ENCLOSURE 1

PROPOSED TECHNICAL SPECIFICATIONS REVISIONS

BROWNS FERRY NUCLEAR PLANT

UNITS 1, 2, AND 3

(TVA BFN TS 252)

TABLE OF CONTENTS

LIST OF TABLES

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.2.L ATWS/RPT	
1. The ATWS/RPT System Instrumentation shall be OPERABLE during REACTOR POWER OPERATION in accordance with Table 3.2.L.	1. Each of the ATWS/RPT System Instrumentation shall be OPERABLE BY performance of tests in Table 4.2.L.
2. The ATWS/RPT System Trip setpoints will be set in accordance with Table 3.2.L.	
3. The actions required when the number of operable channels is less than the minimum operable channels per trip system is specified in Table 3.2.L.	

TABLE 3.2.B (Continued)

Minimum No. Operable Per Trip Sys(1)	Function	Trip Level Setting	Action	Remarks
2	Instrument Channel - Drywell High Pressure (PS-64-58 E-H)	1≤ p≤2.5 psig	A	1. Below trip setting prevents inadvertent operation of containment spray during accident conditions.
2	Instrument Channel - Drywell High Pressure (PS-64-58 A-D, SW #2)	≤ 2.5 psig	A	1. Above trip setting in conjunction with low reactor pressure initiates CSS, Multiplier relays initiate HPCI. 2. Multiplier relay from CSS initiates accident signal. (15)
~~2~~	~~Instrument Channel - Reactor Low Water Level (LS-3-56A, B, C, D)~~	~~≥ 470" above vessel zero~~	~~A~~	~~1. Below trip setting trips recirculation pumps.~~
~~2~~	~~Instrument Channel - Reactor High Pressure (PS-3-204-A, B, C, D)~~	~~≤ 1120 psig~~	~~A~~	~~1. Above trip setting trips recirculation pumps.~~
2	Instrument Channel - Drywell High Pressure (PS-64-58A-D, SW #1)	≤ 2.5 psig	A	1. Above trip setting in conjunction with low reactor pressure initiates LPCI.
2(16)	Instrument Channel - Drywell High Pressure (PS-64-57A-D)	≤ 2.5 psig	A	1. Above trip setting, in conjunction with low reactor water level, drywell high pressure, 120 sec. delay timer and CSS or RHR pump running, initiates ADS.

Table 3.2.L

Minimum No. Channels operable per Trip Sys (1)	Function	Trip Setting	Allowable Value	Action	Remarks
2	ATWS/RPT Logic Reactor Dome Pressure High	1118 psig	$\leq$ 1146.5 psig	(2)	Two out of two of the high reactor dome pressure channels or the low reactor vessel level channels in either trip system trips both reactor recirculation pumps.
2	Reactor Vessel Level Low	483" above vessel zero	$\geq$ 471.52" above vessel zero		

(1) One channel in only one trip system may be placed in an inoperable status for up to 6 hours for required surveillance provided the other channels in that trip system are operable.

(2) Two trip systems exist, either of which will trip both recirculation pumps. Perform Surveillance/maintenance/calibration on one channel in only one trip system at a time. If a channel is found to be inoperable or if the surveillance/maintenance/calibration period for one channel exceeds 6 consecutive hours, the trip system will be declared inoperable or the channel will be placed in a tripped condition. If in RUN mode and one trip system is inoperable for 72 hours or both trip systems are inoperable, the reactor shall be in at least hot standby within 6 hours.

TABLE 4.2.B

SURVEILLANCE REQUIREMENTS FOR INSTRUMENTATION THAT INITIATE OR CONTROL THE CSCS

Function	Functional Test	Calibration	Instrument Check
Instrument Channel - Reactor Low Water Level (LIS-3-58A-D)	(1)	once/3 months	once/day
Instrument Channel - Reactor Low Water Level (LIS-3-104 & 105)	(1)	once/3 months	once/day
Instrument Channel - Reactor Low Water Level (LITS-3-52 & 62)	(1)	once/3 months	once/day
~~Instrument Channel - Reactor Low Water Level (LS-3-56A-D)~~	~~(1)~~	~~once/3 months~~	~~none~~
~~Instrument Channel - Reactor High Pressure (PS-3-204A-D)~~	~~(1)~~	~~once/3 months~~	~~none~~
Instrument Channel - Drywell High Pressure (PS-64-58E-H)	(1)	once/3 months	none
Instrument Channel - Drywell High Pressure (PS-64-58A-D)	(1)	once/3 months	none
Instrument Channel - Drywell High Pressure (PS-64-57A-D)	(1)	once/3 months	none
Instrument Channel - Reactor Low Pressure (PS-3-74A & B) (PS-68-95) (PS-68-96)	(1)	once/3 months	none

BFN-Unit 1

3.2/4.2-44

FEB 05 1987

NOTES FOR TABLES 4.2.A THROUGH 4.2.L except 4.2.D

1. Functional tests shall be performed once per month.

2. Functional tests shall be performed before each startup with a required frequency not to exceed once per week.

3. This instrumentation is excepted from the functional test definition. The functional test will consist of injecting a simulated electrical signal into the measurement channel.

4. Tested during logic system functional tests.

5. Refer to Table 4.1.B.

6. The logic system functional tests shall include a calibration once per operating cycle of time delay relays and timers necessary for proper functioning of the trip systems.

7. The functional test will consist of verifying continuity across the inhibit with a volt-ohmmeter.

8. Instrument checks shall be performed in accordance with the definition of instrument check (see Section 1.0, Definitions). An instrument check is not applicable to a particular setpoint, such as Upscale, but is a qualitative check that the instrument is behaving and/or indicating in an acceptable manner for the particular plant condition. Instrument check is included in this table for convenience and to indicate that an instrument check will be performed on the instrument. Instrument checks are not required when these instruments are not required to be operable or are tripped.

9. Calibration frequency shall be once/year.

10. Deleted

11. Portion of the logic is functionally tested during outage only.

12. The detector will be inserted during each operating cycle and the proper amount of travel into the core verified.

13. Functional test will consist of applying simulated inputs (see note 3). Local alarm lights representing upscale and downscale trips will be verified, but no rod block will be produced at this time. The inoperative trip will be initiated to produce a rod block (SRM and IRM inoperative also bypassed with the mode switch in RUN). The functions that cannot be verified to produce a rod block directly will be verified during the operating cycle.

14. (Deleted)

15. The flow bias comparator will be tested by putting one flow unit in "Test" (producing 1/2 scram) and adjusting the test input to obtain comparator rod block. The flow bias upscale will be verified by observing a local upscale trip light during operation and verified that it will produce a rod block during the operating cycle.

16. Performed during operating cycle. Portions of the logic is checked more frequently during functional tests of the functions that produce a rod block.

17. This calibration consists of removing the function from service and performing an electronic calibration of the channel.

18. Functional test is limited to the condition where secondary containment integrity is not required as specified in Sections 3.7.C.2 and 3.7.C.3.

19. Functional test is limited to the time where the SGTS is required to meet the requirements of Section 4.7.C.1.a.

20. Calibration of the comparator requires the inputs from both recirculation loops to be interrupted, thereby removing the flow bias signal to the APRM and RBM and scramming the reactor. This calibration can only be performed during an outage.

21. Logic test is limited to the time where actual operation of the equipment is permissible.

22. One channel of either the reactor zone or refueling zone Reactor Building Ventilation Radiation Monitoring System may be administratively bypassed for a period not to exceed 24 hours for functional testing and calibration.

23. (Deleted)

24. This instrument check consists of comparing the thermocouple readings for all valves for consistence and for nominal expected values (not required during refueling outages).

25. During each refueling outage, all acoustic monitoring channels shall be calibrated. This calibration includes verification of accelerometer response due to mechanical excitation in the vicinity of the sensor.

26. This instrument check consists of comparing the background signal levels for all valves for consistency and for nominal expected values (not required during refueling outages).

27. Functional test consists of the injection of a simulated signal into the electronic trip circuitry in place of the sensor signal to verify operability of the trip and alarm functions.

28. Calibration consists of the adjustment of the primary sensor and associated components so that they correspond within acceptable range and accuracy to known values of the parameter which the channel monitors, including adjustment of the electronic trip circuitry, so that its output relay changes state at or more conservatively than the analog equivalent of the trip level setting.

29. The functional test frequency decreased to once/3 months to reduce challenges to relief valves per NUREG-0737, Item II.K.3.16.

Table 4.2.L

Function	Functional Test	Channel Calibration	Instrument Check
Reactor Vessel Water Level Low LS-3-58A-D	M(27)	R(28)	N/A
Reactor Vessel Dome Pressure High PS-3-204-D	M(27)	R(28)	N/A

The operability of the meteorological instrumentation ensures that sufficient meteorological data is available for estimating potential radiation dose to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public.

The operability of the seismic instrumentation ensures that sufficient capability is available to promptly determine the magnitude of a seismic event and evaluate the response of those features important to safety. This capability is required to permit comparison of the measured response to that used in the design basis for Browns Ferry Nuclear Plant. The instrumentation provided is consistent with specific portions of the recommendations of Regulatory Guide 1.12 "Instrumentation for Earthquakes."

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments will be calculated in accordance with guidance provided in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring the concentration of potentially explosive gas mixtures in the offgas holdup system. The operability and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with guidance provided in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20 Appendix B, Table II, Column 2. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

ATWS/RPT, Anticipated Transients without Scram/Recirculation Pump Trip system provides a means of limiting the consequences of the unlikely occurrence of a failure to scram during an ATWS event. The response of the plant to this postulated event (ATWS/RPT) follows the BWR Owners Group Report by General Electric NEDE-31096-P-A and the accompanying NRC Staff Safety Evaluation Report.

ATWS/RPT utilizes the engineered safety feature (ESF) master/slave analog trip units (ATU) which consists of four level and four pressure channels total. The initiating logic consists of two independent trip systems each consisting of two reactor dome high pressure channels and two reactor vessel low level channels. A coincident trip of either two low levels or two high pressures in the same trip system causes initiation of ATWS/RPT. This signal from either trip system opens one of two EOC

3.2 BASES (Cont'd)

(end-of-cycle) breakers in series (the other system opens the other breaker) between the pump motor and the Motor Generator set driving each recirculation pump. Both systems are completely redundant such that only one trip system is necessary to perform the ATWS/RPT function. Power comes from the 250 VDC shutdown boards.

Setpoints for reactor dome high pressure and reactor vessel low level are such that a normal Reactor Protection System scram and accompanying recirculation pump trip would occur before or coincident with the trip by ATWS/RPT.

4.2 BASES

The instrumentation listed in Tables 4.2.A through 4.2.F will be functionally tested and calibrated at regularly scheduled intervals: The same design reliability goal as the Reactor Protection System of 0.99999 generally applies for all applications of (1-out-of-2) X (2) logic. Therefore, on-off sensors are tested once/3 months, and bistable trips associated with analog sensors and amplifiers are tested once/week.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (Cont'd)

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.2.L ATWS/RPT	
1. The ATWS/RPT System Instrumentation shall be OPERABLE during REACTOR POWER OPERATION in accordance with Table 3.2.L.	1. Each of the ATWS/RPT System Instrumentation shall be OPERABLE BY performance of tests in Table 4.2.L.
2. The ATWS/RPT System Trip setpoints will be set in accordance with Table 3.2.L.	
3. The actions required when the number of operable channels is less than the minimum operable channels per trip system is specified in Table 3.2.L.	

TABLE 3.2.B (Continued)

Minimum No. Operable Per Trip Sys(1)	Function	Trip Level Setting	Action	Remarks
2	Instrument Channel - Drywell High Pressure (PIS-64-58 E-H)	1≤ p≤2.5 psig	A	1. Below trip setting prevents inadvertent operation of containment spray during accident conditions.
2	Instrument Channel - Drywell High Pressure (PS-64-58 A-D)	≤ 2.5 psig	A	1. Above trip setting in conjunction with low reactor pressure initiates CSS. Multiplier relays initiate HPCI. 2. Multiplier relay from CSS initiates accident signal. (15)
~~2~~	~~Instrument Channel - Reactor Low Water Level (LIS-3-56A-D)~~	~~≥ 470" above vessel zero~~	~~A~~	~~1. Below trip setting trips recirculation pumps.~~
~~2~~	~~Instrument Channel - Reactor High Pressure (PIS-3-204A-D)~~	~~≤ 1120 psig~~	~~A~~	~~1. Above trip setting trips recirculation pumps.~~
2	Instrument Channel - Drywell High Pressure (PIS-64-58A-D)	≤ 2.5 psig	A	1. Above trip setting in conjunction with low reactor pressure initiates LPCI.
2(16)	Instrument Channel - Drywell High Pressure (PIS-64-57A-D)	≤ 2.5 psig	A	1. Above trip setting, in conjunction with low reactor water level, drywell high pressure, 120 sec. delay timer and CSS or RHR pump running, initiates ADS.

Table 3.2.L

Minimum No. Channels operable per Trip Sys (1)	Function	Trip Setting	Allowable Value	Action	Remarks
2	ATWS/RPT Logic Reactor Dome Pressure High	1118 psig	$\leq$ 1146.5 psig	(2)	Two out of two of the high reactor dome pressure channels or the low reactor vessel level channels in either trip system trips both reactor recirculation pumps.
2	Reactor Vessel Level Low	483" above vessel zero	$\geq$ 471.52" above vessel zero		

(1) One channel in only one trip system may be placed in an inoperable status for up to 6 hours for required surveillance provided the other channels in that trip system are operable.

(2) Two trip systems exist, either of which will trip both recirculation pumps. Perform Surveillance/maintenance/calibration on one channel in only one trip system at a time. If a channel is found to be inoperable or if the surveillance/maintenance/calibration period for one channel exceeds 6 consecutive hours, the trip system will be declared inoperable or the channel will be placed in a tripped condition. If in RUN mode and one trip system is inoperable for 72 hours or both trip systems are inoperable, the reactor shall be in at least hot standby within 6 hours.

TABLE 4.2.B
SURVEILLANCE REQUIREMENTS FOR INSTRUMENTATION THAT INITIATE OR CONTROL THE CSCS

Function	Functional Test	Calibration		Instrument Check
Instrument Channel Reactor Low Water Level (LIS-3-58A-D)	(1) (27)	Once/18 Months	(28)	Once/day
Instrument Channel Reactor Low Water Level (LIS-3-184 & 185)	(1) (27)	Once/18 Months	(28)	Once/day
Instrument Channel Reactor Low Water Level (LIS-3-52 & 62)	(1) (27)	Once/18 Months	(28)	Once/day
~~Instrument Channel Reactor Low Water Level (LIS-3-56A-B)~~	~~(1) (27)~~	~~Once/18 Months~~	~~(28)~~	~~none~~
~~Instrument Channel Reactor High Pressure (PIS-3-204A-B)~~	~~(1) (27)~~	~~Once/18 Months~~	~~(28)~~	~~none~~
Instrument Channel Drywell High Pressure (PIS-64-58E-H)	(1) (27)	Once/18 Months	(28)	none
Instrument Channel Drywell High Pressure (PIS-64-58A-D)	(1) (27)	Once/18 Months	(28)	none
Instrument Channel Drywell High Pressure (PIS-64-57A-D)	(1) (27)	Once/18 Months	(28)	none
Instrument Channel Reactor Low Pressure (PIS-3-74A&B, PS-3-74A&B) (PIS-68-95, PS-68-95) (PIS-68-96, PS-68-96)	(1) (27)	Once/18 Months	(28)	none

3.2/4.2-44

NOTES FOR TABLES 4.2.A THROUGH 4.2.L except 4.2. D

1. Functional tests shall be performed once per month.

2. Functional tests shall be performed before each startup with a required frequency not to exceed once per week.

3. This instrumentation is excepted from the functional test definition. The functional test will consist of injecting a simulated electrical signal into the measurement channel.

4. Tested during logic system functional tests.

5. Refer to Table 4.1.B.

6. The logic system functional tests shall include a calibration once per operating cycle of time delay relays and timers necessary for proper functioning of the trip systems.

7. The functional test will consist of verifying continuity across the inhibit with a volt-ohmmeter.

8. Instrument checks shall be performed in accordance with the definition of instrument check (see Section 1.0, Definitions). An instrument check is not applicable to a particular setpoint, such as Upscale, but is a qualitative check that the instrument is behaving and/or indicating in an acceptable manner for the particular plant condition. Instrument check is included in this table for convenience and to indicate that an instrument check will be performed on the instrument. Instrument checks are not required when these instruments are not required to be OPERABLE or are tripped.

9. Calibration frequency shall be once/year.

10. Deleted

11. Portion of the logic is functionally tested during outage only.

12. The detector will be inserted during each operating cycle and the proper amount of travel into the core verified.

13. Functional test will consist of applying simulated inputs (see note 3). Local alarm lights representing upscale and downscale trips will be verified, but no rod block will be produced at this time. The inoperative trip will be initiated to produce a rod block (SRM and IRM inoperative also bypassed with the mode switch in RUN). The functions that cannot be verified to produce a rod block directly will be verified during the operating cycle.

14. (Deleted)

15. The flow bias comparator will be tested by putting one flow unit in "Test" (producing 1/2 scram) and adjusting the test input to obtain comparator rod block. The flow bias upscale will be verified by observing a local upscale trip light during operation and verified that it will produce a rod block during the operating cycle.

16. Performed during operating cycle. Portions of the logic is checked more frequently during functional tests of the functions that produce a rod block.

17. This calibration consists of removing the function from service and performing an electronic calibration of the channel.

18. Functional test is limited to the condition where secondary containment integrity is not required as specified in Sections 3.7.C.2 and 3.7.C.3.

19. Functional test is limited to the time where the SGTS is required to meet the requirements of Section 4.7.C.1.a.

20. Calibration of the comparator requires the inputs from both recirculation loops to be interrupted, thereby removing the flow bias signal to the APRM and RBM and scramming the reactor. This calibration can only be performed during an outage.

21. Logic test is limited to the time where actual operation of the equipment is permissible.

22. One channel of either the reactor zone or refueling zone Reactor Building Ventilation Radiation Monitoring System may be administratively bypassed for a period not to exceed 24 hours for functional testing and calibration.

23. (Deleted)

24. This instrument check consists of comparing the thermocouple readings for all valves for consistence and for nominal expected values (not required during refueling outages).

25. During each refueling outage, all acoustic monitoring channels shall be calibrated. This calibration includes verification of accelerometer response due to mechanical excitation in the vicinity of the sensor.

NOTES FOR TABLES 4.2.A THROUGH 4.2.L except 4.2.D (Cont'd)

26. This instrument check consists of comparing the background signal levels for all valves for consistency and for nominal expected values (not required during refueling outages).

27. Functional test consists of the injection of a simulated signal into the electronic trip circuitry in place of the sensor signal to verify operability of the trip and alarm functions.

28. Calibration consists of the adjustment of the primary sensor and associated components so that they correspond within acceptable range and accuracy to known values of the parameter which the channel monitors, including adjustment of the electronic trip circuitry, so that its output relay changes state at or more conservatively than the analog equivalent of the trip level setting.

29. The functional test frequency decreased to once/3 months to reduce challenges to relief valves per NUREG-0737, Item II.K.3.16.

30. Calibration shall consist of an electronic calibration of the channel, not including the detector, for range decades above 10 R/hr and a one-point source check of the detector below 10 R/hr with an installed or portable gamma source.

Table 4.2.L

Function	Functional Test	Channel Calibration	Instrument Check
Reactor Vessel Water Level Low LS-3-58A-D	M(27)	R(28)	N/A
Reactor Vessel Dome Pressure High PS-3-204-D	M(27)	R(28)	N/A

3.2 BASES (Cont'd)

The operability of the meteorological instrumentation ensures that sufficient meteorological data is available for estimating potential radiation dose to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public.

The operability of the seismic instrumentation ensures that sufficient capability is available to promptly determine the magnitude of a seismic event and evaluate the response of those features important to safety. This capability is required to permit comparison of the measured response to that used in the design basis for Browns Ferry Nuclear Plant. The instrumentation provided is consistent with specific portions of the recommendations of Regulatory Guide 1.12 "Instrumentation for Earthquakes."

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments will be calculated in accordance with guidance provided in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring the concentration of potentially explosive gas mixtures in the offgas holdup system. The operability and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with guidance provided in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20 Appendix B, Table II, Column 2. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

ATWS/RPT, Anticipated Transients without Scram/Recirculation Pump Trip system provides a means of limiting the consequences of the unlikely occurrence of a failure to scram during an ATWS event. The response of the plant to this postulated event (ATWS/RPT) follows the BWR Owners Group Report by General Electric NEDE-31096-P-A and the accompanying NRC Staff Safety Evaluation Report.

ATWS/RPT utilizes the engineered safety feature (ESF) master/slave analog trip units (ATU) which consists of four level and four pressure channels total. The initiating logic consists of two independent trip systems each consisting of two reactor dome high pressure channels and two reactor vessel low level channels. A coincident trip of either two low levels or two high pressures in the same trip system causes initiation of ATWS/RPT. This signal from either trip system opens one of two EOC

(end-of-cycle) breakers in series (the other system opens the other breaker) between the pump motor and the Motor Generator set driving each recirculation pump. Both systems are completely redundant such that only one trip system is necessary to perform the ATWS/RPT function. Power comes from the 250 VDC shutdown boards.

Setpoints for reactor dome high pressure and reactor vessel low level are such that a normal Reactor Protection System scram and accompanying recirculation pump trip would occur before or coincident with the trip by ATWS/RPT.

4.2 BASES

The instrumentation listed in Tables 4.2.A through 4.2.F will be functionally tested and calibrated at regularly scheduled intervals. The same design reliability goal as the Reactor Protection System of 0.99999 generally applies for all applications of (1-out-of-2) X (2) logic. Therefore, on-off sensors are tested once/3 months, and bistable trips associated with analog sensors and amplifiers are tested once/week.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES (Cont'd)

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2. The ATWS/RPT System Trip setpoints will be set in accordance with Table 3.2.L.	
3. The actions required when the number of operable channels is less than the minimum operable channels per trip system is specified in Table 3.2.L.	

TABLE 3.2.B (Continued)

Minimum No. Operable Per Trip.Sys(1)	Function	Trip Level Setting	Action	Remarks
2	Instrument Channel - Drywell High Pressure (PS-64-58 E-H)	1≤ p≤2.5 psig	A	1. Below trip setting prevents inadvertent operation of containment spray during accident conditions.
2	Instrument Channel - Drywell High Pressure (PS-64 58 A-D, SW #2)	≤ 2.5 psig	A	1. Above trip setting in conjunction with low reactor pressure initiates CSS. Multiplier relays initiate HPCI. 2. Multiplier relay from CSS initiates accident signal. (15)
~~2~~	~~Instrument Channel - Reactor Low Water Level (LS-3-56A, B, C, D)~~	~~≥ 470" above vessel zero~~	~~A~~	~~1. Below trip setting trips recirculation pumps.~~
~~2~~	~~Instrument Channel - Reactor High Pressure (PS-3-204 A, B, C, D)~~	~~≤ 1120 psig~~	~~A~~	~~1. Above trip setting trips recirculation pumps.~~
2	Instrument Channel - Drywell High Pressure (PS-64-58A-D, SW #1)	≤ 2.5 psig	A	1. Above trip setting in conjunction with low reactor pressure initiates LPCI.
2(16)	Instrument Channel - Drywell High Pressure (PS-64-57A-D)	≤ 2.5 psig	A	1. Above trip setting, in conjunction with low reactor water level, drywell high pressure, 120 sec. delay timer and CSS or RHR pump running, initiates ADS.

Table 3.2.L

Minimum No. Channels operable per Trip Sys (1)	Function	Trip Setting	Allowable Value	Action	Remarks
2	ATWS/RPT Logic Reactor Dome Pressure High	1118 psig	$\leq$ 1146.5 psig	(2)	Two out of two of the high reactor dome pressure channels or the low reactor vessel level channels in either trip system trips both reactor recirculation pumps.
2	Reactor Vessel Level Low	483" above vessel zero	$\geq$ 471.52" above vessel zero		

(1) One channel in only one trip system may be placed in an inoperable status for up to 6 hours for required surveillance provided the other channels in that trip system are operable.

(2) Two trip systems exist, either of which will trip both recirculation pumps. Perform Surveillance/maintenance/calibration on one channel in only one trip system at a time. If a channel is found to be inoperable or if the surveillance/maintenance/calibration period for one channel exceeds 6 consecutive hours, the trip system will be declared inoperable or the channel will be placed in a tripped condition. If in RUN mode and one trip system is inoperable for 72 hours or both trip systems are inoperable, the reactor shall be in at least hot standby within 6 hours.

TABLE 4.2.B
SURVEILLANCE REQUIREMENTS FOR INSTRUMENTATION THAT INITIATE OR CONTROL THE CSCS

Function	Functional Test	Calibration	Instrument Check
Instrument Channel - Reactor Low Water Level (LIS-3-58A-D)	(1)	once/3 months	once/day
Instrument Channel - Reactor Low Water Level (LIS-3-184 & 185)	(1)	once/3 months	once/day
Instrument Channel - Reactor Low Water Level (LITS-3-52 & 62)	(1)	once/3 months	once/day
~~Instrument Channel - Reactor Low Water Level (LS-3-56A-D)~~	~~(1)~~	~~once/3 months~~	~~none~~
~~Instrument Channel - Reactor High Pressure (PS-3-204A-D)~~	~~(1)~~	~~once/3 months~~	~~none~~
Instrument Channel - Drywell High Pressure (PS-64-58E-H)	(1)	once/3 months	none
Instrument Channel - Drywell High Pressure (PS-64-58A-D)	(1)	once/3 months	none
Instrument Channel - Drywell High Pressure (PS-64-57A-D)	(1)	once/3 months	none
Instrument Channel - Reactor Low Pressure (PS-3-74A & B) (PS-68-95) (PS-68-96)	(1)	once/3 months	none

NOTES FOR TABLES 4.2.A THROUGH 4.2.L except 4.2.D

1. Functional tests shall be performed once per month.

2. Functional tests shall be performed before each startup with a required frequency not to exceed once per week.

3. This instrumentation is excepted from the functional test definition. The functional test will consist of injecting a simulated electrical signal into the measurement channel.

4. Tested during logic system functional tests.

5. Refer to Table 4.1.B.

6. The logic system functional tests shall include a calibration once per operating cycle of time delay relays and timers necessary for proper functioning of the trip systems.

7. The functional test will consist of verifying continuity across the inhibit with a volt-ohmmeter.

8. Instrument checks shall be performed in accordance with the definition of instrument check (see Section 1.0, Definitions). An instrument check is not applicable to a particular setpoint, such as Upscale, but is a qualitative check that the instrument is behaving and/or indicating in an acceptable manner for the particular plant condition. Instrument check is included in this table for convenience and to indicate that an instrument check will be performed on the instrument. Instrument checks are not required when these instruments are not required to be operable or are tripped.

9. Calibration frequency shall be once/year.

10. (DELETED)

11. Portion of the logic is functionally tested during outage only.

12. The detector will be inserted during each operating cycle and the proper amount of travel into the core verified.

13. Functional test will consist of applying simulated inputs (see note 3). Local alarm lights representing upscale and downscale trips will be verified, but no rod block will be produced at this time. The inoperative trip will be initiated to produce a rod block (SRM and IRM inoperative also bypassed with the mode switch in RUN). The functions that cannot be verified to produce a rod block directly will be verified during the operating cycle.

14. (Deleted)

15. The flow bias comparator will be tested by putting one flow unit in "Test" (producing 1/2 scram) and adjusting the test input to obtain comparator rod block. The flow bias upscale will be verified by observing a local upscale trip light during operation and verified that it will produce a rod block during the operating cycle.

16. Performed during operating cycle. Portions of the logic is checked more frequently during functional tests of the functions that produce a rod block.

17. This calibration consists of removing the function from service and performing an electronic calibration of the channel.

18. Functional test is limited to the condition where secondary containment integrity is not required as specified in Sections 3.7.C.2 and 3.7.C.3.

19. Functional test is limited to the time where the SGTS is required to meet the requirements of Section 4.7.C.1.a.

20. Calibration of the comparator requires the inputs from both recirculation loops to be interrupted, thereby removing the flow bias signal to the APRM and RBM and scramming the reactor. This calibration can only be performed during an outage.

21. Logic test is limited to the time where actual operation of the equipment is permissible.

22. One channel of either the reactor zone or refueling zone Reactor Building Ventilation Radiation Monitoring System may be administratively bypassed for a period not to exceed 24 hours for functional testing and calibration.

23. (DELETED)

24. This instrument check consists of comparing the thermocouple readings for all valves for consistence and for nominal expected values (not required during refueling outages).

25. During each refueling outage, all acoustic monitoring channels shall be calibrated. This calibration includes verification of accelerometer response due to mechanical excitation in the vicinity of the sensor.

NOTES FOR TABLES 4.2.A THROUGH 4.2.L except 4.2.D (Continued)

26. This instrument check consists of comparing the background signal levels for all valves for consistency and for nominal expected values (not required during refueling outages).

27. Functional test frequency decreased to once/3 months to reduce the challenges to relief valves per NUREG-0737, Item II.K.3.16.

28. Functional test consists of the injection of a simulated signal into the electronic trip circuitry in place of the sensor signal to verify operability of the trip and alarm functions.

29. Calibration consists of the adjustment of the primary sensor and associated components so that they correspond within acceptable range and accuracy to known values of the parameter which the channel monitors, including adjustment of the electronic trip circuitry, so its output relay changes state at or more conservatively than the analog equivalent of the trip level settings.

Table 4.2.L

Function	Functional Test	Channel Calibration	Instrument Check
Reactor Vessel Water Level Low LS-3-58A-D	M(28)	R(29)	N/A
Reactor Vessel Dome Pressure High PS-3-204-D	M(28)	R(29)	N/A

The operability of the meteorological instrumentation ensures that sufficient meteorological data is available for estimating potential radiation dose to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public.

The operability of the seismic instrumentation ensures that sufficient capability is available to promptly determine the magnitude of a seismic event and evaluate the response of those features important to safety. This capability is required to permit comparison of the measured response to that used in the design basis for Browns Ferry Nuclear Plant. The instrumentation provided is consistent with specific portions of the recommendations of Regulatory Guide 1.12 "Instrumentation for Earthquakes."

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments will be calculated in accordance with guidance provided in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring the concentration of potentially explosive gas mixtures in the offgas. holdup system. The operability and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with guidance provided in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20 Appendix B, Table II, Column 2. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

ATWS/RPT, Anticipated Transients without Scram/Recirculation Pump Trip system provides a means of limiting the consequences of the unlikely occurrence of a failure to scram during an ATWS event. The response of the plant to this postulated event (ATWS/RPT) follows the BWR Owners Group Report by General Electric NEDE-31096-P-A and the accompanying NRC Staff Safety Evaluation Report.

ATWS/RPT utilizes the engineered safety feature (ESF) master/slave analog trip units (ATU) which consists of four level and four pressure channels total. The initiating logic consists of two independent trip systems each consisting of two reactor dome high pressure channels and two reactor vessel low level channels. A coincident trip of either two low levels or two high pressures in the same trip system causes initiation of ATWS/RPT. This signal from either trip system opens one of two EOC

(end-of-cycle) breakers in series (the other system opens the other breaker) between the pump motor and the Motor Generator set driving each recirculation pump. Both systems are completely redundant such that only one trip system is necessary to perform the ATWS/RPT function. Power comes from the 250 VDC shutdown boards.

Setpoints for reactor dome high pressure and reactor vessel low level are such that a normal Reactor Protection System scram and accompanying recirculation pump trip would occur before or coincident with the trip by ATWS/RPT.

4.2 BASES

The instrumentation listed in Tables 4.2.A through 4.2.F will be functionally tested and calibrated at regularly scheduled intervals. The same design reliability goal as the Reactor Protection System of 0.99999 generally applies for all applications of (1-out-of-2) X (2) logic. Therefore, on-off sensors are tested once/3 months, and bistable trips associated with analog sensors and amplifiers are tested once/week.

ENCLOSURE 2

DESCRIPTION AND JUSTIFICATION
BROWNS FERRY NUCLEAR PLANT
UNITS 1, 2, AND 3

Description of Change

The Browns Ferry Nuclear Plant Units 1, 2, and 3 Technical Specifications are being revised to incorporate requirements for the Anticipated Transients Without Scram Recirculation Pump Trip (ATWS-RPT) System.

The limiting conditions for operation, section 3.2.L and table 3.2.L, are being added to provide operability requirements for the ATWS-RPT System. Surveillance Requirements (section 4.2.L) are also being added to periodically verify system operability. The bases section 3.2/4.2 and the index are also being revised to reflect this change.

In addition, the instrument channels for the reactor low water level (LS-3-56A-D) and reactor high pressure (PS-3-204A-D) are being deleted in existing tables 3.2.B and 4.2.B. These instruments will be tested in accordance with new tables 3.2.L and 4.2.L.

Footnotes 28 and 29 are being added to unit 3 "Notes for Table 4.2.A through 4.2.L except 4.2.D" (page 3.2/4.2-60). These footnotes are currently in unit 1 and 2 and need to be added for consistency.

Reason for Change

Paragraph (c)(5) of 10 CFR 50.62 states in part, "Each boiling water reactor must have equipment to trip the reactor recirculation pumps automatically under conditions indicative of an ATWS. This equipment must be designed to perform its function in a reliable manner." BFN is installing an ATWS-RPT System to comply with the regulations. The installation of this system for unit 2 is scheduled to be completed before unit 2 fuel load from the current outage. Units 1 and 3 ATWS-RPT modifications are scheduled to be completed before their fuel load from the current outage.

Justification for Change

10 CFR 50.62 requires all boiling water reactors to make modifications to mitigate the consequences of a failure to scram the reactor during an anticipated operational transient. The basis for these modifications are described in NEDE-31096-P-A, "Anticipated Transients without Scram: Response to NRC ATWS Rule, 10 CFR 50.62," December, 1985.

The ATWS-RPT System will replace the existing RPT-MG logic. The existing RPT-MG trip coils are located before the motor generator (MG) sets (figure 1). When a trip signal is received, the RPT-MG breaker is tripped. The MG set will supply power to the recirculation pump motor until the MG set inertia is spent.

Justification for Change (Cont'd)

The ATWS-RPT System will provide for a faster stopping of recirculation flow by eliminating any MG set inertia effects on the ATWS-RPT. The ATWS-RPT modification employs the "Monticello" design using the two end-of-cycle (EOC) trip breakers. These breakers are located between the MG output and the recirculation pump motor (figure 2). When a trip signal is received, the EOC breakers are tripped and the recirculation pumps coast down. Core power is reduced by flow coast down and by the subsequent voiding of the reactor core. The ATWS-RPT allows for quicker power reduction as it eliminates the MG set inertia.

The trip logic consists of a two-out-of-two low reactor water level signal or a two-out-of-two high reactor dome pressure signal. A coincident trip of either two low-level signals or two high-pressure signals in the same trip channel initiates an ATWS-RPT trip.

The ATWS-RPT System is required to be operable during Reactor Power Operation. Reactor Power Operation is defined in the BFN Technical Specifications as operation with the mode switch in startup or run with the reactor critical and above one percent power. This is more conservative than the operability requirements of the General Electric Standard Technical Specifications (NUREG 0123) which require operability whenever the mode switch is in run (4-5 percent). This operability requirement will ensure the instrumentation is operable under conditions indicative of an ATWS event.

The ATWS-RPT trip setpoints and allowable values for the low reactor water level are 483 and 471.5 inches above vessel zero respectfully. The trip setpoints for high reactor pressure are 1118 and 1146.5 psig. The existing Reactor Protection System (RPS) trip setpoints are 538 inches above vessel zero for low reactor water level and 1055 psig for reactor dome pressure. The ATWS-RPT setpoints were chosen such that a RPS would occur before the ATWS-RPT trip.

ENCLOSURE 3

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION
BROWNS FERRY NUCLEAR PLANT
UNITS 1, 2, AND 3

Description of Proposed Technical Specification Amendment

The proposed technical specifications would be added to the BFN Technical Specifications for Units 1, 2, and 3 to incorporate the necessary limiting conditions for operation and surveillance requirements for the Anticipated Transient Without Scram Recirculation Pump Trip (ATWS-RPT) System.

Basis for Proposed No Significant Hazards Consideration Determination

NRC has provided standards for determining whether a significant hazards consideration exists as stated in 10 CFR 50.92(c). A proposed amendment to an operating license involves no significant hazards considerations if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from an accident previously evaluated, or (3) involve a significant reduction in a margin of safety.

1. The proposed amendment does not involve a significant increase in the probability or consequences of any accident previously evaluated. The proposed technical specification change adds operability and surveillance requirements for the ATWS-RPT modifications as required by 10 CFR 50.62(c)(5). The addition of this system does not adversely alter the function or method of operation of the Reactor Protection System (RPS) under which BFN was license. The installation of the ATWS-RPT System results in a faster recirculation pump coast down which decreases core power at a faster rate then the existing RPT-MG trip system. As required by the ATWS rule, the ATWS-RPT logic is independent of the RPS. The ATWS-RPT logic modification enhances the existing reactor protection features.

   The ATWS-RPT logic modification replaces the existing RPT-motor generator (MG) one-out-of-two trip logic with a two-out-of-two ATWS-RPT trip logic to avoid spurious trips. The limiting conditions for operation and surveillance requirements have been added to ensure system operability.

   The consequences of an accident are not increased because each ATWS-RPT channel will trip both recirculation pumps by means of the end-of-cycle (EOC) breakers which will provide a more rapid core flow reduction and subsequent insertion of negative reactivity due to increased voiding of the reactor core than is provided by the existing RPT-MG trip. The new action statements or surveillance requirements will not affect the consequences of any accident previously analyzed in the BFN Final Safety Analysis Report (FSAR) since the ATWS-RPT System is not used to mitigate the consequences of any accident previously analyzed.

Basis for Proposed No Significant Hazards Consideration Determination (Cont'd)

The ATWS-RPT System modification does not affect the precursors for any accident analysis in the BFN FSAR. In addition, the proposed technical specification change will support the present FSAR assumptions and limitations will be maintained.

2. The proposed change does not create the possibility of a new or different kind of accident from an accident previously evaluated. These changes do not alter the function or method of operation of any safe shutdown systems. The ATWS-RPT two-out-of-two logic modification reduces the potential for spurious trips from the existing RPT-MG trip which is a one-out-of-two logic. In the event the ATWS-RPT logic would trip, the resulting transient would be similar to and bounded by those previously evaluated, (i.e., dual recirculation pump trip at power). If the ATWS-RPT logic fails to actuate when required, the consequences are no greater than before this design change is installed.

3. The proposed change does not involve a significant reduction in the margin of safety. The ATWS-RPT logic modification will enhance the existing reactor protection features and therefore increases the margin of safety. Each ATWS-RPT channel will trip both recirculation pumps by means of the EOC breakers, which will provide a more rapid core flow reduction and subsequent insertion of negative reactivity due to increased voiding of the core.

   The proposed ATWS-RPT allowable and trip setpoints for the reactor dome pressure and low reactor water level are enveloped by the current safety limits. The addition of these technical specifications will ensure that the ATWS-RPT System will perform in a reliable manner, or that the necessary compensating action requirements will be taken such that the margin of safety will be maintained.

Determination of Basis for Proposed No Significant Hazards

Since the application for amendment involves a proposed change that is encompassed by the criteria for which no significant hazards consideration exists, TVA has made a proposed determination that the application involves no significant hazards consideration.

Figure 1

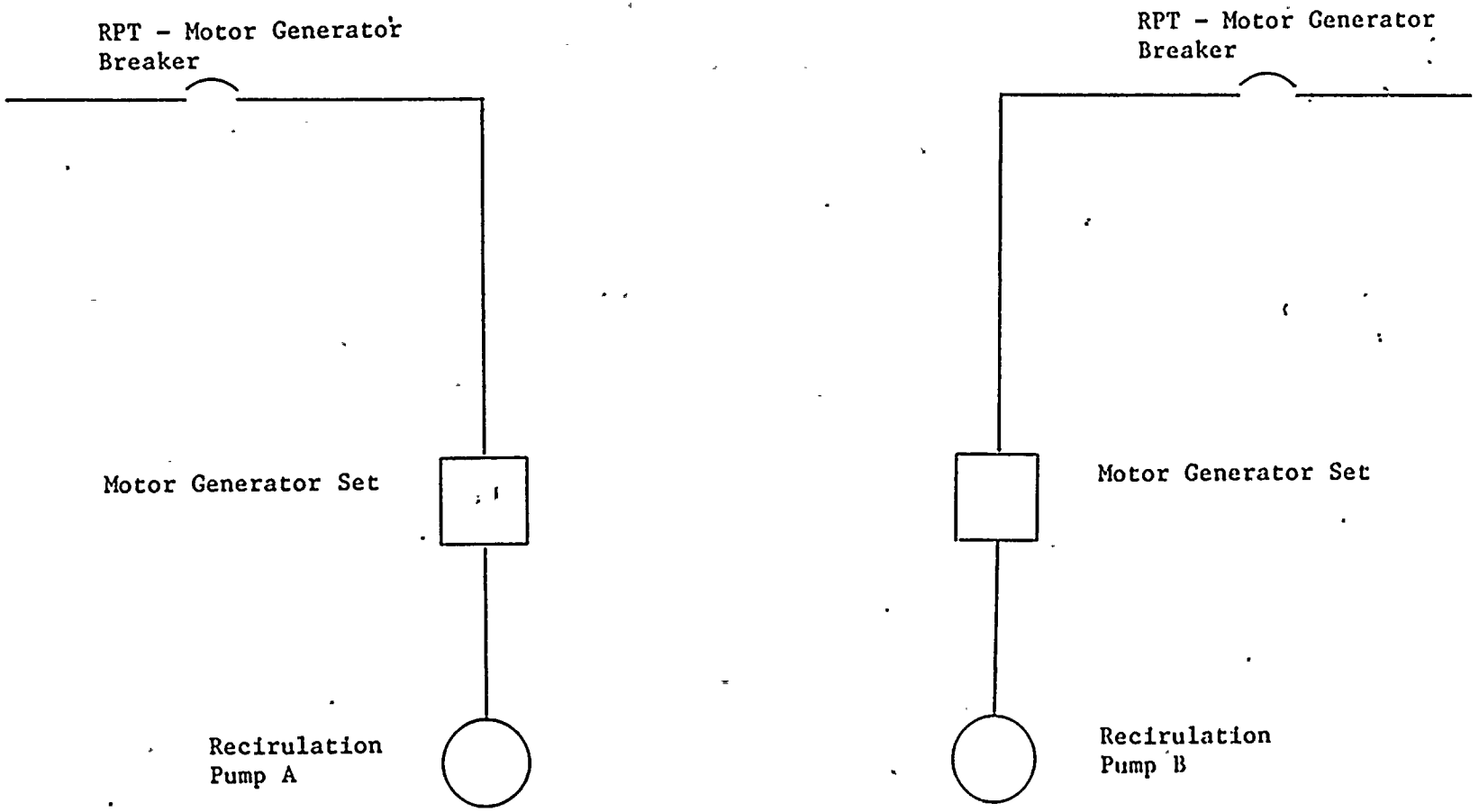
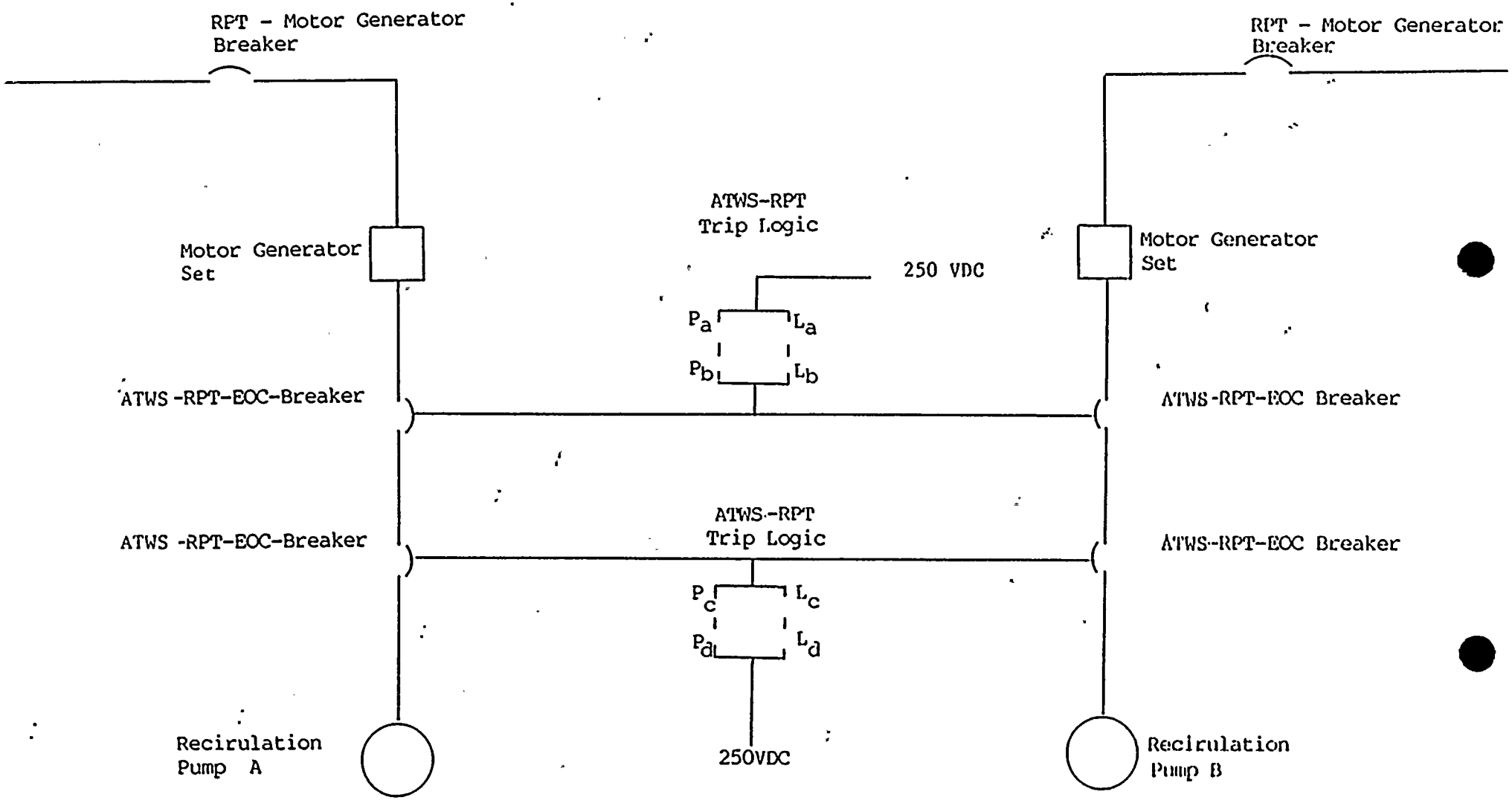

RPT - Motor Generator Breaker
Motor Generator Set
Recirulation Pump A
RPT - Motor Generator Breaker
Motor Generator Set
Recirulation Pump B

Figure 2


RPT - Motor Generator Breaker
RPT - Motor Generator Breaker
ATWS-RPT Trip Logic
Motor Generator Set
250 VDC
Motor Generator Set
P_a
L_a
P_b
L_b
ATWS -RPT-EOC-Breaker
ATWS -RPT-EOC Breaker
ATWS -RPT-EOC-Breaker
ATWS-RPT Trip Logic
ATWS-RPT-EOC Breaker
P_c
L_c
P_d
L_d
Recirulation Pump A
250VDC
Recirulation Pump B