

TH 00092, 00093, 00094
Box 75, PAGER 3

August 19, 1988

Docket Nos. 50-259/260/296

Mr. S. A. White
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Distribution

| | | |
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| Docket File | GGears | TBarnhart(12) |
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| SBlack | DHagan | |
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| JKelly | JPartlow | |

Dear Mr. White:

SUBJECT: SUBJECT: GENERIC LETTER 84-15 DIESEL GENERATOR RELIABILITY TECHNICAL SPECIFICATION CHANGES (TAC R00092, R00093, R00094) (IS 231) BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

The Commission has issued the enclosed Amendments Nos. 153, 149, and 124 to Facility Operating Licenses Nos. DPR-33, DPR-52 and DPR-68 for the Browns Ferry Nuclear Plant, Units 1, 2 and 3, respectively. These amendments are in response to your application dated May 29, 1987, as supplemented April 13, 1988. These amendments implement the recommendations contained in Generic Letter 84-15 on preventing excessive testing and improving the reliability of the diesel generators. The April 13, 1988 submittal does not make substantial changes to the original application, but clarifies the original application to better implement the recommendations of the generic letter.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's 81-Weekly Federal Register Notice.

Sincerely,

Signed by

Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Special Projects

Enclosures:

1. Amendment No. 153 to License No. DPR-33
2. Amendment No. 149 to License No. DPR-52
3. Amendment No. 124 to License No. DPR-68
4. Safety Evaluation

cc w/enclosures:

See next page

*SEE PREVIOUS PAGE FOR CONCURRENCE

CSP:TVA:A/LA*

MSimms

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OSP:TVA/PM*

JKelly:as

5/23/88

OSP:TVA/PM*

GGears

6/07/88

TVA:AD/TP*OGC*

BOLiaw

7/20/88

3/18/88

TVA:AD/P*

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3/18/88

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PDR ADOCK 05000259
P PDR

Mr. S. A. White

-2-

Browns Ferry Nuclear Plant

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-259

BROWNS FERRY NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 153
License No. DPR-33

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated May 29, 1987, as supplemented April 13, 1988, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

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2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-33 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 153, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Special Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: August 19, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 153

FACILITY OPERATING LICENSE NO. DPR-33

DOCKET NO. 50-259

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Overleaf pages* are provided to maintain document completeness.

REMOVE

vii
viii
3.5/4.5-1
3.5/4.5-2
3.5/4.5-5
3.5/4.5-6
3.5/4.5-7
3.5/4.5-8
3.5/4.5-9
3.5/4.5-10
3.5/4.5-12
3.5/4.5-13
3.9/4.9-1
3.9/4.9-2
3.9/4.9-3
3.9/4.9-4
3.9/4.9-7
3.9/4.9-8
3.9/4.9-9
3.9/4.9-10
3.9/4.9-16
3.9/4.9-17
3.9/4.9-18
3.9/4.9-19
3.9/4.9-20
3.9/4.9-21
3.9/4.9-22
6.0-27
6.0-28

INSERT

vii
viii*
3.5/4.5-1*
3.5/4.5-2
3.5/4.5-5
3.5/4.5-6
3.5/4.5-7*
3.5/4.5-8
3.5/4.5-9*
3.5/4.5-10
3.5/4.5-12
3.5/4.5-13*
3.9/4.9-1
3.9/4.9-2
3.9/4.9-3
3.9/4.9-4*
3.9/4.9-7*
3.9/4.9-8
3.9/4.9-9
3.9/4.9-10
3.9/4.9-16
3.9/4.9-17
3.9/4.9-18
3.9/4.9-19
3.9/4.9-20
3.9/4.9-21
3.9/4.9-22
6.0-27
6.0-28

LIST OF TABLES (Cont'd)

| <u>Table</u> | <u>Title</u> | <u>Page No.</u> |
|--------------|--|-----------------|
| 4.2.E | Minimum Test and Calibration Frequency for Drywell Leak Detection Instrumentation. | 3.2/4.2-53 |
| 4.2.F | Minimum Test and Calibration Frequency for Surveillance Instrumentation | 3.2/4.2-54 |
| 4.2.G | Surveillance Requirements for Control Room Isolation Instrumentation. | 3.2/4.2-56 |
| 4.2.H | Minimum Test and Calibration Frequency for Flood Protection Instrumentation | 3.2/4.2-57 |
| 4.2.J | Seismic Monitoring Instrument Surveillance Requirements | 3.2/4.2-58. |
| 4.2.K | Radioactive Gaseous Effluent Instrumentation Surveillance | 3.2/4.2-62 |
| 3.5-1 | Minimum RHRSW and EECW Pump Assignment | 3.5/4.5-11 |
| 3.5.I | MAPLHGR Versus Average Planar Exposure | 3.5/4.5-21 |
| 3.7.A | Primary Containment Isolation Valves | 3.7/4.7-25 |
| 3.7.B | Testable Penetrations with Double O-Ring Seals | 3.7/4.7-32 |
| 3.7.C | Testable Penetrations with Testable Bellows. | 3.7/4.7-33 |
| 3.7.D | Air Tested Isolation Valves. | 3.7/4.7-34 |
| 3.7.E | Primary Containment Isolation Valves which Terminate below the Suppression Pool Water Level. | 3.7/4.7-37 |
| 3.7.F | Primary Containment Isolation Valves Located in Water Sealed Seismic Class 1 Lines | 3.7/4.7-38 |
| 3.7.H | Testable Electrical Penetrations | 3.7/4.7-39 |
| 4.9.A | Diesel Generator Reliability | 3.9/4.9-16 |
| 4.9.A.4.C | Voltage Relay Setpoints/Diesel Generator Start | 3.9/4.9-18 |
| 3.11.A | Fire Protection System Hydraulic Requirements. | 3.11/4.11-10 |
| 6.2.A | Minimum Shift Crew Requirements. | 6.0-3 |

LIST OF ILLUSTRATIONS

| <u>Figure</u> | <u>Title</u> | <u>Page No.</u> |
|---------------|---|-----------------|
| 2.1.1 | APRM Flow Reference Scram and APRM Rod Block Settings | 1.1/2.1-6 |
| 2.1-2 | APRM Flow Bias Scram Vs. Reactor Core Flow | 1.1/2.1-7 |
| 4.1-1 | Graphic Aid in the Selection of an Adequate Interval Between Tests | 3.1/4.1-13 |
| 4.2-1 | System Unavailability. | 3.2/4.2-64 |
| 3.4-1 | Sodium Pentaborate Solution Volume Concentrated Requirements | 3.4/4.4-4 |
| 3.4-2 | Sodium Pentaborate Solution Temperature Requirements | 3.4/4.4-5 |
| 3.5.K-1 | MCPR Limits. | 3.5/4.5-24 |
| 3.5.2 | K _f Factor. | 3.5/4.5-25 |
| 3.6-1 | Minimum Temperature ^o F Above Change in Transient Temperature. | 3.6/4.6-24 |
| 3.6-2 | Change in Charpy V Transition Temperature Vs. Neutron Exposure | 3.6/4.6-25 |
| 4.8.1.a | Gaseous Release Points and Elevations | 3.8/4.8-10 |
| 4.8.1.b | Land Site Boundary | 3.8/4.8-11 |
| 6.2-1 | Offsite Organization for Facility Management and Technical Support | 6.0-33 |
| 6.2-2 | Facility Organization | 6.0-34 |

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.A Core Spray System (CSS)

2. If one CSS loop is INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days providing all active components in the other CSS loop and the RHR system (LPCI mode) and the diesel generators are OPERABLE.
3. If Specification 3.5.A.1 or Specification 3.5.A.2 cannot be met, the reactor shall be shutdown in the Cold Condition within 24 hours.
4. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel at least one core spray loop with one OPERABLE pump and associated diesel generator shall be OPERABLE, except with the reactor vessel head removed as specified in 3.5.A.5 or prior to reactor startup as specified in 3.5.A.1.

4.5.A Core Spray System (CSS)

4.5.A.1.d (Cont'd)

105 psi
differential
pressure
between the
reactor vessel
and the primary
containment.

e. Check Valve Once/
Operating
Cycle

2. When it is determined that one core spray loop is INOPERABLE, at a time when operability is required, the other core spray loop and the RHRS (LPCI mode) shall be demonstrated to be OPERABLE immediately. The OPERABLE core spray loop shall be demonstrated to be OPERABLE daily thereafter.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability

Applies to the operational status of the core and containment cooling systems.

Objective

To assure the operability of the core and containment cooling systems under all conditions for which this cooling capability is an essential response to plant abnormalities.

Specification

A. Core Spray System (CSS)

1. The CSS shall be OPERABLE:
 - (1) prior to reactor startup from a cold condition, or
 - (2) when there is irradiated fuel in the vessel and when the reactor vessel pressure is greater than atmospheric pressure, except as specified in Specification 3.5.A.2.

4.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability

Applies to the surveillance requirements of the core and containment cooling systems when the corresponding limiting condition for operation is in effect.

Objective

To verify the operability of the core and containment cooling systems under all conditions for which this cooling capability is an essential response to plant abnormalities.

Specification

A. Core Spray System (CSS)

1. Core Spray System Testi

| | <u>Item</u> | <u>Frequency</u> |
|----|--|-----------------------|
| a. | Simulated Automatic Actuation test | Once/ Operating Cycle |
| b. | Pump Operability | Once/ month |
| c. | Motor Operated Valve Operability | Once/ month |
| d. | System flow rate: Each loop shall deliver at least 6250 gpm against a system head corresponding to a | Once/3 months |

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

3. If one RHR pump (LPCI mode) is INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days provided the remaining RHR pumps (LPCI mode) and both access paths of the RHRS (LPCI mode) and the CSS and the diesel generators remain OPERABLE.
4. If any 2 RHR pumps (LPCI mode) become INOPERABLE, the reactor shall be placed in the Cold Shutdown condition within 24 hours.
5. If one RHR pump (containment cooling mode) or associated heat exchanger is INOPERABLE, the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pumps (containment cooling mode) and associated heat exchangers and diesel generators and all access paths of the RHRS (containment cooling mode) are OPERABLE.

SURVEILLANCE REQUIREMENT

4.5.B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

3. When it is determined that one RHR pump (LPCI mode) is INOPERABLE at a time when operability is required, the remaining RHR pumps (LPCI mode) and active components in both access paths of the RHRS (LPCI mode) and the CSS shall be demonstrated to be OPERABLE immediately and daily thereafter.
4. No additional surveillance required.
5. When it is determined that one RHR pump (containment cooling mode) or associated heat exchanger is INOPERABLE at a time when operability is required, the remaining RHR pumps (containment cooling mode), the associated heat exchangers and all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and weekly thereafter until the INOPERABLE RHR pump (containment cooling mode) and associated heat exchanger is returned to normal service.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITION FOR OPERATION

3.5 B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

6. If two RHR pumps (containment cooling mode) or associated heat exchangers are INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days provided the remaining RHR pumps (containment cooling mode), the associated heat exchangers, diesel generators, and all access paths of the RHRS (containment cooling mode) are OPERABLE.

7. If two access paths of the RHRS (containment cooling mode) for each phase of the mode (drywell sprays, suppression chamber sprays, and suppression pool cooling) are not OPERABLE, the unit may remain in operation for a period not to exceed 7 days provided at least one path for each phase of the mode remains OPERABLE.

SURVEILLANCE REQUIREMENTS

4.5 B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

6. When it is determined that two RHR pumps (containment cooling mode) or associated heat exchangers are INOPERABLE at a time when operability is required, the remaining RHR pumps (containment cooling mode), the associated heat exchangers, and all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and daily thereafter until at least three RHR pumps (containment cooling mode) and associated heat exchangers are returned to normal service.

7. When it is determined that one or more access paths of the RHRS (containment cooling mode) are INOPERABLE when access is required, all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and all active components in the access paths which are not backed by a second OPERABLE access path for the same phase of the mode (drywell sprays, suppression chamber sprays and suppression pool cooling) shall be demonstrated to be OPERABLE daily thereafter until the second path is returned to normal service.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. If Specifications 3.5.B.1 through 3.5.B.7 are not met, an orderly shutdown shall be initiated and the reactor shall be shutdown and placed in the cold condition within 24 hours.
9. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel at least one RHR loop with two pumps or two loops with one pump per loop shall be OPERABLE. The pumps' associated diesel generators must also be OPERABLE.
10. If the conditions of Specification 3.5.A.5 are met, LPCI and containment cooling are not required.
11. When there is irradiated fuel in the reactor and the reactor vessel pressure is greater than atmospheric, 2 RHR pumps and associated heat exchangers and valves on an adjacent unit must be OPERABLE and capable of supplying cross-connect capability except as specified in Specification 3.5.B.12 below. (Note: Because cross-connect capability is not a short-term requirement, a component is not considered INOPERABLE if cross-connect capability can be restored to service within 5 hours.)

SURVEILLANCE REQUIREMENTS

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. No additional surveillance required.
9. When the reactor vessel pressure is atmospheric, the RHR pumps and valves that are required to be OPERABLE shall be demonstrated to be OPERABLE monthly.
10. No additional surveillance required.
11. The RHR pumps on the adjacent units which supply cross-connect capability shall be demonstrated to be OPERABLE monthly when the cross-connect capability is required.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

- 12. If one RHR pump or associated heat exchanger located on the unit cross-connection in the adjacent unit is **INOPERABLE** for any reason (including valve inoperability, pipe break, etc.), the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pump and associated diesel generator are **OPERABLE**.

- 13. If RHR cross-connection flow or heat removal capability is lost, the unit may remain in operation for a period not to exceed 10 days unless such capability is restored.

- 14. All recirculation pump discharge valves shall be **OPERABLE** prior to reactor startup (or closed if permitted elsewhere in these specifications).

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

- 12. When it is determined that one RHR pump or associated heat exchanger located on the unit cross-connection in the adjacent unit is **INOPERABLE** at a time when operability is required, the remaining RHR pump and associated heat exchanger on the unit cross-connection shall be demonstrated to be **OPERABLE** immediately and every 15 days thereafter until the **INOPERABLE** pump and associated heat exchanger are returned to normal service.

- 13. No additional surveillance required.

- 14. All recirculation pump discharge valves shall be tested for operability during any period of reactor Cold Shutdown exceeding 48 hours, if operability tests have not been performed during the preceding 31 days.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS)

1. Prior to reactor startup from a cold condition, 9 RHRSW pumps must be OPERABLE, with 7 pumps (including pump D1 or D2) assigned to RHRSW service and 2 automatically starting pumps assigned to EECW service.

4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS)

1. a. Each of the RHRSW pumps normally assigned to automatic service on the EECW headers will be tested automatically each time the diesel generators are tested. Each of the RHRSW pumps and all associated essential control valves for the EECW headers and RHR heat exchanger headers shall be demonstrated to be OPERABLE once every three months.
- b. Annually each RHRSW pump shall be flow-rate tested. To be considered OPERABLE, each pump shall pump at least 4500 gpm through its normally assigned flow path.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Continued)

2. During reactor power operation, RHRSW pumps must be OPERABLE and assigned to service as indicated in Table 3.5-1 for the specified time limits.

3. During power operation, both RHRSW pumps D1 and D2 normally or alternately assigned to the RHR heat exchanger header supplying the standby coolant supply connection must be OPERABLE except as specified in 3.5.C.4 and 3.5.C.5 below.

4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Continued)

2. a. If no more than two RHRSW pumps are INOPERABLE, increased surveillance is not required.

- b. When three RHRSW pumps are INOPERABLE, the remaining pumps and associated essential control valves shall be operated daily.

- c. When four RHRSW pumps are INOPERABLE, the remaining pumps and associated essential control valves shall be operated daily.

3. Routine surveillance for these pumps is specified in 4.5.C.1.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.D Equipment Area Coolers

1. The equipment area cooler associated with each RHR pump and the equipment area cooler associated with each set of core spray pumps (A and C or B and D) must be OPERABLE at all times when the pump or pumps served by that specific cooler is considered to be OPERABLE.
2. When an equipment area cooler is not OPERABLE, the pump(s) served by that cooler must be considered INOPERABLE for Technical Specification purposes.

E. High Pressure Coolant Injection System (HPCIS)

1. The HPCI system shall be OPERABLE:
 - (1) prior to startup from a Cold Condition; or
 - (2) whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is greater than 122 psig, except as specified in Specification 3.5.E.2.

4.5.D Equipment Area Coolers

1. Each equipment area cooler is operated in conjunction with the equipment served by that particular cooler; therefore, the equipment area coolers are tested at the same frequency as the pumps which they serve.

E. High Pressure Coolant Injection System (HPCIS)

1. HPCI Subsystem testing shall be performed as follows:
 - a. Simulated Automatic Actuation Test Once/operating cycle
 - b. Pump Operability Once/month
 - c. Motor Operated Valve Operability Once/month
 - d. Flow Rate at normal reactor vessel operating pressure Once/3 months

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Continued)

4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Continued)

4. One of the D1 or D2 RHRSW pumps assigned to the RHR heat exchanger supplying the standby coolant supply connection may be INOPERABLE for a period not to exceed 30 days provided the OPERABLE pump is aligned to supply the RHR heat exchanger header and the associated diesel generator and essential control valves are OPERABLE.
5. The standby coolant supply capability may be INOPERABLE for a period not to exceed 10 days.
6. If Specifications 3.5.C.2 through 3.5.C.5 are not met, an orderly shutdown shall be initiated and the unit placed in the Cold Shutdown condition within 24 hours.
7. There shall be at least 2 RHRSW pumps, associated with the selected RHR pumps, aligned for RHR heat exchanger service for each reactor vessel containing irradiated fuel.

4. When it is determined that one of the RHRSW pumps supplying standby coolant is INOPERABLE at a time when operability is required, the OPERABLE RHRSW pump on the same header and the RHR heat exchanger header and associated essential control valves shall be demonstrated to be OPERABLE immediately and every 15 days thereafter.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9 Auxiliary Electrical System

Applicability

Applies to all the auxiliary electrical power system.

Objective

To assure an adequate supply of electrical power for operation of those systems required for safety.

Specification

A. Auxiliary Electrical Equipment

1. The reactor shall not be started up (made critical) from the cold condition unless the following are satisfied:
 - a. Diesel generators A, B, C, and D OPERABLE.
 - b. Requirements 3.9.A.3 through 3.9.A.6 are met.
 - c. At least two of the following offsite power sources are available:
 - (1) The 500-kV system is available to the units 1 and 2 shut-down boards through the unit 1 station-service transformer TUSS/1B with no credit taken for the two 500-kV Trinity lines. If the unit/2 station-service transformer is the second choice, a minimum of two 500-kV lines must be available.

SURVEILLANCE REQUIREMENTS

4.9 Auxiliary Electrical System

Applicability

Applies to the periodic testing requirements of the auxiliary electrical system.

Objective

Verify the operability of the auxiliary electrical system.

Specification

A. Auxiliary Electrical System

1. Diesel Generators
 - a. Each diesel generator shall be manually started and loaded to demonstrate operational readiness in accordance with the frequency specified in Table 4.9.A on a staggered test basis. The test shall continue for at least a one hour period at 75% of rated load or greater and the operation of the diesel fuel oil transfer pumps shall be demonstrated. Also, the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers.

The diesel generator fast starts (10 seconds) from standby conditions shall be performed once per 184 days in these surveillance tests. All other engine starts for the purpose of this test may be preceded by an engine idle start.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

3.9.A.1.c. (Cont'd)

- (2) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 2 station-service transformer TUSS 2B with no credit taken for the two 500-kV Trinity lines. If the unit 1 station-service transformer is the second choice, a minimum of two 500-kV lines must be available.
- (3) The Trinity 161-kV line is available to the units 1 and 2 shutdown boards through both common station-service transformers.

NOTES FOR (3):

- (a) If unit 3 is claiming the Trinity line as an offsite source, see unit 3 technical specifications, section 3.9.A.1.c.2.
- (b) If unit 1 is in cold shutdown, only one common station-service transformer is required.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

4.9.A.1. (Cont'd)

Additional reporting requirements due to failures are noted in Table 4.9.A.

All diesel generator starts shall be logged.

- b. Once per operating cycle, a test will be conducted simulating a loss of offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:
 - (1) Deenergization of the emergency buses and load shedding from the emergency buses.
 - (2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads through load sequencing, and operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

3.9.A.1.c. (Cont'd)

- (4) The Athens 161-kV line is available to the units 1 and 2 shutdown boards through a common station-service transformer when unit 1 is in Cold Shutdown and unit 3 is not claiming the Athens line as an offsite source.

NOTE FOR (3) AND (4):

With no cooling tower pumps or fans running, a cooling tower transformer may be substituted for a common station-service transformer.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

4.9.A.1.b (Cont'd)

- (3) On diesel generator breaker trip, the loads are shed from the emergency buses and the diesel output breaker recloses on the autostart signal, the emergency buses are energized with permanently connected loads, the autoconnected emergency loads are energized through load sequencing, and the diesel operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

- c. Once a month the quantity of diesel fuel available shall be logged.
- d. Each diesel generator shall be given an annual inspection in accordance with instructions based on the manufacturer's recommendations.
- e. Once a month a sample of diesel fuel shall be checked for quality. The quality shall be within acceptable limits specified in Table 1 of the latest revision to ASTM D975 and logged.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

2. The reactor shall not be started up (made critical) from the hot standby condition unless all of the following conditions are satisfied:

a. At least one offsite power source is available as specified in 3.9.A.1.c.

b. Three units 1 and 2 diesel generators shall be OPERABLE.

c. An additional source of power consisting of one of the following:

(1) A second offsite power source available as specified in 3.9.A.1.c.

(2) A fourth OPERABLE units 1 and 2 diesel generator.

d. Requirements 3.9.A.3 through 3.9.A.6 are met.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

2. DC Power System - Unit Batteries (250-V), Diesel-Generator Batteries (125-V) and Shutdown Board Batteries (250-V)

a. Every week the specific gravity, voltage and temperature of the pilot cell and overall battery voltage shall be measured and logged.

b. Every three months the measurement shall be made of voltage of each cell to nearest 0.1 volt, specific gravity of each cell, and temperature of every fifth cell. These measurements shall be logged.

c. A battery rated discharge (capacity) test shall be performed and the voltage, time, and output current measurements shall be logged at intervals not to exceed 24 months.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

5. Logic Systems

a. Common accident signal logic system is OPERABLE.

b. 480-V load shedding logic system is OPERABLE.

6. There shall be a minimum of 103,300 gallons of diesel fuel in the standby diesel-generator fuel tanks.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

4.9.A.4. (Cont'd)

c. The loss of voltage and degraded voltage relays which start the diesel generators from the 4-kV shutdown boards shall be calibrated annually for trip and reset and the measurements logged. These relays shall be calibrated as specified in Table 4.9.A.4.c.

d. 4-kV shutdown board voltages shall be recorded once every 12 hours.

5. 480-V RMOV Boards 1D and 1E

a. Once per operating cycle the automatic transfer feature for 480-V RMOV boards 1D and 1E shall be functionally tested to verify auto-transfer capability.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.B. Operation with Inoperable Equipment

Whenever the reactor is in Startup mode or Run mode and not in a cold condition, the availability of electric power shall be as specified in 3.9.A except as specified herein.

1. From and after the date that only one offsite power source is available, reactor operation is permissible for 7 days.
2. From and after the date that the 4-kV bus tie board becomes INOPERABLE, reactor operation is permissible indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

SURVEILLANCE REQUIREMENTS

4.9.B. Operation with Inoperable Equipment

1. When only one offsite power source is OPERABLE, all units 1 and 2 diesel generators must be demonstrated to be OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter.
2. When a required offsite power source is unavailable to unit 1 because the 4-kV bus tie board or a start bus is INOPERABLE, all unit 1 and 2 diesel generators shall be demonstrated OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter. The remaining offsite source and associated buses shall be checked to be energized daily.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.D. Operation With Inoperable Equipment

3. When one of the units 1 and 2 diesel generator is INOPERABLE, continued reactor operation is permissible during the succeeding 7 days, provided that 2 offsite power sources are available as specified in 3.9.A.1.c and all of the CS, RHR (LPCI and containment cooling) systems, and the remaining three units 1 and 2 diesel generators are OPERABLE. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.
4. When one units 1 and 2 4-kV shutdown board is INOPERABLE, continued reactor operation is permissible for a period of 5 days provided that 2 offsite power sources are available as specified in 3.9.A.1.c and the remaining 4-kV shutdown boards and associated diesel generators, CS, RHR (LPCI and containment cooling) systems, and all 480-V emergency power boards are OPERABLE. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.

SURVEILLANCE REQUIREMENTS

4.9.B. Operation With Inoperable Equipment

3. When one of the units 1 and 2 diesel generators is found to be INOPERABLE, all of the remaining diesel generators shall be demonstrated to be OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter.
4. When one 4-kV shutdown board is found to be INOPERABLE, all diesel generators associated with the remaining 4-kV shutdown boards shall be demonstrated to be OPERABLE within 24 hours, and power availability for the remaining 4-kV shutdown boards shall be verified within 1 hour and at least once per 8 hours thereafter.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.B. Operation With Inoperable Equipment

5. When one of the shutdown buses is INOPERABLE, reactor operation is permissible for a period of 7 days.
6. When one of the 480-V diesel auxiliary boards becomes INOPERABLE, reactor operation is permissible for a period of 5 days.
7. From and after the date that one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued reactor operation is permissible during the succeeding 7 days. Except for routine surveillance testing, NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

SURVEILLANCE REQUIREMENTS

4.9.B. Operation With Inoperable Equipment

5. When a shutdown bus is found to be INOPERABLE, all 1 and 2 diesel generators shall be proven OPERABLE within 24 hours.
6. When one units 1 and 2 diesel auxiliary board is found to be INOPERABLE, each unit 1 and 2 diesel generator shall be proven OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

AUXILIARY ELECTRICAL SYSTEMS

TABLE 4.9.A

Diesel Generator Reliability

| <u>No. of Failures in last 20 valid tests*</u> | <u>No. of Failures in last 100 valid tests*</u> | <u>Reliability Actions</u> |
|--|---|--|
| ≤ 1 | - | Test at least once per 31 days |
| ≥ 2 | - | Test at least once per 7 days** |
| > 3 | ≥ 6 | Within 30 days, prepare a report for NRC audit, in accordance with Section 6.9.2.7. |
| > 5 | ≥ 11 | Declare the diesel generator INOPERABLE and perform a requalification test for the affected diesel generator pursuant to the attachment to this table. |

* Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, except that the number of tests and failures are determined on a per diesel generator basis. For the purposes of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 20 valid tests". Entry into this test schedule shall be made at the 31 day test frequency.

**This test frequency shall be maintained until seven consecutive failure free demands have been performed and the number of failures in the last 20 valid demands has been reduced on one or less.

BFN - Unit 1

ATTACHMENT TO TABLE 4.9.A
DIESEL GENERATOR REQUALIFICATION PROGRAM

- (1) Perform seven consecutive successful demands without a failure within 30 days of diesel generator being restored to operable status and fourteen consecutive successful demands without a failure within 75 days of diesel generator of being restored to OPERABLE status.
- (2) If a failure occurs during the first seven tests in the requalification test program, perform seven successful demands without an additional failure within 30 days of diesel generator of being restored to OPERABLE status and fourteen consecutive successful demands without a failure within 75 days of being restored to OPERABLE status.
- (3) If a failure occurs during the second seven tests (tests 8 through 14) of (1) above, perform fourteen consecutive successful demands without an additional failure within 75 days of the failure which occurred during the requalification testing.
- (4) Following the second failure during the requalification test program, be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- (5) During requalification testing the diesel generator should not be tested more frequently than at 24-hour intervals.

After a diesel generator has been successfully requalified, subsequent repeated requalification tests will not be required for that diesel generator under the following conditions:

- (a) The number of failures in the last 20 valid demands is less than 5.
- (b) The number of failures in the last 100 valid demands is less than 11.
- (c) In the event that, following successful requalification of a diesel generator, the number of failures is still in excess of the remedial action criteria (a and/or b above) the following exception will be allowed until the diesel generator is no longer in violation of the remedial action criteria (a and/or b above).

Requalification testing will not be required provided that after each valid demand the number of failures in the last 20 and/or 100 valid demands has not increased. Once the diesel generator is no longer in violation of the remedial action criteria above the provisions of those criteria alone will prevail.

TABLE 4.9.A.4.C
VOLTAGE RELAY SETPOINTS/DIESEL GENERATOR START

| Relay Location | Trip Level Setting | | Remarks |
|--|--|--|--|
| 1. 4-kV Shutdown Boards | Trip Setpoint: Allowable Values: Trip Range: Reset Setpoint: Allowable Values: Reset Range: | 0 volts with a 1.5-second time delay + .1 second 1.4 to 1.6 seconds 2870-V +2% of 2870-V 2813-V to 2927-V | Start diesel generators on loss of offsite power. |
| <u>Undervoltage</u> | | | |
| 2. 4-kV Shutdown Boards | Trip Setpoint: Allowable Values: Reset Setpoint: | 3920 3900-3940 Reset at $\leq 1.5\%$ above trip value | Second level undervoltage sensing relays - start diesel generator on degraded voltage. |
| 3. 4-kV Shutdown Boards (Timers shown for 4-kV shutdown board A. 4-kV shutdown boards B, C, and D, similar, except for change of suffix.) | <u>Timer</u> | <u>Setpoint (seconds)</u> | <u>Critical Time (seconds)</u> |
| | 2-211-1A | 0.3 \pm 10% | N/A |
| | 2-211-2A | 4.0 \pm 10% | N/A |
| | 2-211-3A | 6.9 \pm 10% | 8.2 |
| | 2-211-4A | 1.3 \pm 10% | 1.5 |
| | | | Auxiliary timers for second level undervoltage sensing relays. |
| | | | The setpoint ranges specified assure that the operating times will be below the critical times specified. These ranges are based on timer repeatability of $\pm 5\%$ as specified by the manufacturer. |

3.9/4.9-18

Amendment No. 153

BFN Unit 1

3.9 BASES

The objective of this specification is to assure an adequate source of electrical power to operate facilities to cool the plant during shutdown and to operate the engineered safeguards following an accident. There are three sources of alternating current electrical energy available, namely, the 161-kV transmission system, the 500-kV transmission system, and the diesel generators.

The unit station-service transformer B for unit 1 or the unit station-service transformer B for unit 2 provide noninterruptible sources of offsite power from the 500-kV transmission system to the units 1 and 2 shutdown boards. Auxiliary power can also be supplied from the 161-kV transmission system through the common station-service transformers or through the cooling tower transformers by way of the bus tie board. The 4-kV bus tie board may remain out of service indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

The minimum fuel oil requirement of 103,300 gallons is sufficient for seven days of full load operation of three diesels and is conservatively based on availability of a replenishment supply.

The degraded voltage sensing relays provide a start signal to the diesel generators in the event that a deteriorated voltage condition exists on a 4-kV shutdown board. This starting signal is independent of the starting signal generated by the complete loss of voltage relays and will continue to function and start the diesel generators on complete loss of voltage should the loss of voltage relays become inoperable. The 15-day inoperable time limit specified when one of the three phase-to-phase degraded voltage relays is inoperable is justified based on the two-out-of-three permissive logic scheme provided with these relays.

A 4-kV shutdown board is allowed to be out of operation for a brief period to allow for maintenance and testing, provided all remaining 4-kV shutdown boards and associated diesel generators, CS, RHR, (LPCI and containment cooling) systems supplied by the remaining 4-kV shutdown boards, and all emergency 480-V power boards are operable.

There are eight 250-V dc battery systems, each of which consists of a battery, battery charger, and distribution equipment. Three of these systems provide power for unit control functions, operative power for unit motor loads, and alternative drive power for a 115-V ac unit-preferred mg set. One 250-V dc system provides power for common plant and transmission system control functions, drive power for a 115-V ac plant-preferred mg set, and emergency drive power for certain unit large motor loads. The four remaining systems deliver control power to the 4,160-V shutdown boards.

3.9 BASES (Cont'd)

Each 250-V dc shutdown board control power supply can receive power from its own battery, battery charger, or from a spare charger. The chargers are powered from normal plant auxiliary power or from the standby diesel-driven generator system. Zero resistance short circuits between the control power supply and the shutdown board are cleared by fuses located in the respective control power supply. Each power supply is located in the reactor building near the shutdown board it supplies. Each battery is located in its own independently ventilated battery room.

The 250-V dc system is so arranged, and the batteries sized so that the loss of any one unit battery will not prevent the safe shutdown and cooldown of all three units in the event of the loss of offsite power and a design basis accident in any one unit. Loss of control power to any engineered safeguard control circuits is annunciated in the main control room of the unit affected. The loss of one 250-V shutdown board battery affects normal control power only for the 4,160-V shutdown board which it supplies. The station battery supplies loads that are not essential for safe shutdown and cooldown of the nuclear system. This battery was not considered in the accident load calculations.

There are two 480-Volt ac RMOV boards that contain mg sets in their feeder lines. These 480-Volt ac RMOV boards have an automatic transfer from their normal to alternate power source (480-Volt ac shutdown boards). The mg sets act as electrical isolators to prevent a fault from propagating between electrical divisions due to an automatic transfer. The 480-Volt ac RMOV boards involved provide motive power to valves associated with the LPCI mode of the RHR system. Having an mg set out of service reduces the assurance that full RHR (LPCI) capacity will be available when required. Since sufficient equipment is available to maintain the minimum complement required for RHR (LPCI) operation, a 7-day servicing period is justified. Having two mg sets out of service can considerably reduce equipment availability; therefore, the affected unit shall be placed in Cold Shutdown within 24 hours.

The offsite power source requirements are based on the capacity of the respective lines. The Trinity line is limited to supplying two operating units because of the load limitations of CSST's A and B. The Athens line is limited to supplying one operating unit because of the load limitations of the Athens line. The limiting conditions are intended to prevent the 161-kV system from supplying more than two units in the event of a single failure in the offsite power system.

4.9 BASES

The monthly test of the diesel generators is primarily to check for failures and deterioration in the system since last use. The diesels will be loaded to at least 75 percent of rated power while engine and generator temperatures are stabilized (about one hour). The minimum 75-percent load will prevent soot formation in the cylinders and injection nozzles. Operation up to an equilibrium temperature ensures that there is no overheating problem. The tests also provide an engine and generator operating history to be compared with subsequent engine-generator test data to identify and to correct any mechanical or electrical deficiency before it can result in a system failure.

The test during refueling outages is more comprehensive, including procedures that are most effectively conducted at that time. These include automatic actuation and functional capability tests to verify that the generators can start and be ready to assume load in 10 seconds. The annual inspection will detect any signs of wear long before failure.

Battery maintenance with regard to the floating charge, equalizing charge, and electrolyte level will be based on the manufacturer's instruction and sound maintenance practices. In addition, written records will be maintained of the battery performance. The plant batteries will deteriorate with time but precipitous failure is unlikely. The type of surveillance called for in this specification is that which has been demonstrated through experience to provide an indication of a cell becoming irregular or unserviceable long before it becomes a failure.

The equalizing charge, as recommended by the manufacturer, is vital to maintaining the ampere-hour capacity of the battery, and will be applied as recommended.

The testing of the logic systems will verify the ability of the logic systems to bring the auxiliary electrical system to running standby readiness with the presence of an accident signal from any reactor or an undervoltage signal on the 4-kV shutdown boards.

The periodic simulation of accident signals in conjunction with diesel-generator voltage available signals will confirm the ability of the 480-V load shedding logic system to sequentially shed and restart 480-V loads if an accident signal were present and diesel-generator voltage was the only source of electrical power.

4.9 BASES (Cont'd)

REFERENCES

1. Normal Auxiliary Power System (BFNP FSAR Subsection 8.4)
2. Standby AC Power Supply and Distribution (BFNP FSAR Subsection 8.5)
3. 250-Volt DC Power Supply and Distribution (BFNP FSAR Subsection 8.6)
4. Memorandum from Gene M. Wilhoite to H. J. Green dated December 4, 1981 (LOO 811208 664) and memorandum from C. E. Winn to H. J. Green dated January 10, 1983 (G02 830112 002)

Report shall be submitted within 10 days after the event describing the magnitude, frequency spectrum, and resultant effect upon plant features important to safety.

7. Diesel Generator Reliability Improvement Program Report shall be submitted within 30 days of meeting failure criteria in Table 4.9.A. As a minimum, the Reliability Improvement Program report for NRC audit shall include:
- a. A summary of all tests (valid and invalid) that occurred within the time period over which the last 20/100 valid tests were performed.
 - b. Analysis of failures and determination of root causes of failures.
 - c. Evaluation of each of the recommendations of NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability in Operating Reactors," with respect to their application to the plant.
 - d. Identification of all actions taken or to be taken to (1) Correct the root causes of failures defined in b above and (2) Achieve a general improvement of diesel generator reliability.
 - e. A supplemental report shall be prepared for an NRC audit within 30 days after each subsequent failure during a valid demand, for so long as the affected diesel generator unit continues to violate the criteria (3/20 or 6/100) for the reliability improvement program remedial action. The supplemental report need only update the failure/demand history for the affected diesel generator unit since the last report for that diesel generator. The supplemental report shall also present an analysis of the failure(s) with a root cause determination, if possible, and shall delineate any further procedural, hardware or operational changes to be incorporated into the site diesel generator improvement program and the schedule for implementation of those changes.

8. Secondary Containment
Leak Rate Testing*

4.7.C.

Within 90 days
of completion
of each test.

*Each integrated leak rate test of the secondary containment shall be the subject of a summary technical report. This report should include data on the wind speed, wind direction, outside and inside temperatures during the test, concurrent reactor building pressure, and emergency ventilation flow rate. The report shall also include analyses and interpretations of those data which demonstrate compliance with the specified leak rate limits.

6.10 STATION OPERATING RECORDS AND RETENTION

6.10.1 Records and/or logs shall be kept in a manner convenient for review as indicated below:

- a. All normal plant operation including such items as power level, fuel exposure, and shutdowns
- b. Principal maintenance activities
- c. Reportable Events
- d. Checks, inspections, tests, and calibrations of components and systems, including such diverse items as source leakage
- e. Reviews of changes made to the procedures or equipment or reviews of tests and experiments to comply with 10 CFR 50.59
- f. Radioactive shipments
- g. Test results in units of microcuries for leak tests performed pursuant to Specification 3.8.D



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

TENNESSEE VALLEY AUTHORITY
DOCKET NO. 50-260
BROWNS FERRY NUCLEAR PLANT, UNIT 2
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 149
License No. DPR-52

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated May 29, 1987, as supplemented April 13, 1988, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

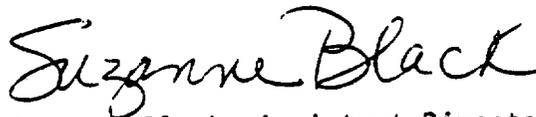
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-52 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 149, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Special Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: August 19, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 149

FACILITY OPERATING LICENSE NO. DPR-52

DOCKET NO. 50-260

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Overleaf pages* are provided to maintain document completeness.

REMOVE

vii
viii
3.5/4.5-1
3.5/4.5-2
3.5/4.5-5
3.5/4.5-6
3.5/4.5-7
3.5/4.5-8
3.5/4.5-9
3.5/4.5-10
3.5/4.5-12
3.5/4.5-13
3.9/4.9-1
3.9/4.9-2
3.9/4.9-3
3.9/4.9-4
3.9/4.9-7
3.9/4.9-8
3.9/4.9-9
3.9/4.9-10
3.9/4.9-16
3.9/4.9-17
3.9/4.9-18
3.9/4.9-19
3.9/4.9-20
3.9/4.9-21
3.9/4.9-22
6.0-27
6.0-28

INSERT

vii
viii*
3.5/4.5-1*
3.5/4.5-2
3.5/4.5-5
3.5/4.5-6
3.5/4.5-7*
3.5/4.5-8
3.5/4.5-9*
3.5/4.5-10
3.5/4.5-12
3.5/4.5-13*
3.9/4.9-1
3.9/4.9-2
3.9/4.9-3
3.9/4.9-4*
3.9/4.9-7*
3.9/4.9-8
3.9/4.9-9
3.9/4.9-10
3.9/4.9-16
3.9/4.9-17
3.9/4.9-18
3.9/4.9-19
3.9/4.9-20
3.9/4.9-21
3.9/4.9-22
6.0-27
6.0-28

LIST OF TABLES (Cont'd)

| <u>Table</u> | <u>Title</u> | <u>Page No.</u> |
|--------------|--|-----------------|
| 4.2.E | Minimum Test and Calibration Frequency for Drywell Leak Detection Instrumentation. | 3.2/4.2-53 |
| 4.2.F | Minimum Test and Calibration Frequency for Surveillance Instrumentation | 3.2/4.2-54 |
| 4.2.G | Surveillance Requirements for Control Room Isolation Instrumentation. | 3.2/4.2-56 |
| 4.2.H | Minimum Test and Calibration Frequency for Flood Protection Instrumentation | 3.2/4.2-57 |
| 4.2.J | Seismic Monitoring Instrument Surveillance Requirements | 3.2/4.2-58 |
| 4.2.K | Radioactive Gaseous Effluent Instrumentation . . . Surveillance | 3.2/4.2-62 |
| 3.5-1 | Minimum RHRSW and EECW Pump Assignment | 3.5/4.5-11 |
| 3.5.I | MAPLHGR Versus Average Planar Exposure | 3.5/4.5-21 |
| 3.7.A | Primary Containment Isolation Valves | 3.7/4.7-25 |
| 3.7.B | Testable Penetrations with Double O-Ring Seals | 3.7/4.7-32 |
| 3.7.C | Testable Penetrations with Testable Bellows. | 3.7/4.7-33 |
| 3.7.D | Air Tested Isolation Valves. | 3.7/4.7-34 |
| 3.7.E | Primary Containment Isolation Valves which Terminate below the Suppression Pool Water Level. | 3.7/4.7-37 |
| 3.7.F | Primary Containment Isolation Vales Located in Water Sealed Seismic Class 1 Lines | 3.7/4.7-38 |
| 3.7.H | Testable Electrical Penetrations | 3.7/4.7-39 |
| 4.9.A | Diesel Generator Reliability | 3.9/4.9-16 |
| 4.9.A.4.C | Voltage Relay Setpoints/Diesel Generator Start | 3.9/4.9-18 |
| 3.11.A | Fire Protection System Hydraulic Requirements. | 3.11/4.11-10 |
| 6.2.A | Minimum Shift Crew Requirements. | 6.0-3 |

LIST OF ILLUSTRATIONS

| <u>Figure</u> | <u>Title</u> | <u>Page No.</u> |
|---------------|--|-----------------|
| 2.1.1 | APRM Flow Reference Scram and APRM Rod Block Settings | 1.1/2.1-6 |
| 2.1-2 | APRM Flow Bias Scram Vs. Reactor Core Flow | 1.1/2.1-7 |
| 4.1-1 | Graphic Aid in the Selection of an Adequate Interval Between Tests | 3.1/4.1-13 |
| 4.2-1 | System Unavailability. | 3.2/4.2-64 |
| 3.4-1 | Sodium Pentaborate Solution Volume Concentrated Requirements | 3.4/4.4-4 |
| 3.4-2 | Sodium Pentaborate Solution Temperature Requirements | 3.4/4.4-5 |
| 3.5.K-1 | MCPR Limits. | 3.5/4.5-22 |
| 3.5.2 | K _f Factor. | 3.5/4.5-23 |
| 3.6-1 | Minimum Temperature °F Above Change in Transient Temperature. | 3.6/4.6-24 |
| 3.6-2 | Change in Charpy V Transition Temperature Vs. Neutron Exposure | 3.6/4.6-25 |
| 4.8.1.a | Gaseous Release Points and Elevations | 3.8/4.8-10 |
| 4.8.1.b | Land Site Boundary | 3.8/4.8-11 |
| 6.2-1 | Offsite Organization for Facility Management and Technical Support | 6.0-33 |
| 6.2-2 | Facility Organization | 6.0-34 |

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability

Applies to the operational status of the core and containment cooling systems.

Objective

To assure the operability of the core and containment cooling systems under all conditions for which this cooling capability is an essential response to plant abnormalities.

Specification

A. Core Spray System (CSS)

1. The CSS shall be OPERABLE:
 - (1) prior to reactor startup from a cold condition, or
 - (2) when there is irradiated fuel in the vessel and when the reactor vessel pressure is greater than atmospheric pressure, except as specified in Specification 3.5.A.2.

SURVEILLANCE REQUIREMENTS

4.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability

Applies to the surveillance requirements of the core and containment cooling systems when the corresponding limiting condition for operation is in effect.

Objective

To verify the operability of the core and containment cooling systems under all conditions for which this cooling capability is an essential response to plant abnormalities.

Specification

A. Core Spray System (CSS)

1. Core Spray System Testing.

| | <u>Item</u> | <u>Frequency</u> |
|----|--|-----------------------|
| a. | Simulated Automatic Actuation test | Once/ Operating Cycle |
| b. | Pump Operability | Once/ month |
| c. | Motor Operated Valve Operability | Once/ month |
| d. | System flow rate: Each loop shall deliver at least 6250 gpm against a system head corresponding to a | Once/3 months |

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.A Core Spray System (CSS)

4.5.A Core Spray System (CSS)

4.5.A.1.d (Cont'd)

105 psi
differential
pressure
between the
reactor vessel
and the primary
containment.

e. Check Valve Once/
Operating
Cycle

2. If one CSS loop is INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days providing all active components in the other CSS loop and the RHR system (LPCI mode) and the diesel generators are OPERABLE.
3. If Specification 3.5.A.1 or Specification 3.5.A.2 cannot be met, the reactor shall be shutdown in the Cold Condition within 24 hours.
4. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel at least one core spray loop with one OPERABLE pump and associated diesel generator shall be OPERABLE, except with the reactor vessel head removed as specified in 3.5.A.5 or prior to reactor startup as specified in 3.5.A.1.

2. When it is determined that one core spray loop is INOPERABLE, at a time when operability is required, the other core spray loop and the RHRS (LPCI mode) shall be demonstrated to be OPERABLE immediately. The OPERABLE core spray loop shall be demonstrated to be OPERABLE daily thereafter.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

3. If one RHR pump (LPCI mode) is INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days provided the remaining RHR pumps (LPCI mode) and both access paths of the RHRS (LPCI mode) and the CSS and the diesel generators remain OPERABLE.
4. If any 2 RHR pumps (LPCI mode) become INOPERABLE, the reactor shall be placed in the Cold Shutdown condition within 24 hours.
5. If one RHR pump (containment cooling mode) or associated heat exchanger is INOPERABLE, the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pumps (containment cooling mode) and associated heat exchangers and diesel generators and all access paths of the RHRS (containment cooling mode) are OPERABLE.

SURVEILLANCE REQUIREMENT

4.5.B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

3. When it is determined that one RHR pump (LPCI mode) is INOPERABLE at a time when operability is required, the remaining RHR pumps (LPCI mode) and active components in both access paths of the RHRS (LPCI mode) and the CSS shall be demonstrated to be OPERABLE immediately and daily thereafter.
4. No additional surveillance required.
5. When it is determined that one RHR pump (containment cooling mode) or associated heat exchanger is INOPERABLE at a time when operability is required, the remaining RHR pumps (containment cooling mode), the associated heat exchangers and all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and weekly thereafter until the INOPERABLE RHR pump (containment cooling mode) and associated heat exchanger is returned to normal service.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITION FOR OPERATION

3.5 B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

6. If two RHR pumps (containment cooling mode) or associated heat exchangers are INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days provided the remaining RHR pumps (containment cooling mode), the associated heat exchangers, diesel generators, and all access paths of the RHRS (containment cooling mode) are OPERABLE.

7. If two access paths of the RHRS (containment cooling mode) for each phase of the mode (drywell sprays, suppression chamber sprays, and suppression pool cooling) are not OPERABLE, the unit may remain in operation for a period not to exceed 7 days provided at least one path for each phase of the mode remains OPERABLE.

SURVEILLANCE REQUIREMENTS

4.5 B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

6. When it is determined that two RHR pumps (containment cooling mode) or associated heat exchangers are INOPERABLE at a time when operability is required, the remaining RHR pumps (containment cooling mode), the associated heat exchangers, and all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and daily thereafter until at least three RHR pumps (containment cooling mode) and associated heat exchangers are returned to normal service.

7. When it is determined that one or more access paths of the RHRS (containment cooling mode) are INOPERABLE when access is required, all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and all active components in the access paths which are not backed by a second OPERABLE access path for the same phase of the mode (drywell sprays, suppression chamber sprays and suppression pool cooling) shall be demonstrated to be OPERABLE daily thereafter until the second path is returned to normal service.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. If Specifications 3.5.B.1 through 3.5.B.7 are not met, an orderly shutdown shall be initiated and the reactor shall be shutdown and placed in the cold condition within 24 hours.
9. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel at least one RHR loop with two pumps or two loops with one pump per loop shall be OPERABLE. The pumps' associated diesel generators must also be OPERABLE.
10. If the conditions of Specification 3.5.A.5 are met, LPCI and containment cooling are not required.
11. When there is irradiated fuel in the reactor and the reactor vessel pressure is greater than atmospheric, 2 RHR pumps and associated heat exchangers and valves on an adjacent unit must be OPERABLE and capable of supplying cross-connect capability except as specified in Specification 3.5.B.12 below. (Note: Because cross-connect capability is not a short-term requirement, a component is not considered INOPERABLE if cross-connect capability can be restored to service within 5 hours.)

SURVEILLANCE REQUIREMENTS

4.5.B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

8. No additional surveillance required.
9. When the reactor vessel pressure is atmospheric, the RHR pumps and valves that are required to be OPERABLE shall be demonstrated to be OPERABLE monthly.
10. No additional surveillance required.
11. The RHR pumps on the adjacent units which supply cross-connect capability shall be demonstrated to be OPERABLE monthly when the cross-connect capability is required.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

12. If three RHR pumps or associated heat exchangers located on the unit cross-connection in the adjacent units are INOPERABLE for any reason (including valve inoperability, pipe break, etc.), the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pump and associated diesel generator are OPERABLE.
13. If RHR cross-connection flow or heat removal capability is lost, the unit may remain in operation for a period not to exceed 10 days unless such capability is restored.
14. All recirculation pump discharge valves shall be OPERABLE prior to reactor startup (or closed if permitted elsewhere in these specifications).

4.5.B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

12. When it is determined that three RHR pumps or associated heat exchangers located on the unit cross-connection in the adjacent units are INOPERABLE at a time when operability is required, the remaining RHR pump and associated heat exchanger on the unit cross-connection shall be demonstrated to be OPERABLE immediately and every 15 days thereafter until the INOPERABLE pump and associated heat exchanger are returned to normal service.
13. No additional surveillance required.
14. All recirculation pump discharge valves shall be tested for operability during any period of reactor Cold Shutdown exceeding 48 hours, if operability tests have not been performed during the preceding 31 days.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS)

1. Prior to reactor startup from a cold condition, 9 RHRSW pumps must be OPERABLE, with 7 pumps (including one of pumps D1, D2, B2 or B1) assigned to RHRSW service and 2 automatically starting pumps assigned to EECW service.

SURVEILLANCE REQUIREMENTS

4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS)

1. a. Each of the RHRSW pumps normally assigned to automatic service on the EECW headers will be tested automatically each time the diesel generators are tested. Each of the RHRSW pumps and all associated essential control valves for the EECW headers and RHR heat exchanger headers shall be demonstrated to be OPERABLE once every three months.
- b. Annually each RHRSW pump shall be flow-rate tested. To be considered OPERABLE, each pump shall pump at least 4500 gpm through its normally assigned flow path.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Cont'd)

2. During reactor power operation, RHRSW pumps must be OPERABLE and assigned to service as indicated in Table 3.5-1 for the specified time limits.

3. During unit 2 power operation, any two RHRSW pumps (D1, D2, B1, and B2) normally or alternately assigned to the RHR heat exchanger header supplying the standby coolant supply connection must be OPERABLE except as specified in 3.5.C.4 and 3.5.C.5 below.

4.5.C. RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Cont'd)

2. a. If no more than two RHRSW pumps are INOPERABLE, increased surveillance is not required.
- b. When three RHRSW pumps are INOPERABLE, the remaining pumps and associated essential control valves shall be operated weekly.
- c. When four RHRSW pumps are INOPERABLE, the remaining pumps and associated essential control valves shall be operated daily.

3. Routine surveillance for these pumps is specified in 4.5.C.1.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.D. Equipment Area Coolers

1. The equipment area cooler associated with each RHR pump and the equipment area cooler associated with each set of core spray pumps (A and C or B and D) must be OPERABLE at all times when the pump or pumps served by that specific cooler is considered to be OPERABLE.
2. When an equipment area cooler is not OPERABLE, the pump(s) served by that cooler must be considered INOPERABLE for Technical Specification purposes.

E. High Pressure Coolant Injection System (HPCIS)

1. The HPCI system shall be OPERABLE:
 - (1) prior to startup from a Cold Condition; or
 - (2) whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is greater than 122 psig, except as specified in Specification 3.5.E.2.

4.5.D. Equipment Area Coolers

1. Each equipment area cooler is operated in conjunction with the equipment served by that particular cooler; therefore, the equipment area coolers are tested at the same frequency as the pumps which they serve.

E. High Pressure Coolant Injection System (HPCIS)

1. HPCI Subsystem testing shall be performed as follows:
 - a. Simulated Automatic Actuation Test Once/operating cycle
 - b. Pump Operability Once/month
 - c. Motor Operated Valve Operability Once/month
 - d. Flow Rate at normal reactor vessel operating pressure Once/3 months

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Continued)

4. Three of the D1, D2, B1, B2 RHRSW pumps assigned to the RHR heat exchanger supplying the standby coolant supply connection may be INOPERABLE for a period not to exceed 30 days provided the OPERABLE pump is aligned to supply the RHR heat exchanger header and the associated diesel generator and essential control valves are OPERABLE.
5. The standby coolant supply capability may be INOPERABLE for a period not to exceed 10 days.
6. If Specifications 3.5.C.2 through 3.5.C.5 are not met, an orderly shutdown shall be initiated and the unit placed in the Cold Shutdown condition within 24 hours.
7. There shall be at least 2 RHRSW pumps, associated with the selected RHR pumps, aligned for RHR heat exchanger service for each reactor vessel containing irradiated fuel.

4.5.C. RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Cont'd)

4. When it is determined that three of the RHRSW pumps supplying standby coolant are INOPERABLE at a time when operability is required, the OPERABLE RHRSW pump on the same header and the RHR heat exchanger header and associated essential control valves shall be demonstrated to be OPERABLE immediately and every 15 days thereafter.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

Applies to all the auxiliary electrical power system.

Objective

To assure an adequate supply of electrical power for operation of those systems required for safety.

Specification

A. Auxiliary Electrical Equipment

1. The reactor shall not be started up (made critical) from the cold condition unless the following are satisfied:
 - a. Diesel generators A, B, C, and D OPERABLE.
 - b. Requirements 3.9.A.3 through 3.9.A.6 are met.
 - c. At least two of the following offsite power sources are available:
 - (1) The 500-kV system is available to the units 1 and 2 shut-down boards through the unit 1 station-service transformer TUSS 1B with no credit taken for the two 500-kV Trinity lines. If the unit 2 station-service transformer is the second source, a minimum of two 500-kV lines must be available.

SURVEILLANCE REQUIREMENTS

4.9 AUXILIARY ELECTRICAL SYSTEM

Applicability

Applies to the periodic testing requirements of the auxiliary electrical system.

Objective

Verify the operability of the auxiliary electrical system.

Specification

A. Auxiliary Electrical System

1. Diesel Generators
 - a. Each diesel generator shall be manually started and loaded to demonstrate operational readiness in accordance with the frequency specified in Table 4.9.A on a staggered test basis. The test shall continue for at least a one hour period at 75% of rated load or greater and the operation of the diesel fuel oil transfer pumps shall be demonstrated. Also, the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers.

The diesel generator fast starts (10 seconds) from standby conditions shall be performed once per 184 days in these surveillance tests. All other engine starts for the purpose of this test may be preceded by an engine idle start.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

3.9.A.1.c. (Cont'd)

- (2) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 2 station-service transformer TUSS 2B with no credit taken for the two 500-kV Trinity lines. If the unit 1 station-service transformer is the second choice, a minimum of two 500-kV lines must be available.
- (3) The Trinity 161-kV line is available to the units 1 and 2 shutdown boards through both common station-service transformers.

NOTES FOR (3):

- (a) If unit 3 is claiming the Trinity line as an offsite source, see unit 3 technical specifications, section 3.9.A.1.c.2.
- (b) If unit 1 is in cold shutdown, only one common station-service transformer is required.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

4.9.A.1. (Cont'd)

Additional reporting requirements due to failures are noted in Table 4.9.A.

All diesel generator starts shall be logged.

- b. Once per operating cycle, a test will be conducted simulating a loss of offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:
 - (1) Deenergization of the emergency buses and load shedding from the emergency buses.
 - (2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads through load sequencing, and operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

.9.A. Auxiliary Electrical Equipment

4.9.A. Auxiliary Electrical System

3.9.A.1.c. (Cont'd)

4.9.A.1.b (Cont'd)

- (4) The Athens 161-kV line is available to the units 1 and 2 shutdown boards through a common station-service transformer when unit 1 is in Cold Shutdown and unit 3 is not claiming the Athens line as an offsite source.

- (3) On diesel generator breaker trip, the loads are shed from the emergency buses and the diesel output breaker recloses on the autostart signal, the emergency buses are energized with permanently connected loads, the autoconnected emergency loads are energized through load sequencing, and the diesel operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

NOTE FOR (3) AND (4):

With no cooling tower pumps or fans running, a cooling tower transformer may be substituted for a common station-service transformer.

- c. Once a month the quantity of diesel fuel available shall be logged.
- d. Each diesel generator shall be given an annual inspection in accordance with instructions based on the manufacturer's recommendations.
- e. Once a month a sample of diesel fuel shall be checked for quality. The quality shall be within acceptable limits specified in Table 1 of the latest revision to ASTM D975 and logged.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

2. The reactor shall not be started up (made critical) from the hot standby condition unless all of the following conditions are satisfied:
 - a. At least one offsite power source is available as specified in 3.9.A.1.c.
 - b. Three units 1 and 2 diesel generators shall be OPERABLE.
 - c. An additional source of power consisting of one of the following:
 - (1) A second offsite power source available as specified in 3.9.A.1.c.
 - (2) A fourth OPERABLE units 1 and 2 diesel generator.
 - d. Requirements 3.9.A.3 through 3.9.A.6 are met.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

2. DC Power System - Unit Batteries (250-V), Diesel-Generator Batteries (125-V) and Shutdown Board Batteries (250-V)
 - a. Every week the specific gravity, voltage and temperature of the pilot cell and overall battery voltage shall be measured and logged.
 - b. Every three months the measurement shall be made of voltage of each cell to nearest 0.1 volt, specific gravity of each cell, and temperature of every fifth cell. These measurements shall be logged.
 - c. A battery rated discharge (capacity) test shall be performed and the voltage, time, and output current measurements shall be logged at intervals not to exceed 24 months.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.B. Operation with Inoperable Equipment

Whenever the reactor is in STARTUP mode or RUN mode and not in a cold condition, the availability of electric power shall be as specified in 3.9.A except as specified herein.

1. From and after the date that only one offsite power source is available, reactor operation is permissible for 7 days.

2. From and after the date that the 4-kV bus tie board becomes INOPERABLE, reactor operation is permissible indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

SURVEILLANCE REQUIREMENTS

4.9.B. Operation with Inoperable Equipment

1. When only one offsite power source is OPERABLE, all units 1 and 2 diesel generators must be demonstrated to be OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter.

2. When a required offsite power source is unavailable to unit 1 because the 4-kV bus tie board or a start bus is INOPERABLE, all unit 1 and 2 diesel generators shall be demonstrated OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter. The remaining offsite source and associated buses shall be checked to be energized daily.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

5. Logic Systems

a. Common accident signal logic system is OPERABLE.

b. 480-V load shedding logic system is OPERABLE.

6. There shall be a minimum of 103,300 gallons of diesel fuel in the standby diesel-generator fuel tanks.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

4.9.A.4. (Cont'd)

c. The loss of voltage and degraded voltage relays which start the diesel generators from the 4-kV shutdown boards shall be calibrated annually for trip and reset and the measurements logged. These relays shall be calibrated as specified in Table 4.9.A.4.c.

d. 4-kV shutdown board voltages shall be recorded once every 12 hours.

5. 480-V RMOV Boards 2D and 2E

a. Once per operating cycle the automatic transfer feature for 480-V RMOV boards 2D and 2E shall be functionally tested to verify auto-transfer capability.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.B. Operation With Inoperable Equipment

3. When one of the units 1 and 2 diesel generator is INOPERABLE, continued reactor operation is permissible during the succeeding 7 days, provided that 2 offsite power sources are available as specified in 3.9.A.1.c and all of the CS, RHR (LPCI and containment cooling) systems, and the remaining three units 1 and 2 diesel generators are OPERABLE. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.
4. When one units 1 and 2 4-kV shutdown board is INOPERABLE, continued reactor operation is permissible for a period of 5 days provided that 2 offsite power sources are available as specified in 3.9.A.1.c and the remaining 4-kV shutdown boards and associated diesel generators, CS, RHR (LPCI and containment cooling) systems, and all 480-V emergency power boards are OPERABLE. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the cold condition within 24 hours.

SURVEILLANCE REQUIREMENTS

4.9.B. Operation With Inoperable Equipment

3. When one of the units 1 and 2 diesel generators is found to be INOPERABLE, all of the remaining diesel generators shall be demonstrated to be OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter.
4. When one 4-kV shutdown board is found to be INOPERABLE, all diesel generators associated with the remaining 4-kV shutdown boards shall be demonstrated to be OPERABLE within 24 hours, and power availability for the remaining 4-kV shutdown boards shall be verified within 1 hour and at least once per 8 hours thereafter.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.B. Operation With Inoperable Equipment

5. When one of the shutdown buses is INOPERABLE, reactor operation is permissible for a period of 7 days.
6. When one of the 480-V diesel auxiliary boards becomes INOPERABLE, reactor operation is permissible for a period of 5 days.
7. From and after the date that one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued reactor operation is permissible during the succeeding 7 days. Except for routine surveillance testing, NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

4.9.B. Operation With Inoperable Equipment

5. When a shutdown bus is found to be INOPERABLE, all 1 and 2 diesel generators shall be proven OPERABLE within 24 hours.
6. When one units 1 and 2 diesel auxiliary board is found to be INOPERABLE, each unit 1 and 2 diesel generator shall be proven OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

AUXILIARY ELECTRICAL SYSTEMS

TABLE 4.9.A

Diesel Generator Reliability

| <u>No. of Failures in last 20 valid tests*</u> | <u>No. of Failures in last 100 valid tests*</u> | <u>Reliability Actions</u> |
|--|---|--|
| ≤ 1 | - | Test at least once per 31 days |
| ≥ 2 | - | Test at least once per 7 days** |
| ≥ 3 | ≥ 6 | Within 30 days, prepare a report for NRC audit, in accordance with Section 6.9.2.7. |
| ≥ 5 | ≥ 11 | Declare the diesel generator INOPERABLE and perform a requalification test for the affected diesel generator pursuant to the attachment to this table. |

* Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, except that the number of tests and failures are determined on a per diesel generator basis. For the purposes of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 20 valid tests". Entry into this test schedule shall be made at the 31 day test frequency.

**This test frequency shall be maintained until seven consecutive failure free demands have been performed and the number of failures in the last 20 valid demands has been reduced on one or less.

B1-N - Unit 2

3.9/4.9-16

Amendment No. 149

ATTACHMENT TO TABLE 4.9.A
DIESEL GENERATOR REQUALIFICATION PROGRAM

- (1) Perform seven consecutive successful demands without a failure within 30 days of diesel generator being restored to operable status and fourteen consecutive successful demands without a failure within 75 days of diesel generator of being restored to OPERABLE status.
- (2) If a failure occurs during the first seven tests in the requalification test program, perform seven successful demands without an additional failure within 30 days of diesel generator of being restored to OPERABLE status and fourteen consecutive successful demands without a failure within 75 days of being restored to OPERABLE status.
- (3) If a failure occurs during the second seven tests (tests 8 through 14) of (1) above, perform fourteen consecutive successful demands without an additional failure within 75 days of the failure which occurred during the requalification testing.
- (4) Following the second failure during the requalification test program, be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- (5) During requalification testing the diesel generator should not be tested more frequently than at 24-hour intervals.

After a diesel generator has been successfully requalified, subsequent repeated requalification tests will not be required for that diesel generator under the following conditions:

- (a) The number of failures in the last 20 valid demands is less than 5.
- (b) The number of failures in the last 100 valid demands is less than 11.
- (c) In the event that, following successful requalification of a diesel generator, the number of failures is still in excess of the remedial action criteria (a and/or b above) the following exception will be allowed until the diesel generator is no longer in violation of the remedial action criteria (a and/or b above).

Requalification testing will not be required provided that after each valid demand the number of failures in the last 20 and/or 100 valid demands has not increased. Once the diesel generator is no longer in violation of the remedial action criteria above the provisions of those criteria alone will prevail.

TABLE 4.9.A.4.C
VOLTAGE RELAY SETPOINTS/DIESEL GENERATOR START

| <u>Relay Location</u> | <u>Trip Level Setting</u> | | <u>Remarks</u> |
|--|--|--|--|
| 1. 4-kV Shutdown Boards | Trip Setpoint: Allowable Values: Trip Range: Reset Setpoint: Allowable Values: Reset Range: | 0 volts with a 1.5-second time delay + .1 second 1.4 to 1.6 seconds 2870-V +2% of 2870-V 2813-V to 2927-V | Start diesel generators on loss of offsite power. |
| <u>Undervoltage</u> | | | |
| 2. 4-kV Shutdown Boards | Trip Setpoint: Allowable Values: Reset Setpoint: | 3920 3900-3940 Reset at $\leq 1.5\%$ above trip value | Second level undervoltage sensing relays - start diesel generator on degraded voltage. |
| 3. 4-kV Shutdown Boards (timers shown for 4-kV shutdown board A. 4-kV shutdown boards B, C, and D, similar, except for change of suffix.) | <u>Timer</u> | <u>Setpoint (seconds)</u> | <u>Critical Time (seconds)</u> |
| | 2-211-1A | 0.3 $\pm 10\%$ | N/A |
| | 2-211-2A | 4.0 $\pm 10\%$ | N/A |
| | 2-211-3A | 6.9 $\pm 10\%$ | 8.2 |
| | 2-211-4A | 1.3 $\pm 10\%$ | 1.5 |
| | | | Auxiliary timers for second level undervoltage sensing relays. |
| | | | The setpoint ranges specified assure that the operating times will be below the critical times specified. These ranges are based on timer repeatability of $\pm 5\%$ as specified by the manufacturer. |

BIN Unit 2

3.9/4.9-18

Amendment No. 149

3.9 BASES

The objective of this specification is to assure an adequate source of electrical power to operate facilities to cool the plant during shutdown and to operate the engineered safeguards following an accident. There are three sources of alternating current electrical energy available, namely, the 161-kV transmission system, the 500-kV transmission system, and the diesel generators.

The unit station-service transformer B for unit 1 or the unit station-service transformer B for unit 2 provide noninterruptible sources of offsite power from the 500-kV transmission system to the units 1 and 2 shutdown boards. Auxiliary power can also be supplied from the 161-kV transmission system through the common station-service transformers or through the cooling tower transformers by way of the bus tie board. The 4-kV bus tie board may remain out of service indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

The minimum fuel oil requirement of 103,300 gallons is sufficient for seven days of full load operation of three diesels and is conservatively based on availability of a replenishment supply.

The degraded voltage sensing relays provide a start signal to the diesel generators in the event that a deteriorated voltage condition exists on a 4-kV shutdown board. This starting signal is independent of the starting signal generated by the complete loss of voltage relays and will continue to function and start the diesel generators on complete loss of voltage should the loss of voltage relays become inoperable. The 15-day inoperable time limit specified when one of the three phase-to-phase degraded voltage relays is inoperable is justified based on the two-out-of-three permissive logic scheme provided with these relays.

A 4-kV shutdown board is allowed to be out of operation for a brief period to allow for maintenance and testing, provided all remaining 4-kV shutdown boards and associated diesel generators, CS, RHR, (LPCI and containment cooling) systems supplied by the remaining 4-kV shutdown boards, and all emergency 480-V power boards are operable.

There are eight 250-V dc battery systems, each of which consists of a battery, battery charger, and distribution equipment. Three of these systems provide power for unit control functions, operative power for unit motor loads, and alternative drive power for a 115-V ac unit-preferred mg set. One 250-V dc system provides power for common plant and transmission system control functions, drive power for a 115-V ac plant-preferred mg set, and emergency drive power for certain unit large motor loads. The four remaining systems deliver control power to the 4,160-V shutdown boards.

3.9 BASES (Cont'd)

Each 250-V dc shutdown board control power supply can receive power from its own battery, battery charger, or from a spare charger. The chargers are powered from normal plant auxiliary power or from the standby diesel-driven generator system. Zero resistance short circuits between the control power supply and the shutdown board are cleared by fuses located in the respective control power supply. Each power supply is located in the reactor building near the shutdown board it supplies. Each battery is located in its own independently ventilated battery room.

The 250-V dc system is so arranged, and the batteries sized so that the loss of any one unit battery will not prevent the safe shutdown and cooldown of all three units in the event of the loss of offsite power and a design basis accident in any one unit. Loss of control power to any engineered safeguard control circuits is annunciated in the main control room of the unit affected. The loss of one 250-V shutdown board battery affects normal control power only for the 4,160-V shutdown board which it supplies. The station battery supplies loads that are not essential for safe shutdown and cooldown of the nuclear system. This battery was not considered in the accident load calculations.

There are two 480-V ac RMOV boards that contain mg sets in their feeder lines. These 480-V ac RMOV boards have an automatic transfer from their normal to alternate power source (480-V ac shutdown boards). The mg sets act as electrical isolators to prevent a fault from propagating between electrical divisions due to an automatic transfer. The 480-V ac RMOV boards involved provide motive power to valves associated with the LPCI mode of the RHR system. Having an mg set out of service reduces the assurance that full RHR (LPCI) capacity will be available when required. Since sufficient equipment is available to maintain the minimum complement required for RHR (LPCI) operation, a 7-day servicing period is justified. Having two mg sets out of service can considerably reduce equipment availability; therefore, the affected unit shall be placed in Cold Shutdown within 24 hours.

The offsite power source requirements are based on the capacity of the respective lines. The Trinity line is limited to supplying two operating units because of the load limitations of CSST's A and B. The Athens line is limited to supplying one operating unit because of the load limitations of the Athens line. The limiting conditions are intended to prevent the 161-kV system from supplying more than two units in the event of a single failure in the offsite power system.

4.9 BASES

The monthly tests of the diesel generators are primarily to check for failures and deterioration in the system since last use. The diesels will be loaded to at least 75 percent of rated power while engine and generator temperatures are stabilized (about one hour). The minimum 75-percent load will prevent soot formation in the cylinders and injection nozzles. Operation up to an equilibrium temperature ensures that there is no overheating problem. The tests also provide an engine and generator operating history to be compared with subsequent engine-generator test data to identify and to correct any mechanical or electrical deficiency before it can result in a system failure.

The test during refueling outages is more comprehensive, including procedures that are most effectively conducted at that time. These include automatic actuation and functional capability tests to verify that the generators can start and be ready to assume load in 10 seconds. The annual inspection will detect any signs of wear long before failure. The diesel generators are shared by units 1 and 2. Therefore, the capability for the units 1 and 2 diesel generators to accept the emergency loads will be performed during the unit 1 operating cycle using the unit 1 loads.

Battery maintenance with regard to the floating charge, equalizing charge, and electrolyte level will be based on the manufacturer's instruction and sound maintenance practices. In addition, written records will be maintained of the battery performance. The plant batteries will deteriorate with time but precipitous failure is unlikely. The type of surveillance called for in this specification is that which has been demonstrated through experience to provide an indication of a cell becoming irregular or unserviceable long before it becomes a failure.

The equalizing charge, as recommended by the manufacturer, is vital to maintaining the ampere-hour capacity of the battery, and will be applied as recommended.

The testing of the logic systems will verify the ability of the logic systems to bring the auxiliary electrical system to running standby readiness with the presence of an accident signal from any reactor or an undervoltage signal on the 4-kV shutdown boards.

The periodic simulation of accident signals in conjunction with diesel-generator voltage available signals will confirm the ability of the 480-V load shedding logic system to sequentially shed and restart 480-V loads if an accident signal were present and diesel-generator voltage were the only source of electrical power.

REFERENCES

1. Normal Auxiliary Power System (BFNP FSAR Subsection 8.4)
2. Standby AC Power Supply and Distribution (BFNP FSAR Subsection 8.5)
3. 250-Volt DC Power Supply and Distribution (BFNP FSAR Subsection 8.6)
4. Memorandum from Gene M. Wilhoite to H. J. Green dated December 4, 1981 (LOO 811208 664) and memorandum from C. E. Winn to H. J. Green dated January 10, 1983 (G02 830112 002)

Report shall be submitted within 10 days after the event describing the magnitude, frequency spectrum, and resultant effect upon plant features important to safety.

7. Diesel Generator Reliability Improvement Program Report shall be submitted within 30 days of meeting failure criteria in Table 4.9.A. As a minimum, the reliability Improvement Program report for NRC audit shall include:
 - a. A summary of all tests (valid and invalid) that occurred within the time period over which the last 20/100 valid tests were performed.
 - b. Analysis of failures and determination of root causes of failures.
 - c. Evaluation of each of the recommendations of NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability in Operating Reactors," with respect to their application to the plant.
 - d. Identification of all actions taken or to be taken to (1) Correct the root causes of failures defined in b above and (2) Achieve a general improvement of diesel generator reliability.
 - e. A supplemental report shall be prepared for an NRC audit within 30 days after each subsequent failure during a valid demand, for so long as the affected diesel generator unit continues to violate the criteria (3/20 or 6/100) for the reliability improvement program remedial action. The supplemental report need only update the failure/demand history for the affected diesel generator unit since the last report for that diesel generator. The supplemental report shall also present an analysis of the failure(s) with a root cause determination, if possible, and shall delineate any further procedural, hardware or operational changes to be incorporated into the site diesel generator improvement program and the schedule for implementation of those changes.

| | | |
|--|--------|--|
| 8. Secondary Containment Leak Rate Testing* | 4.7.C. | Within 90 days of completion of each test. |
| 9. High-Range Primary Containment Radiation Monitors | 3.2.F | Within 7 days after 7 days of inoperability. |
| 10. High-Range Gaseous Effluent Radiation Monitors | 3.2.F | Within 7 days after 7 days of inoperability. |

*Each integrated leak rate test of the secondary containment shall be the subject of a summary technical report. This report should include data on the wind speed, wind direction, outside and inside temperatures during the test, concurrent reactor building pressure, and emergency ventilation flow rate. The report shall also include analyses and interpretations of those data which demonstrate compliance with the specified leak rate limits.

6.10 STATION OPERATING RECORDS AND RETENTION

6.10.1 Records and/or logs shall be kept in a manner convenient for review as indicated below:

- a. All normal plant operation including such items as power level, fuel exposure, and shutdowns
- b. Principal maintenance activities
- c. Reportable Events
- d. Checks, inspections, tests, and calibrations of components and systems, including such diverse items as source leakage
- e. Reviews of changes made to the procedures or equipment or reviews of tests and experiments to comply with 10 CFR 50.59
- f. Radioactive shipments
- g. Test results in units of microcuries for leak tests performed pursuant to Specification 3.8.D



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-296

BROWNS FERRY NUCLEAR PLANT, UNIT 3

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 124
License No. DPR-68

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Tennessee Valley Authority (the licensee) dated May 29, 1987, as supplemented April 13, 1988, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

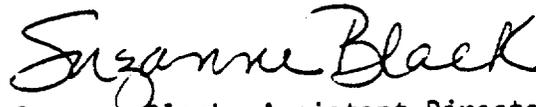
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-68 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 124, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Suzanne Black, Assistant Director
for Projects
TVA Projects Division
Office of Special Projects

Attachment:
Changes to the Technical
Specifications

Date of Issuance: August 19, 1988

ATTACHMENT TO LICENSE AMENDMENT NO. 149

FACILITY OPERATING LICENSE NO. DPR-68

DOCKET NO. 50-296

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change. Overleaf pages* are provided to maintain document completeness.

REMOVE

vii
viii
3.5/4.5-1
3.5/4.5-2
3.5/4.5-5
3.5/4.5-6
3.5/4.5-7
3.5/4.5-8
3.5/4.5-9
3.5/4.5-10
3.5/4.5-12
3.5/4.5-13
3.9/4.9-1
3.9/4.9-2
3.9/4.9-3
3.9/4.9-4
3.9/4.9-7
3.9/4.9-8
3.9/4.9-9
3.9/4.9-10
3.9/4.9-15
3.9/4.9-16
3.9/4.9-17
3.9/4.9-18
3.9/4.9-19
3.9/4.9-20
3.9/4.9-21
6.0-27
6.0-28

INSERT

vii
viii*
3.5/4.5-1*
3.5/4.5-2
3.5/4.5-5
3.5/4.5-6
3.5/4.5-7*
3.5/4.5-8
3.5/4.5-9*
3.5/4.5-10
3.5/4.5-12
3.5/4.5-13*
3.9/4.9-1
3.9/4.9-2
3.9/4.9-3
3.9/4.9-4*
3.9/4.9-7*
3.9/4.9-8
3.9/4.9-9
3.9/4.9-10
3.9/4.9-15
3.9/4.9-16
3.9/4.9-17
3.9/4.9-18
3.9/4.9-19
3.9/4.9-20
3.9/4.9-21
6.0-27
6.0-28

LIST OF TABLES (Cont'd)

| <u>Table</u> | <u>Title</u> | <u>Page No.</u> |
|--------------|--|-----------------|
| 4.2.E | Minimum Test and Calibration Frequency for Drywell Leak Detection Instrumentation. | 3.2/4.2-52 |
| 4.2.F | Minimum Test and Calibration Frequency for Surveillance Instrumentation | 3.2/4.2-53 |
| 4.2.G | Surveillance Requirements for Control Room Isolation Instrumentation. | 3.2/4.2-55 |
| 4.2.H | Minimum Test and Calibration Frequency for Flood Protection Instrumentation | 3.2/4.2-56 |
| 4.2.J | Seismic Monitoring Instrument Surveillance Requirements | 3.2/4.2-57 |
| 4.2.K | Radioactive Gaseous Effluent Instrumentation Surveillance | 3.2/4.2-61 |
| 3.5-1 | Minimum RHRSW and EECW Pump Assignment | 3.5/4.5-11 |
| 3.5.I | MAPLHGR Versus Average Planar Exposure | 3.5/4.5-21 |
| 3.7.A | Primary Containment Isolation Valves | 3.7/4.7-24 |
| 3.7.B | Testable Penetrations with Double O-Ring Seals | 3.7/4.7-31 |
| 3.7.C | Testable Penetrations with Testable Bellows. | 3.7/4.7-32 |
| 3.7.D | Air Tested Isolation Valves. | 3.7/4.7-33 |
| 3.7.E | Primary Containment Isolation Valves which Terminate below the Suppression Pool Water Level. | 3.7/4.7-36 |
| 3.7.F | Primary Containment Isolation Vales Located in Water Sealed Seismic Class 1 Lines | 3.7/4.7-37 |
| 3.7.H | Testable Electrical Penetrations | 3.7/4.7-38 |
| 4.9.A | Diesel Generator Reliability | 3.9/4.9-15 |
| 4.9.A.4.C | Voltage Relay Setpoints/Diesel Generator Start | 3.9/4.9-17 |
| 3.11.A | Fire Protection System Hydraulic Requirements. | 3.11/4.11-10 |
| 6.2.A | Minimum Shift Crew Requirements. | 6.0-3 |

LIST OF ILLUSTRATIONS

| <u>Figure</u> | <u>Title</u> | <u>Page No.</u> |
|---------------|--|-----------------|
| 2.1.1 | APRM Flow Reference Scram and APRM Rod Block Settings | 1.1/2.1-6 |
| 2.1-2 | APRM Flow Bias Scram Vs. Reactor Core Flow | 1.1/2.1-7 |
| 4.1-1 | Graphic Aid in the Selection of an Adequate Interval Between Tests | 3.1/4.1-12 |
| 4.2-1 | System Unavailability. | 3.2/4.2-63 |
| 3.4-1 | Sodium Pentaborate Solution Volume Concentrated Requirements | 3.4/4.4-4 |
| 3.4-2 | Sodium Pentaborate Solution Temperature Requirements | 3.4/4.4-5 |
| 3.5.K-1 | MCPR Limits. | 3.5/4.5-25 |
| 3.5.2 | K _f Factor. | 3.5/4.5-26 |
| 3.6-1 | Minimum Temperature °F Above Change in Transient Temperature. | 3.6/4.6-24 |
| 3.6-2 | Change in Charpy V Transition Temperature Vs. Neutron Exposure | 3.6/4.6-25 |
| 4.8.1.a | Gaseous Release Points and Elevation | 3.8/4.8-10 |
| 4.8.1.b | Land Site Boundary | 3.8/4.8-11 |
| 6.2-1 | Offsite Organization for Facility Management and Technical Support | 6.0-33 |
| 6.2-2 | Facility Organization | 6.0-34 |

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5 CORE AND CONTAINMENT COOLING SYSTEMS

4.5 CORE AND CONTAINMENT COOLING SYSTEMS

Applicability

Applies to the operational status of the Core and Containment Cooling Systems.

Applicability

Applies to the surveillance requirements of the Core and Containment Cooling Systems when the corresponding limiting condition for operation is in effect.

Objective

To assure the operability of the Core and Containment Cooling Systems under all conditions for which this cooling capability is an essential response to plant abnormalities.

Objective

To verify the operability of the Core and Containment Cooling Systems under all conditions for which this cooling capability is an essential response to plant abnormalities.

Specification

Specification

A. Core Spray System (CSS)

A. Core Spray System (CSS)

1. The CSS shall be OPERABLE:
 - (1) prior to reactor startup from a Cold Condition, or
 - (2) when there is irradiated fuel in the vessel and when the reactor vessel pressure is greater than atmospheric pressure, except as specified in Specification 3.5.A.2.

1. Core Spray System Testing.

| | <u>Item</u> | <u>Frequency</u> |
|----|--|-----------------------|
| a. | Simulated Automatic Actuation test | Once/ Operating Cycle |
| b. | Pump Operability | Once/ month |
| c. | Motor Operated Valve Operability | Once/ month |
| d. | System flow rate: Each loop shall deliver at least 6250 gpm against a system head corresponding to a | Once/3 months |

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.A Core Spray System (CSS)

2. If one CSS loop is INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days providing all active components in the other CSS loop and the RHR system (LPCI mode) and the diesel generators are OPERABLE.
3. If Specification 3.5.A.1 or Specification 3.5.A.2 cannot be met, the reactor shall be shutdown in the Cold Condition within 24 hours.
4. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel at least one core spray loop with one OPERABLE pump and associated diesel generator shall be OPERABLE, except with the reactor vessel head removed as specified in 3.5.A.5 or prior to reactor startup as specified in 3.5.A.1.

SURVEILLANCE REQUIREMENTS

4.5.A Core Spray System (CSS)

4.5.A.1.d (Cont'd)

105 psi
differential
pressure
between the
reactor vessel
and the primary
containment.

- e. Testable Once/
Check Valve Operating
 Cycle

2. When it is determined that one core spray loop is INOPERABLE, at a time when operability is required, the other core spray loop and the RHRS (LPCI mode) shall be demonstrated to be OPERABLE immediately. The OPERABLE core spray loop shall be demonstrated to be OPERABLE daily thereafter.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENT

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

3. If one RHR pump (LPCI mode) is INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days provided the remaining RHR pumps (LPCI mode) and both access paths of the RHRS (LPCI mode) and the CSS and the diesel generators remain OPERABLE.
4. If any 2 RHR pumps (LPCI mode) become INOPERABLE, the reactor shall be placed in the Cold Shutdown condition within 24 hours.
5. If one RHR pump (containment cooling mode) or associated heat exchanger is INOPERABLE, the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pumps (containment cooling mode) and associated heat exchangers and diesel generators and all access paths of the RHRS (containment cooling mode) are OPERABLE.

4.5.B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

3. When it is determined that one RHR pump (LPCI mode) is INOPERABLE at a time when operability is required, the remaining RHR pumps (LPCI mode) and active components in both access paths of the RHRS (LPCI mode) and the CSS shall be demonstrated to be OPERABLE immediately and daily thereafter.
4. No additional surveillance required.
5. When it is determined that one RHR pump (containment cooling mode) or associated heat exchanger is INOPERABLE at a time when operability is required, the remaining RHR pumps (containment cooling mode), the associated heat exchangers and all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and weekly thereafter until the INOPERABLE RHR pump (containment cooling mode) and associated heat exchanger is returned to normal service.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITION FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5 B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

6. If two RHR pumps (containment cooling mode) or associated heat exchangers are INOPERABLE, the reactor may remain in operation for a period not to exceed 7 days provided the remaining RHR pumps (containment cooling mode), the associated heat exchangers, diesel generators, and all access paths of the RHRS (containment cooling mode) are OPERABLE.

7. If two access paths of the RHRS (containment cooling mode) for each phase of the mode (drywell sprays, suppression chamber sprays, and suppression pool cooling) are not OPERABLE, the unit may remain in operation for a period not to exceed 7 days provided at least one path for each phase of the mode remains OPERABLE.

4.5 B. Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)

6. When it is determined that two RHR pumps (containment cooling mode) or associated heat exchangers are INOPERABLE at a time when operability is required, the remaining RHR pumps (containment cooling mode), the associated heat exchangers, and all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and daily thereafter until at least three RHR pumps (containment cooling mode) and associated heat exchangers are returned to normal service.

7. When it is determined that one or more access paths of the RHRS (containment cooling mode) are INOPERABLE when access is required, all active components in the access paths of the RHRS (containment cooling mode) shall be demonstrated to be OPERABLE immediately and all active components in the access paths which are not backed by a second OPERABLE access path for the same phase of the mode (drywell sprays, suppression chamber sprays and suppression pool cooling) shall be demonstrated to be OPERABLE daily thereafter until the second path is returned to normal service.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)(Cont'd)

8. If Specifications 3.5.B.1 through 3.5.B.7 are not met, an orderly shutdown shall be initiated and the reactor shall be shutdown and placed in the Cold Condition within 24 hours.
9. When the reactor vessel pressure is atmospheric and irradiated fuel is in the reactor vessel at least one RHR loop with two pumps or two loops with one pump per loop shall be OPERABLE. The pumps' associated diesel generators must also be OPERABLE.
10. If the conditions of Specification 3.5.A.5 are met, LPCI and containment cooling are not required.
11. When there is irradiated fuel in the reactor and the reactor vessel pressure is greater than atmospheric, unit 2 RHR pumps B and D associated with heat exchangers and valves must be OPERABLE and capable of supplying cross-connect capability except as specified in Specification 3.5.B.12 below. (Note: Because cross-connect capability is not a short-term requirement, a component is not considered INOPERABLE if cross-connect capability can be restored to service within 5 hours.)

SURVEILLANCE REQUIREMENTS

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)(Cont'd)

8. No additional surveillance required.
9. When the reactor vessel pressure is atmospheric, the RHR pumps and valves that are required to be OPERABLE shall be demonstrated to be OPERABLE monthly.
10. No additional surveillance required.
11. The B and D RHR pumps on unit 2 which supply cross-connect capability shall be OPERABLE monthly when the cross-connect capability is required.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)(Cont'd)

12. If one RHR pump or associated heat exchanger located on the unit cross-connection in unit 2 is INOPERABLE for any reason (including valve inoperability, pipe break, etc.), the reactor may remain in operation for a period not to exceed 30 days provided the remaining RHR pump and associated diesel generator are OPERABLE.
13. If RHR cross-connection flow or heat removal capability is lost, the unit may remain in operation for a period not to exceed 10 days unless such capability is restored.
14. All recirculation pump discharge valves shall be OPERABLE prior to reactor startup (or closed if permitted elsewhere in these specifications).

SURVEILLANCE REQUIREMENTS

4.5.B Residual Heat Removal System (RHRS) (LPCI and Containment Cooling)(Cont'd)

12. When it is determined that one RHR pump or associated heat exchanger located on the unit cross-connection in the adjacent unit is INOPERABLE at a time when operability is required, the remaining RHR pump and associated heat exchanger on the unit cross-connection shall be demonstrated to be OPERABLE immediately and every 15 days thereafter until the INOPERABLE pump and associated heat exchanger are returned to normal service.
13. No additional surveillance required.
14. All recirculation pump discharge valves shall be tested for operability during any period of reactor Cold Shutdown exceeding 48 hours, if operability tests have not been performed during the preceding 31 days.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS)

1. Prior to reactor startup from a Cold Condition, 9 RHRSW pumps must be OPERABLE, with 7 pumps (including pump B1 or B2) assigned to RHRSW service and 2 automatically starting pumps assigned to EECW service.

SURVEILLANCE REQUIREMENTS

4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWS)

1. a. Each of the RHRSW pumps normally assigned to automatic service on the EECW headers will be tested automatically each time the diesel generators are tested. Each of the RHRSW pumps and all associated essential control valves for the EECW headers and RHR heat exchanger headers shall be demonstrated to be OPERABLE once every three months.
- b. Annually each RHRSW pump shall be flow-rate tested. To be considered OPERABLE, each pump shall pump at least 4500 gpm through its normally assigned flow path.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Cont'd)

2. During reactor power operation, RHRSW pumps must be OPERABLE and assigned to service as indicated in Table 3.5-1 for the specified time limits.

3. During power operation, both RHRSW pumps B1 and B2 normally or alternately assigned to the RHR heat exchanger header supplying the standby coolant supply connection must be OPERABLE; except as specified in 3.5.C.4 and 3.5.C.5 below.

SURVEILLANCE REQUIREMENTS

4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Cont'd)

2.
 - a. If no more than two RHRSW pumps are INOPERABLE, increased surveillance is not required.
 - b. When three RHRSW pumps are INOPERABLE, the remaining pumps and associated essential control valves shall be operated weekly.
 - c. When four RHRSW pumps are INOPERABLE, the remaining pumps and associated essential control valves shall be operated daily.

3. Routine surveillance for these pumps is specified in 4.5.C.1.

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.5.D Equipment Area Coolers

1. The equipment area cooler associated with each RHR pump and the equipment area cooler associated with each set of core spray pumps (A and C or B and D) must be OPERABLE at all times when the pump or pumps served by that specific cooler is considered to be OPERABLE.
2. When an equipment area cooler is not OPERABLE, the pump(s) served by that cooler must be considered INOPERABLE for Technical Specification purposes.

E. High Pressure Coolant Injection System (HPCIS)

1. The HPCI system shall be OPERABLE:
 - (1) prior to startup from a Cold Condition; or
 - (2) whenever there is irradiated fuel in the reactor vessel and the reactor vessel pressure is greater than 122 psig, except as specified in Specification 3.5.E.2.

4.5.D Equipment Area Coolers

1. Each equipment area cooler is operated in conjunction with the equipment served by that particular cooler; therefore, the equipment area coolers are tested at the same frequency as the pumps which they serve.

E. High Pressure Coolant Injection System (HPCIS)

1. HPCI subsystem testing shall be performed as follows:
 - a. Simulated Automatic Actuation Test Once/operating cycle
 - b. Pump Operability Once/month
 - c. Motor Operated Valve Operability Once/month
 - d. Flow Rate at normal reactor vessel operating pressure Once/3 months

3.5/4.5 CORE AND CONTAINMENT COOLING SYSTEMS

LIMITING CONDITIONS FOR OPERATION

3.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Cont'd)

4. One of the B1 or B2 RHRSW pumps assigned to the RHR heat exchanger supplying the standby coolant supply connection may be INOPERABLE for a period not to exceed 30 days provided the OPERABLE pump is aligned to supply the RHR heat exchanger header and the associated diesel generator and essential control valves are OPERABLE.
5. The standby coolant supply capability may be INOPERABLE for a period not to exceed 10 days.
6. If Specifications 3.5.C.2 through 3.5.C.5 are not met, an orderly shutdown shall be initiated and the unit placed in the Cold Shutdown condition within 24 hours.
7. There shall be at least 2 RHRSW pumps, associated with the selected RHR pumps, aligned for RHR heat exchanger service for each reactor vessel containing irradiated fuel.

SURVEILLANCE REQUIREMENTS

4.5.C RHR Service Water and Emergency Equipment Cooling Water Systems (EECWs) (Cont'd)

4. When it is determined that the B1 or B2 RHRSW pump is INOPERABLE at a time when operability is required, the OPERABLE RHRSW pump on the same header and the RHR heat exchanger header and associated essential control valves shall be demonstrated to be OPERABLE immediately and every 15 days thereafter.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9 Auxiliary Electrical System

Applicability

Applies to all the auxiliary electrical power system.

Objective

To assure an adequate supply of electrical power for operation of those systems required for safety.

Specification

A. Auxiliary Electrical Equipment

1. The reactor shall not be started up (made critical) from the Cold Condition unless the following are satisfied:
 - a. Diesel generators 3A, 3B, 3C, and 3D OPERABLE.
 - b. Requirements 3.9.A.3 through 3.9.A.6 are met.
 - c. At least two of the following offsite power sources are available:
 - (1) The 500-kV system is available to the unit 3 shutdown boards through the unit 3 station-service transformer TUSS 3B with no credit taken for the two 500-kV Trinity lines.

SURVEILLANCE REQUIREMENTS

4.9 Auxiliary Electrical System

Applicability

Applies to the periodic testing requirements of the auxiliary electrical system.

Objective

Verify the operability of the auxiliary electrical system.

Specification

A. Auxiliary Electrical System

1. Diesel Generators

- a. Each diesel generator shall be manually started and loaded to demonstrate operational readiness in accordance with the frequency specified in Table 4.9.A on a staggered test basis. The test shall continue for at least a 1 hour period at 75% of rated load or greater and the operation of the diesel fuel oil transfer pumps shall be demonstrated. Also, the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers.

The diesel generator fast starts (10 seconds) from standby conditions shall be performed once per 184 days in these surveillance tests. All other engine starts for the purpose of this test may be preceded by an engine idle start.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

3.9.A.1.c. (Cont'd)

- (2) The Trinity 161-kV line is available to the unit 3 shutdown boards through a common station-service or cooling tower transformer.

NOTE FOR (2):

If units 1 and 2 are both in operation and claiming the Trinity line as an offsite source, TUSS 3B must be claimed as the other offsite source for unit 3.

- (3) The Athens 161-kV line is available to unit 3 shutdown boards through a common station-service or cooling tower transformer.

NOTE FOR (3):

If either unit 1 or unit 2 is claiming the Athens line as an offsite source, it may not be claimed as an offsite source for unit 3.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

4.9.A.1. (Cont'd)

Additional reporting requirements due to failures are noted in Table 4.9.A.

All diesel generator starts shall be logged.

- b. Once per operating cycle, a test will be conducted simulating a loss of offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:

- (1) Deenergization of the emergency buses and load shedding from the emergency buses.
- (2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads through load sequencing, and operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

3.9.A.1.c.(3) (Cont'd)

NOTES FOR (2) AND (3):

If both Athens and Trinity lines are claimed as the two offsite sources for unit 3, no credit may be taken for the Athens-Trinity line tie breaker. Specifically, the Athens line supplies unit 3 through common station-service transformer A or cooling tower transformer 1, and the Trinity line must supply unit 3 through common station-service transformer B or cooling tower transformer. 2.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

4.9.A.1.b. (Cont'd)

(3) On diesel generator breaker trip, the loads are shed from the emergency buses and the diesel output breaker closes on the autostart signal, the emergency buses are energized with permanently connected loads, the auto-connected emergency loads are energized through load sequencing, and the diesel operates for greater than or equal to five minutes while its generator is loaded with the emergency loads.

- c. Once a month the quantity of diesel fuel available shall be logged.
- d. Each diesel generator shall be given an annual inspection in accordance with instructions based on the manufacturer's recommendations.
- e. Once a month a sample of diesel fuel shall be checked for quality. The quality shall be within acceptable limits specified in Table 1 of the latest revision to ASTM D975 and logged.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

2. The reactor shall not be started up (made critical) from the Hot Standby condition unless all of the following conditions are satisfied:
 - a. At least one offsite power source is available as specified in 3.9.A.1.c.
 - b. Three units 3 diesel generators shall be OPERABLE.
 - c. An additional source of power consisting of one of the following:
 - (1) A second offsite power source available as specified in 3.9.A.1.c.
 - (2) A fourth unit 3 diesel generator OPERABLE.
 - d. Requirements 3.9.A.3 through 3.9.A.6 are met.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

2. DC Power System - Unit Batteries (250-V), Diesel-Generator Batteries (125-V) and Shutdown Board Batteries (250-V)
 - a. Every week the specific gravity, voltage, and temperature of the pilot cell, and overall battery voltage shall be measured and logged.
 - b. Every three months the measurements shall be made of voltage of each cell to nearest 0.1 volt, specific gravity of each cell, and temperature of every fifth cell. These measurements shall be logged.
 - c. A battery rated discharge (capacity) test shall be performed and the voltage, time, and output current measurements shall be logged at intervals not to exceed 24 months.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.A. Auxiliary Electrical Equipment

5. Accident signal logic system is OPERABLE.

6. There shall be a minimum of 103,300 gallons of diesel fuel in the unit 3 standby diesel-generator fuel tanks.

SURVEILLANCE REQUIREMENTS

4.9.A. Auxiliary Electrical System

4.9.A.4. (Cont'd)

- c. The loss of voltage and degraded voltage relays which start the diesel generators from the 4-kV shutdown boards shall be calibrated annually for trip and reset and the measurements logged. These relays shall be calibrated as specified in Table 4.9.A.4.c.

 - d. 4-kV shutdown board voltages shall be recorded once every 12 hours.
-
- ##### 5. 480-V RMOV Boards 3D and 3E
- a. Once per operating cycle, the automatic transfer feature for 480-V RMOV boards 3D and 3E shall be functionally tested to verify auto-transfer capability.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.B. Operation with Inoperable Equipment

Whenever the reactor is in STARTUP mode or RUN mode and not in a Cold Condition, the availability of electric power shall be as specified in 3.9.A except as specified herein.

1. From and after the date that only one offsite power source is available, reactor operation is permissible under this condition for seven days.
2. When one unit 3 diesel generator (3A, 3B, 3C, or 3D) is INOPERABLE, continued reactor operation is permissible during the succeeding 7 days, provided that two offsite power sources are available as specified in 3.9.A.1.c. and all of the CS, RHR (LPCI and containment cooling) systems, and the remaining three unit 3 diesel generators are OPERABLE. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the Cold Condition within 24 hours.

SURVEILLANCE REQUIREMENTS

4.9.B. Operation with Inoperable Equipment

1. When only one offsite power source is OPERABLE, all unit 3 diesel generators must be demonstrated to be OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter.
2. When one unit 3 diesel generator is found to be INOPERABLE, all of the remaining unit 3 diesel generators shall be demonstrated to be OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

3.9.B. Operation With Inoperable Equipment

3. From and after the date that the 4-kV bus tie board becomes inoperable, reactor operation is permissible indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

4. When one unit 3 4-kV shutdown board is INOPERABLE, continued reactor operation is permissible for a period of 5 days provided that 2 offsite power sources are available as specified in 3.9.A.1.c and the remaining unit 3 4-kV shutdown boards and associated diesel generators, CS, RHR (LPCI and containment cooling) systems, and all unit 3 480-V emergency power boards are OPERABLE. If this requirement cannot be met, an orderly shutdown shall be initiated and the reactor shall be shut down and in the Cold Condition within 24 hours.

SURVEILLANCE REQUIREMENTS

4.9.B. Operation With Inoperable Equipment

3. When a required offsite power source is unavailable because the 4-kV bus tie board or a start bus is INOPERABLE, all unit 3 diesel generators shall be demonstrated OPERABLE within 24 hours, and power availability for the associated boards shall be verified within 1 hour and at least once per 8 hours thereafter. The remaining offsite source and associated buses shall be checked to be energized daily.

4. When one unit 3 4-kV shutdown board is found to be INOPERABLE, all diesel generators associated with the remaining 4-kV shutdown boards shall be demonstrated to be OPERABLE within 24 hours, and power availability for the remaining 4-kV shutdown boards shall be verified within 1 hour and at least once per 8 hours thereafter.

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.9.B. Operation With Inoperable Equipment

5. From and after the date that one of the 480-V, diesel auxiliary boards becomes INOPERABLE, reactor operation is permissible for a period of 5 days.

6. From and after the date that the 250-V shutdown board 3EB battery or one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued reactor operation is permissible during the succeeding seven days. Except for routine surveillance testing, the NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

7. When one division of the logic system is INOPERABLE, continued reactor operation is permissible under this condition for seven days, provided the CSCS requirements listed in Specification 3.9.B.2 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

4.9.B. Operation With Inoperable Equipment

5. When one 480-V diesel auxiliary board is found INOPERABLE, each unit 3 diesel shall be verified OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

AUXILIARY ELECTRIC SYSTEMS

TABLE 4.9.A

Diesel Generator Reliability

| <u>No. of Failures in last 20 valid tests*</u> | <u>No. of Failures in last 100 valid tests*</u> | <u>Reliability Actions</u> |
|--|---|--|
| ≤ 1 | - | Test at least once per 31 days |
| ≥ 2 | - | Test at least once per 7 days** |
| ≥ 3 | ≥ 6 | Within 30 days, prepare a report for NRC audit, in accordance with Section 6.9.2.7. |
| ≥ 5 | ≥ 11 | Declare the diesel generator INOPERABLE and perform a requalification test for the affected diesel generator pursuant to the attachment to this table. |

* Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, except that the number of tests and failures are determined on a per diesel generator basis. For the purposes of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 20 valid tests". Entry into this test schedule shall be made at the 31 day test frequency.

**This test frequency shall be maintained until seven consecutive failure free demands have been performed and the number of failures in the last 20 valid demands has been reduced on one or less.

BFN - Unit 3

3.9/4.9-15

Amendment No. 124

ATTACHMENT TO TABLE 4.9.A
DIESEL GENERATOR REQUALIFICATION PROGRAM

- (1) Perform seven consecutive successful demands without a failure within 30 days of diesel generator being restored to operable status and fourteen consecutive successful demands without a failure within 75 days of diesel generator of being restored to OPERABLE status.
- (2) If a failure occurs during the first seven tests in the requalification test program, perform seven successful demands without an additional failure within 30 days of diesel generator of being restored to OPERABLE status and fourteen consecutive successful demands without a failure within 75 days of being restored to OPERABLE status.
- (3) If a failure occurs during the second seven tests (tests 8 through 14) of (1) above, perform fourteen consecutive successful demands without an additional failure within 75 days of the failure which occurred during the requalification testing.
- (4) Following the second failure during the requalification test program, be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- (5) During requalification testing the diesel generator should not be tested more frequently than at 24-hour intervals.

After a diesel generator has been successfully requalified, subsequent repeated requalification tests will not be required for that diesel generator under the following conditions:

- (a) The number of failures in the last 20 valid demands is less than 5.
- (b) The number of failures in the last 100 valid demands is less than 11.
- (c) In the event that, following successful requalification of a diesel generator, the number of failures is still in excess of the remedial action criteria (a and/or b above) the following exception will be allowed until the diesel generator is no longer in violation of the remedial action criteria (a and/or b above).

Requalification testing will not be required provided that after each valid demand the number of failures in the last 20 and/or 100 valid demands has not increased. Once the diesel generator is no longer in violation of the remedial action criteria above the provisions of those criteria alone will prevail.

TABLE 4.9.A.4.C

VOLTAGE RELAY SETPOINTS/DIESEL GENERATOR START

| Relay Location | Trip Level Setting | | Remarks |
|--|--|--|--|
| 1. 4-kV Shutdown Boards | Trip Setpoint: | 0 volts with a 1.5-second time delay | Start diesel generators on loss of offsite power. |
| | Allowable Values: | + .1 second | |
| | Trip Range: | 1.4 to 1.6 seconds | |
| | Reset Setpoint: | 2870-V | |
| | Reset Range: | 2813-V to 2927-V | |
| <u>Undervoltage</u> | | | |
| 2. 4-kV Shutdown Boards | Trip Setpoint: | 3920 | Second level undervoltage sensing relays - start diesel generator on degraded voltage. |
| | Allowable Values: | 3900-3940 | |
| | Reset Setpoint: | Reset at $\leq 1.5\%$ above trip value | |
| 3. 4-kV Shutdown Boards (Timers shown for 4-kV shutdown board 3EA. 4-kV shutdown boards B, C, and D, similar, except for change of suffix.) | <u>Timer</u> | <u>Setpoint (seconds)</u> | <u>Critical Time (seconds)</u> |
| | 2-211-1A | 0.3 $\pm 10\%$ | N/A |
| | 2-211-2A | 4.0 $\pm 10\%$ | N/A |
| | 2-211-3A | 6.9 $\pm 10\%$ | 8.2 |
| | 2-211-4A | 1.3 $\pm 10\%$ | 1.5 |
| | Auxiliary timers for second level undervoltage sensing relays. | | |
| | The setpoint ranges specified assure that the operating times will be below the critical times specified. These ranges are based on timer repeatability of $\pm 5\%$ as specified by the manufacturer. | | |

BFN-Unit 3

3.9/4.9-17

Amendment No. 124

3.9 BASES

The objective of this specification is to assure an adequate source of electrical power to operate facilities to cool the unit during shutdown and to operate the engineered safeguards following an accident. There are three sources of alternating current electrical energy available, namely, the 161-kV transmission system, the 500-kV transmission system, and the diesel generators.

The unit station-service transformer B for unit 3 provides a noninterruptible source of offsite power from the 500-kV transmission system to the unit 3 shutdown boards. Auxiliary power can also be supplied from the 161-kV transmission system through the common station-service transformers or through the cooling tower transformers by way of the bus tie board. The 4-kV bus tie board may remain out of service indefinitely provided one of the required offsite power sources is not supplied from the 161-kV system through the bus tie board.

The minimum fuel oil requirement of 103,300 gallons is sufficient for seven days of full load operation of three diesels and is conservatively based on availability of a replenishment supply.

The degraded voltage sensing relays provide a start signal to the diesel generators in the event that a deteriorated voltage condition exists on a 4-kV shutdown board. This starting signal is independent of the starting signal generated by the complete loss of voltage relays and will continue to function and start the diesel generators on complete loss of voltage should the loss of voltage relays become inoperable. The 15-day inoperable time limit specified when one of the three phase-to-phase degraded voltage relays is inoperable is justified based on the two-out-of-three permissive logic scheme provided with these relays.

A 4-kV shutdown board is allowed to be out of operation for a brief period to allow for maintenance and testing, provided all remaining 4-kV shutdown boards and associated diesel generators, CS, RHR, (LPCI and containment cooling) systems supplied by the remaining 4-kV shutdown boards, and all emergency 480-V power boards are operable.

The 480-V diesel auxiliary board may be out of service for short periods for tests and maintenance. There are five 250-V dc battery systems associated with unit 3, each of which consists of a battery, battery charger, and distribution equipment. Three of these systems provide power for unit control functions, operative power for unit motor loads, and alternative drive power for a 115-V ac unit-preferred mg set. One 250-V dc system provides power for common plant and transmission system control functions, drive power for a 115-V ac plant-preferred mg set, and emergency drive power for certain unit large motor loads. The fifth battery system delivers control power to a 4-kV shutdown board.

3.9 BASES (Cont'd)

The 250-V dc system is so arranged and the batteries sized so that the loss of any one unit battery will not prevent the safe shutdown and cooldown of all three units in the event of the loss of offsite power and a design basis accident in any one unit. Loss of control power to any engineered safeguard control circuits is annunciated in the main control room of the unit affected.

The station battery supplies loads that are not essential for safe shutdown and cooldown of the nuclear system. This battery was not considered in the accident load calculations.

There are two 480-V ac RMOV boards that contain mg sets in their feeder lines. These 480-V ac RMOV boards have an automatic transfer from their normal to alternate power source (480-V ac shutdown boards). The mg sets act as electrical isolators to prevent a fault from propagating between electrical divisions due to an automatic transfer. The 480-V ac RMOV boards involved provide motive power to valves associated with the LPCI mode of the RHR system. Having an mg set out of service reduces the assurance that full RHR (LPCI) capacity will be available when required. Since sufficient equipment is available to maintain the minimum complement required for RHR (LPCI) operation, a 7-day servicing period is justified. Having two mg sets out of service can considerably reduce equipment availability; therefore, the affected unit shall be placed in Cold Shutdown within 24 hours.

The offsite power source requirements are based on the capacity of the respective lines. The Trinity line is limited to supplying two operating units because of the load limitations of CSST's A and B. The Athens line is limited to supplying one operating unit because of the load limitations of the Athens line. The limiting conditions are intended to prevent the 161-kV system from supplying more than two units in the event of a single failure in the offsite power system.

4.9 BASES

The monthly tests of the diesel generators are primarily to check for failures and deterioration in the system since last use. The diesels will be loaded to at least 75 percent of rated power while engine and generator temperatures are stabilized (about one hour). The minimum 75-percent load will prevent soot formation in the cylinders and injection nozzles. Operation up to an equilibrium temperature ensures that there is no overheating problem. The tests also provide an engine and generator operating history to be compared with subsequent engine-generator test data to identify and to correct any mechanical or electrical deficiency before it can result in a system failure.

The test during refueling outages is more comprehensive, including procedures that are most effectively conducted at that time. These include automatic actuation and functional capability tests to verify that the generators can start and be ready to assume load in 10 seconds. The annual inspection will detect any signs of wear long before failure.

Battery maintenance with regard to the floating charge, equalizing charge, and electrolyte level will be based on the manufacturer's instruction and sound maintenance practices. In addition, written records will be maintained of the battery performance. The plant batteries will deteriorate with time but precipitous failure is unlikely. The type of surveillance called for in this specification is that which has been demonstrated through experience to provide an indication of a cell becoming irregular or unserviceable long before it becomes a failure.

The equalizing charge, as recommended by the manufacturer, is vital to maintaining the ampere-hour capacity of the battery, and will be applied as recommended.

The testing of the logic system will verify the ability of the logic systems to bring the auxiliary electrical system to running standby readiness with the presence of an accident signal from any reactor or an undervoltage signal on the start buses or 4-kV shutdown boards.

The periodic simulation of accident signals in conjunction with diesel-generator voltage available signals will confirm the ability of the 480-V load shedding logic system to sequentially shed and restart 480-V loads if an accident signal were present and diesel-generator voltage were the only source of electrical power.

4.9 BASES (Cont'd)

References

1. Normal Auxiliary Power System (BFNP FSAR Subsection 8.4)
2. Standby AC Power Supply and Distribution (BFNP FSAR Subsection 8.5)
3. 250-Volt DC Power Supply and Distribution (BFNP FSAR Subsection 8.6)
4. Memorandum from G. M. Wilhoite to H. J. Green dated December 4, 1981 (LOO 811208 664) and memorandum from C. E. Winn to H. J. Green dated January 10, 1983 (G02 830112 002)

Report shall be submitted within 10 days after the event describing the magnitude, frequency spectrum, and resultant effect upon plant features important to safety.

7. Diesel Generator Reliability Improvement Program Report shall be submitted within 30 days of meeting failure criteria in Table 4.9.A. As a minimum, the reliability Improvement Program report for NRC audit shall include:
 - a. A summary of all tests (valid and invalid) that occurred within the time period over which the last 20/100 valid tests were performed.
 - b. Analysis of failures and determination of root causes of failures.
 - c. Evaluation of each of the recommendations of NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability in Operating Reactors," with respect to their application to the plant.
 - d. Identification of all actions taken or to be taken to (1) Correct the root causes of failures defined in b above and (2) Achieve a general improvement of diesel generator reliability.
 - e. A supplemental report shall be prepared for an NRC audit within 30 days after each subsequent failure during a valid demand, for so long as the affected diesel generator unit continues to violate the criteria (3/20 or 6/100) for the reliability improvement program remedial action. The supplemental report need only update the failure/demand history for the affected diesel generator unit since the last report for that diesel generator. The supplemental report shall also present an analysis of the failure(s) with a root cause determination, if possible, and shall delineate any further procedural, hardware or operational changes to be incorporated into the site diesel generator improvement program and the schedule for implementation of those changes.

8. Secondary Containment
Leak Rate Testing*

4.7.C.

Within 90 days
of completion
of each test.

*Each integrated leak rate test of the secondary containment shall be the subject of a summary technical report. This report should include data on the wind speed, wind direction, outside and inside temperatures during the test, concurrent reactor building pressure, and emergency ventilation flow rate. The report shall also include analyses and interpretations of those data which demonstrate compliance with the specified leak rate limits.

6.10 STATION OPERATING RECORDS AND RETENTION

6.10.1 Records and/or logs shall be kept in a manner convenient for review as indicated below:

- a. All normal plant operation including such items as power level, fuel exposure, and shutdowns
- b. Principal maintenance activities
- c. Reportable Events
- d. Checks, inspections, tests, and calibrations of components and systems, including such diverse items as source leakage
- e. Reviews of changes made to the procedures or equipment or reviews of tests and experiments to comply with 10 CFR 50.59
- f. Radioactive shipments
- g. Test results in units of microcuries for leak tests performed pursuant to Specification 3.8.D

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

SUPPORTING AMENDMENT NO. 153 TO FACILITY OPERATING LICENSE NO. DPR-33

AMENDMENT NO. 149 TO FACILITY OPERATING LICENSE NO. DPR-52

AMENDMENT NO. 124 TO FACILITY OPERATING LICENSE NO. DPR-68

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3

DOCKETS NOS. 50-259, 50-260 AND 50-296

1.0 INTRODUCTION

The staff has determined that the risk from station blackout is such that early actions to improve diesel generator reliability would have a significant safety benefit. By letter dated July 2, 1984 the NRC issued Generic Letter (GL) 84-15 which contained proposed actions to improve and maintain diesel generator reliability. GL 84-15 contained recommendations for changes to the Technical Specifications (TS) to reduce the number of fast starts and improve reliability.

By letter dated May 29, 1987, the Tennessee Valley Authority (TVA) (the licensee) submitted a TS change as recommended by GL 84-15 for the Browns Ferry Nuclear Plant (BFN) Units 1, 2 and 3. Upon initial staff review it was apparent that the proposed amendments did not require the same level of testing as the proposed TS in GL 84-15 when only one offsite power source is operable and when one of any of the units' diesel generators, shutdown bus, 5-KV shutdown board or diesel auxiliary board are inoperable. After discussions with the NRC staff, the licensee, by letter dated April 13, 1988, proposed additional TS changes which clarify the original application to better implement the recommendations of the generic letter.

2.0 EVALUATION

The proposed changes to the BFN TS would prevent excessive testing and improve reliability of the diesel generators. The proposed changes include the following:

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PDR

1. Delete the requirements for diesel generator testing whenever an emergency core cooling system (ECCS) train becomes inoperable. TS 4.5.A.2, 4.5.B.3, 4.5.B.5, 4.5.B.6, 4.5.B.12, 4.5.C.2.b, 4.5.C.2.c, and 4.5.4.
2. TS 4.9.B.1, 2, 3, 4, 5, and 6 require the remaining diesel generators and other electrical equipment to be tested "immediately and daily thereafter" whenever another diesel generator or other electrical equipment is inoperable. These specifications would be changed to require testing within 24 hours and verify power availability for the associated or remaining boards within 1 hour and at least once per 8 hours thereafter.
3. Administrative changes to add Table 4.9.A which specifies diesel generator testing frequencies and reliability program. TS 4.9.A.1.a, Table 4.9.A, and 6.9.2.7.
4. Restrict the requirement for diesel generator fast starts to once per 184 days. TS 4.9.A.1.a.
5. Require a log book to record diesel generator starts. TS 4.9.A.1.a.

The following pages would be revised only to provide proper pagination: Units 1 and 2, pages 3.9/4.9-3, -18, -19, -20, -21 and -22; Unit 3, pages 3.9/4.9-3, -17, -18, -19, -20, and -21.

The requirement to test the diesel generators whenever an ECCS train fails as stated in GL 84-15, will result in the excessive testing and degradation of the diesel engines. Failures experienced in the ECCS and residual heat removal (RHR) service water systems have no mechanistic connection with the performance of operable diesel generators and therefore additional testing of the diesel generators is not required.

The current TS require the remaining diesel generators or other TS listed electrical equipment be tested "immediately and daily thereafter" whenever another TS listed power source is declared inoperable. TVA has proposed to modify this requirement to require diesel testing within 24 hours and verification of availability of power for the associated or remaining board(s) within 1 hour and at least once per 8 hours thereafter. The immediate testing currently required by the TS subjects the diesel engine to undue wear and stress on the engine parts. TVA states that a 24-hour interval will reduce unnecessary starting and stopping of equipment and eliminate cold fast diesel startups. TVA also states that the associated boards will be verified in terms of correct breaker alignment and indicated power availability from the control room. The staff has evaluated these proposed changes and has determined that because no mechanistic relationship exists between the operability of an

individual power supply and the failure of other TS listed equipment, immediate testing is not necessary and, in fact, proper pre-lubrication before diesel startups should improve the reliability of the diesel generators. The proposed changes are also consistent with the frequency recommended in GL 84-15 and are, therefore, acceptable.

The proposed normal periodic surveillance testing frequency would be dependent upon test failure experience on a per diesel generator basis. This change is consistent with GL 84-15 and does not relax the current regular testing frequency. The present surveillance interval is monthly and the longest interval allowed by the new requirement will be once per 31 days. The staff has determined that the proposed surveillance frequencies will not adversely affect diesel generator performance, and is, therefore, acceptable.

The requirement for fast start testing has been proposed to be limited to once per 184 days as recommended in GL 84-15. Fast-start testing results in incremental degradation of the diesel engines and is therefore in opposition to diesel generator reliability and availability. However, it is felt that fast-start tests should not be totally eliminated because of the need for such a capability during a design basis accident. The proposed change to cold fast diesel starting once per 184 days is, therefore, acceptable.

To provide additional diesel generator reliability the licensee has proposed changes to the TS to incorporate performance specifications which encompass aspects of the existing requirements for surveillance testing of diesel generators stipulated in Regulatory Guide 1.108 and the qualitative recommendations of NUREG/CR-0660. The proposed changes are identical to the performance specifications recommended in GL 84-15 and are, therefore, acceptable.

The proposed changes to the TS are consistent with GL 84-15. They provide positive improvements to diesel generator reliability. Based on the above, the staff has concluded that the proposed changes to the TS will enhance plant safety, and are therefore, acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

The amendments involve a change to a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a

proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement nor environmental assessment need be prepared in connection with the issuance of these amendments.

4.0 CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (52 FR 49232) on December 30, 1987 and consulted with the State of Alabama. No public comments were received and the State of Alabama did not have any comments.

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security nor to the health and safety of the public.

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