of Water Plus Foaming Additives

The inspector discussed this requirement with the representative from the Division of Engineering Design and confirmed that this training had been included in the Fire Brigade Instructor's Guide in the following sections:

(a) Part I (Lesson Plan IV)

(b) Part II (Lesson Plan III)

(c) Part III (Lesson Plan V)

After discussing the training with the representative and reviewing the information in the guide, the requirement appeared to be satisfactorily completed.

(3) Fire Extinguishment Drills Under Conditions Appropriate to the Plant

The inspector discussed this requirement with the representative from the Division of Engineering Design and confirmed that this training was included in the Fire Brigade Instructor's Guide in the following sections:

(a) Part I (Lesson VIII)

(b) Part II (Lesson III)

(c) Part III (Lesson IX)

After discussing the training with the representative and reviewing the information in the guide, the requirement appeared to be satisfactorily completed.

(4) Familiarity With Preplanned Fire Plans

The inspector discussed this training with the representative from the Division of Engineering Services. The representative confirmed that this training had been added to the Fire Brigade Instructor's Guide in the following sections:

(a) Part I (Lesson Plan I)

(b) Part II (Lesson Plan I)

(c) Part III (Lesson Plan III)

After discussing the training with the representative and reviewing the information in the guide, the requirement appeared to be satisfactorily completed.

(5) Special Awareness Training for Unit Operators and Auxiliary Unit Operators

This training requirement defined the following training areas:

(a) Detailed study of purpose, construction, and operation of all plant systems in the zones that they supervise.

The inspector discussed this requirement with the Plant Superintendent, the Superintendent of Operations, and the Assistant Superintendent of Operations. In these discussions the inspector was informed that a specific training program had not been developed especially for these individuals because this training was inherent in the Student Generating Plant Operators' Training Program. To confirm that a detail study of the purpose, construction, and operations was included in this program, the inspector reviewed Standard Practice BFA-75, "Training For Nuclear Plant Operators." The inspector reviewed the procedure with special attention to Attachment 1. After the discussions and procedure review of the established Student Generating Plant Operators' Training Program, the requirement appeared to be satisfactorily completed.

(b) This section also required that training be established for Unit Operators and Auxiliary Operators to perform the following functions:

1 Malfunctions that may occur that might raise a fire risk

2 Methods of recognizing a developing malfunction

3 Site marking for periodic inspection for developing malfunctions

4 Actions to be taken if dangerous conditions develop

The inspector discussed this requirement with the Plant Superintendent, the Superintendent of Operations, and Assistant Superintendent of Operations. In these discussions the inspector was informed that no specific training course had been established especially for the Unit Operators and Auxiliary Operators because it was included in their daily work requirements, operator training programs, and plant procedures.

To verify the daily activities and procedures relating to this requirement, the inspector reviewed Standard

Practice BFO-5, "Monitoring of Plant Equipment." In reviewing this procedure, the inspector verified that the procedures required the following:

1 Unit operators will continuously monitor the status of plant systems and equipment by means of annunciators, indicating lights, indicators, etc.

2 Assistant Unit Operators will inspect equipment and spaces at least once each shift and assistant shift engineers, shift engineers, and other knowledgeable supervisory personnel will make frequent unscheduled inspections throughout the plant.

3 The shift engineer's and assistant shift engineer's daily journal contain's entries of all significant occurrences coming to his attention within and without the plant confines.

The inspector was informed that the objective of these efforts addressed in the procedure was to provide reasonable assurance that unauthorized physical changes in the status of components of equipment do not go undetected for long periods.

In addition to reviewing the Standard Practice (BFO-5), the inspector discussed and reviewed the logs that were maintained by Auxiliary Unit Operators in the turbine building, reactor building, and the radwaste building. By reviewing the logs, the inspector verified the surveillance of the plant systems by Auxiliary Unit Operators on each shift.

To continue the verification, the inspector reviewed the lengthy Surveillance Instruction 2 for Unit 1, 2, and 3 that defines all of the instrument checks and observations that are required on each shift.

This section of the SER-Supplement No. 2 also required temporary effective barriers for protecting safety related equipment as well as the use of welding permits. The inspector verified that welding permits had been established and used in accordance with

Standard Practice BFM-8 Protective barriers around safety-related equipment would be designated in the work authorizations in accordance with Standard Practice BFA-62, "Instruction For Work Performance," and in plant instructions as required by Standard Practice BFA-2, "Preparation and Use of Plant Instructions." The use of the welding permits and the use of the BFA-62 and BFA-2 appeared to satisfy the requirement.

(6) Fire Watch Training

Section 2.2.2 of the SER-Supplement No. 2 required that a training program be developed to include the fire watchmen.

The inspector discussed this requirement with the representative from the Division of Engineering Design and confirmed that the training was included in Part V of the Fire Brigade Instructor's Guide. The inspector reviewed the training program and it appeared to satisfy the supplement requirement.

(7) Fire Detection System Technology

a. Section 2.2.3 of the SER-Supplement No. 2 required that individuals who are responsible for installing, testing and servicing fire detectors should be instructed in:

(a) Principle of operation of fire detection system

(b) Construction of fire detection system

(c) Most advantageous placement of detectors

(d) Detector range of sensitivity

(e) Maintenance and repair

(f) Testing methods

The inspector thoroughly discussed this training with the Plant Superintendent and representatives from the Division of Engineering Services. The inspector was informed that two different groups of individuals actually performed the functions listed in this section of the SER-Supplement. The inspector was informed that the electricians at the

plant were responsible for the maintenance, repair, and testing of the detectors, and the engineers with the Division of Engineering Services in Chattanooga, Tennessee were responsible for the following:

(a) Principle of operation

(b) Construction of fire detection systems

(c) Placement of detectors

(d) Detector range

The inspector was informed that the electricians at the plant by virture of their classification as electricians received training in the electrician apprentice training and were qualified to perform the maintenance and repair of the detectors. The inspector questioned the electrician apprentice training and was presented a copy of the training outline. The inspector reviewed the program and verified that the members of the electrical union who would install the detector would have completed this training that extended over a period of four years and provided extensive training in electrical maintenance and installation.

In addition to the apprentice training, these individuals would also test the detectors using the surveillance instruction that was prepared by electrical engineers. The inspector confirmed the surveillance instruction by reviewing SI-4.11.C.1 and 4.11.C.5, "Fire Protection System Testing of Smoke and Heat Detectors Unit 1, 2 and 3." In reviewing the instruction, the inspector confirmed that the heat and smoke detector would be functionally tested for operability on a semi-annual basis and functionally tested for sensitivity at intervals of once per year. After thoroughly reviewing the electrical training and the surveillance instruction, the requirement for Sections e and f of the Fire Detection System Technology Program appeared to be satisfied.

b. To confirm that the remaining sections of the requirement would be performed by the Division of Engineering Design, the inspector reviewed correspondence dated August 12, 1976, that explained that the Fire Protection Engineering Section of TVA would be responsible for Sections a, b, c and d of this requirement. The inspector was informed

that this division had the responsibility for this work and by virtue of the advanced training of the individuals within the section had been instructed in items (a) through (d).

The training of both groups of individuals appeared to adequately complete the requirement.

c. Fire Brigade Members Manual

Section 2.2.1.4 of the SER-Supplement No. 2 required that fire manuals should be prepared for fire brigade member's study. A presentation of the manual was given to the inspector and the Plant Superintendent by a fire safety engineer. The manual appeared to be very thorough in covering the following reference areas:

(1) General Fire Information

(2) Respiratory Protection

(3) Fixed Fire Suppression Systems

(4) Portable Fire Suppression Systems

(5) Technical Data

After reviewing the manual and discussing it with the fire safety engineer and the Plant Superintendent, the manual appeared to satisfy the SER requirement.

d. Professional Fireman

Section 2.2.4 of the SER-Supplement No. 2 required that a professional fireman with extensive experience in industrial fire protection be made available and assigned fire protection related duties. The inspector discussed this requirement with the Plant Superintendent who informed the inspector that a position for a safety engineer had been created at the plant and was included in the In-Plant Fire Program Organization in the Technical Specifications (Figure 6.3-1). The Plant Superintendent informed the inspector that the position was presently being filled by a safety engineer on loan from the TVA - Division of Safety Engineering Services. He continued to explain to the inspector that the temporary fire safety engineers had experience in industrial fire protection and the permanent fire safety

engineer would have fire safety experience. He continued to explain that the duties of the Safety Engineer (fire) would be in accordance with the Technical Specifications and include the following responsibilities:

(1) Provide consultation to plant management on all fire safety matters

(2) Coordinate and evaluate testing, maintenance, and repair of all fire related equipment

(3) Conduct periodic safety and fire inspections

(4) Conduct fire training and evaluate fire drills

(5) Provide on-the-scene advice to fire brigade leaders during fire emergencies

(6) Interpret and evaluate requirements for control of transient fire loads

(7) Review pre-fire plans

(8) Participate in establishing material aid agreements

(9) Provide surveillance of open-flame permits

After discussing the safety engineering position with the Plant Superintendent, and reviewing the requirements in the Technical Specification, the SER requirement appeared to be adequately completed.

IE Rpt. Nos. 50-259/76-18, 50-260/76-18
and 50-296/76-16

DETAILS II Prepared by: N. Economos 9/21/76
N. Economos, Metallurgical Engineer Date
Engineering Support Section No. 2
Reactor Construction and Engineering
Support Branch

Dates of Inspection: August 17-19, 1976

Reviewed by: A. R. Herdt 9/22/76
A. R. Herdt, Chief Date
Engineering Support Section No. 2
Reactor Construction and Engineering
Support Branch

All information in Details II applies to Units 1 and 2 as indicated.

1. Persons Contacted

Tennessee Valley Authority (TVA)

R. H. Daniel - NDE Engineer (DPP)
C. A. McLaughlin - Nuclear Engineer (DPP)

2. Review of Inservice Inspection Records - Unit 1

The first years inservice inspection (ISI) work for Browns Ferry Nuclear Plant Unit 1 as described in Section 4.6.G of the Browns Ferry Technical Specification was performed during September 30 and December 1-3, 1975.

A summary of the work performed and results thereof were submitted to IE:II on April 9, 1976 for review. Results of this review were reported in IE:II Report No. 50-296/76-7.

Nuclear Services Corporation (NSC), under contract to TVA, performed the majority of this inspection work. This included ultrasonic examination of designated welds in the reactor pressure vessel (RPV) and in the pressure boundary piping system. TVA's input included visual and/or ultrasonic reactor closure head studs, nuts, washers, bushings and the clad patch in the RPV. Section XI, of the ASME Boiler and Pressure vessel Code, 1971 Edition through the summer addenda of the same year was used to established minimum code requirements.

Within this area the inspector reviewed the records of the ISI test data for compliance with code requirements and TVA's Technical

Specification commitments. Other records which were reviewed at this time included, personnel qualifications, instrument calibration and/or certifications and, TVA's audits performed while the ISI was in progress. The review disclosed that two reportable indications, 100% to 200% DAC, were observed; one in the nozzle-to-vessel weld of nozzle member N2E and the other in saddle weld No. KMS-1-53 in the main steam system. Both indications were evaluated as geometrical in nature. No corrective action is anticipated for these two welds at this time.

In addition to the welds earmarked for examination during this ISI, TVA also examined certain other welds for monitoring purposes to protect against damage caused by pipe whip; these welds were as follows:

Main Steam - GMS-1-32
Feedwater - KFW-1-39
High Pressure Core Injection - THPCI-1-154
Reactor Water Cleanup - DSRWC-1-4

Within these areas there were no noncompliances.

3. Recirculation Bypass Lines (Unit 2)

During this ISI, Nuclear Services Corporation ultrasonically examined the welds on the caps used to seal the 4-inch bypass lines. These lines were removed and capped because of the cracking which occurred in similar SS pipes in other BWR plants. To perform the UT examination, the aforemention contractor used the same procedure and code requirements as in Unit 1. In all, twenty-eight welds were examined; no reportable indications were observed and/or recorded. The inspector audited the data package against procedural and code requirements and there were no apparent noncompliances.

4. Augmented Inservice Inspection Program - Units 1 and 2

The inspector and TVA's Level III examiner discussed certain phases of the augmented inservice inspection program for Browns Ferry Units 1 and 2. TVA's representative stated that certain parts of the Technical Specification will be revised to comply, where practical, with the ASME Code, Section XI, 1975 edition. The method used to examine the vessel to flange weld was discussed in detail and the inspector stated that subsequent ISIs should include provisions for a shear wave examination of this weld in addition to the straight beam used in the past. This matter will be reviewed on a routine basis in future inspections. No items of noncompliance were identified.

DETAILS III Prepared by: R J Sullivan 10/2/76
R. F. Sullivan, Reactor Inspector Date
Reactor Projects Section No. 1
Reactor Operations and Nuclear
Support Branch

Dates of Inspection: August 24-27, 1976

Reviewed by: H C Dance 10/7/76
H. C. Dance, Chief Date
Reactor Projects Section No. 1
Reactor Operations and Nuclear
Support Branch

1. Persons Contacted

H. J. Green - Plant Superintendent
J. G. Dewease - Assistant Plant Superintendent
J. B. Studdard - Operations Supervisor
R. Hunkapiller - Assistant Operations Supervisor
T. P. Bragg - QA Staff Supervisor
W. A. Roberts - Maintenance Supervisor
D. Thompson - Electrical Engineer
R. G. Metke - Plant Results Supervisor

2. Reportable Occurrence Review

A total of 10 licensee Reportable Occurrence reports were reviewed to verify conformance to Technical Specification requirements on reporting. The review included timeliness, completeness, corrective action including steps taken to prevent recurrence and the internal review and approval actions. Information was obtained from discussions with members of the plant staff and examination of records including the PORC minutes of the meetings where the subject occurrences were discussed.

The following specific reports were reviewed.

a. BFAO-50-260/76-3

Reed relay failures were discovered during testing which would permit the sequential withdrawal of two adjacent control rods and, in one case, the simultaneous withdrawal of two control rods. Modifications to the Reactor Manual Control System and the Rod Block Monitor have been made in Units 2 and 3 and were in progress on Unit 1 to correct the problem.

b. BFRO-50-260/76-7

While the reactor was in cold shutdown water leaked past the control rod accumulator pistons on 3 hydraulic units. The accumulators were taken out-of-service to replace O-ring seals which was not authorized by the Interim Technical Specifications. This noncompliance was identified by the licensee who requested and subsequently received a Technical Specification change which permitted an accumulator to be removed from service for repair.

c. BFRO-50-260/76-8

The power supply to SRM channels A and C was interrupted for several hours when a connector was broken off battery 2A during routine cleaning. The reactor was in cold shutdown. This resulted in noncompliance with the Interim Technical Specifications which was identified by the licensee.

d. BFRO-50-260/76-9

Dust accumulation caused a smoke detector to alarm. The detector was cleaned.

e. BFRO-50-259/76-10

Workmen damaged a cable tray heat detector in the reactor room. The detector was replaced.

f. BFRO-50-259/76-11

A broken thermocouple wire led to the temporary loss of torus temperature indication in the control room on instrument TI-64-55A which was in noncompliance with Interim Technical Specifications as identified by the licensee. Other torus temperature indication was available. The reactor was in cold shutdown.

g. BFRO-50-259/76-12

A stuck level switch prevented the automatic start on a raw service water pump and required the starting of a fire pump to satisfy a Technical Specification requirement. The switch was repaired.

h. BFRO-50-296/76-1

During initial fuel loading of Unit 3 a blade guide handle broke while the guide was being removed from the core and the guide fell back into its original position in the core. Examination including in-core underwater TV viewing revealed no damage except to the blade guide handle. The handle broke when a hung-up telescoping section of the fuel handling boom suddenly released. The boom was replaced.

i. BFRO-50-296/76-2

During a routine surveillance check of control rod accumulators the operator noted low pressure on a number of accumulators. This resulted in noncompliance with the Technical Specification which requires that control rods with inoperable accumulators be disarmed electrically. The licensee identified this noncompliance item. The reactor was in cold shutdown prior to initial critical. The control rod drive pump had been removed from service 4 days earlier to permit personnel to install strain gauge instrumentation on certain fuel channels in the vessel.

j. BFRO-50-296/76-3

Eight alarms were received from smoke detectors in the spreading room due to increased sensitivity from dust. The cause was attributed to the Flamemastic spraying in the spreading room. The detectors were cleaned and returned to service.

The information provided in several of the reports lack sufficient detail to adequately evaluate the licensee's action relative to the occurrence but supplemental information needed to complete the evaluation was available at the site. Plant management informed the inspector that future occurrence reports to NRC would include supplemental information where needed.

A review was made of the internal reporting requirements and assignments of responsibilities for reporting. There were no unresolved questions resulting from the review of the administration of the occurrence reporting program. Policy, practices and responsibility assignments reviewed are covered in the following Browns Ferry documents:

a. BFA5 Plant Operations Review Committee

b. BFA29 Corrective Action

c. BFA42 Reporting of Nuclear Plant Operating and Plant Performance Information

d. BFA62 Authorization and Work Performance

e. Operational QA Manual, Parts II and III

3. IE Bulletin Followup

The TVA response of 7/30/76 to IE Bulletin 76-06, relative to safety/relief valve actuators, was reviewed with plant maintenance supervision. The reported current status and actions planned were verified. Maintenance procedure MMI 13 was revised 8/10/76 to require that a new diaphragm be installed each time the air operator is disassembled and inspected. The planned program should result in the replacement of each diaphragm before the manufacturers recommended service life of 5 years is exceeded.

4. Control Rod Drive System Testing - Unit 2

The results of the control rod testing done in accordance with Startup Retest Instruction 5 were reviewed. The testing was performed as committed to in the "Recovery Plan." The control rod drive speeds, friction checks and scram times all met the test criteria as well as Technical Specification requirements.

DETAILS IV

Prepared by: D. J. Burke 10/4/76
D. J. Burke, Reactor Inspector Date
Reactor Projects Section No. 1
Reactor Operations and Nuclear
Support Branch

Dates of Inspection: August 24-27, 1976

Reviewed by: H. C. Dance 10/5/76
H. C. Dance, Chief Date
Reactor Projects Section No. 1
Reactor Operations and Nuclear
Support Branch

1. Personnel Contacted

H. J. Green - Plant Superintendent
J. G. Dewease - Assistant Plant Superintendent
J. B. Studdard - Operations Supervisor
R. Hunkapiller - Assistant Operations Supervisor
T. P. Bragg - QA staff Supervisor
R. W. McGee - QA Engineering Aide
R. G. Metke - Results Section Supervisor
L. Blankner - Reactor Engineer
B. C. Morris - Nuclear Engineer
Several Shift Engineers; Unit operators, and Assistant SE and UO personnel

2. Criticality Witnessing, Unit 2

The inspector witnessed the reactor restart and criticality at Browns's Ferry, Unit 2. Criticality was achieved on the forty-ninth rod (34-19) in withdrawal sequence B at 1520 (CST) on August 27, 1976. The critical rod configuration was not predicted; the licensee stated that the critical rod configurations will be compared to the expected configuratious (to detect reactivity anomalies) at selected power operating conditions as per TS 4.3.D. The inspector had no further questions at this time. The nuclear instrumentation functioned as required and the reactor coolant chemistry was within TS limits. The TS Section 6.8 staffing requirements were also met during the startup. The inspector observed parts of SRI-4, Full Core Shutdown Margin, prior to the approach to critical. The analytically most reactive rod (26-07) was fully withdrawn and three adjacent rods were subsequently withdrawn until the required shutdown margin was demonstrated. The test results will be reviewed

when they are complete and approved. The integrated plant operations procedure BF GOI 100-1, and the Master Startup Retest Instruction, BF MSRI, were utilized and signed off as required during the system preparation and reactor startup.

The inspector also reviewed certain surveillance tests to verify that the licensee was meeting the applicable TS requirements. The following Surveillance Instructions (SI) were reviewed:

SI 4.1.A-10, Main steam line high radiation calibration
SI 4.2.B-31, RCIC turbine steam line flow calibration
SI 4.2.C-1A, APRM tests
SI 4.2.C-3A, IRM tests
SI 4.2.C-4A, SRM tests
SI 4.3.B.3-1B, Rod Worth Minimizer
SI 4.4.A, Standby Liquid Control
SI 4.5.A.1.b, Core Spray (CS) pump operability test
SI 4.5.B.1.d, CS Flow Test
SI 4.5.B.1.c, RHR MOV operability test
SI 4.5.B.13, Recirculation pump discharge valves test
SI 4.5.E.1.b, HPCI pump operability test
SI 4.5.E.1.c, HPCI MOV operability test
SI 4.6.A.7, RCS temperature logs
SI 4.7.A.4.a, Drywell-suppression chamber vacuum breaker exercise
SI 4.9.A.2.a (and EMI 4), Battery checks

One item of noncompliance was identified when the inspector determined that SI 4.5.B.1.c, the residual heat removal system (RHRS) motor operated valve operability test, had not been completed. This is contrary to the TS limiting conditions for operation 3.5.B.1 which requires the RHRS to be operable prior to a reactor startup from a cold condition, and is therefore an infraction. The inspector stated that withdrawing rods and taking the reactor critical, in the Startup Mode, from a cold condition with the RPV head on, is considered to be a reactor startup. The inspector verified that the licensee did subsequently perform SI 4.5.B.1.c on August 27, 1976; therefore, no response to the item of noncompliance is necessary.

The inspector noted that SI 4.5.B.1.d, the RHR pump flow test, was performed on August 3, 1976; however, the typical pump flow demonstrated was 10,800 gpm at 62 psig. The TS requires that each RHR or LPCI pump deliver 9,000 gpm at 125 psig; the inspector stated that the LPCI pump head capacity curves would be required to verify compliance with the TS. The licensee subsequently revised SI 4.5B.1.d to test the RHR pumps at 9,000 gpm at 170 psig. The inspector had no further questions.

3. Unit 1 Control Room Fire

While observing startup operations in Unit 2, the inspector witnessed the fire and the corrective firefighting action that occurred in the adjacent Unit 1 reactor control room (RCR). The fire occurred at approximately 10:05 a.m. on August 27, 1976, in the reactor first-out annunciator statalarm panel XA-55-1 in console panel 9-7. A few small flames were observed when the operating staff opened the alarm panel door, but the primary result of the electrical fire was smoke that billowed into the RCR. The control room personnel on duty initiated the fire alarm as soon as the smoke was observed and then used one of the local hand-held carbon dioxide bottles to extinguish the fire within two or three minutes (10:07 a.m.). The fire and damage appeared to be limited to the wires and plug-in electronic cards located directly behind the statalarm panel door. The cause of the fire is being investigated, but the fire itself appears to have been centered in two of the four rows of cards. A short in one of the cards, possibly a selenium diode failure, is suspected; the alarm panel and its power feeder breakers are being investigated.

4. Procedure Verification

The inspector determined that the licensee has prepared and approved the heatup phase test procedures required by the Technical Specifications and by the Recovery Plan, Part XI, Section D. The licensee had Startup Retest Instructions (SRI), Surveillance Instructions (SI), or General Operating Instructions (GOI) to test the following systems:

RCS final leak check (GOI 100-7)
Control rod drive system (SRI 5)
MSIV test (SI 4.7.D.1.b)
Control rod inhibit functions (GOI 100-b and SI 4.3.B.2)
RCS chemistry (SI 4.6.B)

In reviewing GOI 100-7, Reactor Leak Check, the inspector noted that the leak check consisted of a visual inspection of the RCS pressure boundary, and not an actual leak test which would measure the makeup water inventory or use, to verify that the leakage does not exceed TS 3.6.C.1 (e.g., 5 gpm unidentified). However, the RCS leakage is checked during reactor operations by the drywell sump and air sampling systems as required by the TS. The inspector had no further questions.

DETAILS V

Prepared by: H. C. Dance, Chief — 9/29/76 Date
Reactor Projects Section No. 1
Reactor Operations and Nuclear
Support Branch

Dates of Inspection: August 9, 1976

Reviewed by: F. J. Long, Chief — 9/29/76 Date
Reactor Operations and Nuclear
Support Branch

1. Persons Contacted

H. J. Green - Plant Superintendent
J. Roberts - Test Engineer

2. Unit 1 Integrated Leak Rate Test

Observations were made during the pressurizations of Unit 1 containment on August 9, 1976, at the data test station and in the control room. Test initiation was being completed in accordance with approved procedure BF SI 4.7.A.2, Primary Containment Integrated Leak Rate Test. Prerequisites required prior to pressurization had been completed according to procedure signoffs. Supplementing records of calibration, valve lineups, and local tests were available for review. The blade angle of the drywall cooler fans had been repositioned to 20° for six fans and 10° for four fans to assist with air circulation during the test. Amperage was being monitored periodically and four fans had already been taken off line when amperage had increased to 50 during the pressurization. Repair to reduce MSIV's I-51 and I-52 leakage from 29.3 SCFH to technical specification limits of 11.5 SCFH per valve following the type A test was indicated and was being carried as an exception to the indicated test prerequisites. The test log book stated four instrument valves had been found mispositioned and had been corrected. This was brought to the attention of station management. The inspector confirmed that five valves associated with supplying compressed air to containment were properly positioned. Test results were subsequently reported by the licensee to be acceptable and will be reviewed in detail when the test report is submitted to the NRC.