Docket No. 50-277
License No. DPR-44

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 3A

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.1 (Unit 2)

List of Pages Affected:

35	Page replaced
36	Page replaced
36a	Page deleted
37	Table 3.1.1
38	Table 3.1.1
39	Table 3.1.1 (Notes)
41	Table 4.1.1
42	Table 4.1.1
43	Table 4.1.1 (Notes)
44	Table 4.1.2
45	Table 4.1.2
46	Table 4.1.2 (Notes)

LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the instrumentation and associated devices which initiate a reactor scram.

Objective

To assure the operability of the reactor protection system.

Specification:

A. When there is fuel in the vessel the setpoint, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch shall be as given in Table 3.1.1.

B. The designed system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 50 milliseconds. Otherwise, the affected trip system shall be placed in the tripped condition, or the action listed in Table 3.1.1 for the specific trip function shall be taken.

Insert new page 35

SURVEILLANCE REQUIREMENTS

4.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram.

Objective

To specify the type and frequency of surveillance to be applied to the protection instrumentation.

Specification:

A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1.1 and 4.1.2 respectively.

B. DELETED

move to new page 36

LIMITING CONDITIONS FOR OPERATION

3.1 Reactor Protection System (RPS)

A. The RPS instrumentation for each trip function in Table 3.1.1 shall be Operable; and, there shall be two Operable or tripped trip systems for each Trip Function.

The designed system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 50 milliseconds.

Applicability:

According to Table 3.1.1.

Conditions and Required Actions: (1)(2)

1 With one or more channel(s) required by Table 3.1.1 inoperable in one or more trip functions, place the inoperable channel or associated trip system in trip within 12 hours.

2. With one or more trip functions with one or more channels required by Table 3.1.1 inoperable in both trip systems, place channel in one trip system in trip or place one trip system in trip within 6 hours.

3. With one or more automatic trip functions or two or more manual trip functions (Mode Switch in Shutdown, Manual Scram and RPS Channel Test Switches) with RPS trip capability not maintained, restore RPS trip capability within one hour.

4. If the required actions and associated completion time of Action 1 or 2 or 3 are not met, take the action required by Table 3.1.1 for the Trip Function.

SURVEILLANCE REQUIREMENTS

4.1 Reactor Protection System

A. Each RPS instrument channel shall be demonstrated Operable by performance of a channel functional test and channel calibration at the Frequencies shown in Tables 4.1.1 and 4.1.2, respectively.

Response time measurements (from the opening of the sensor contact up to and including the opening of the trip actuator contacts) are not part of the normal instrument test. The RPS response time of each reactor trip function shall be demonstrated to be within its limits once per operating cycle.

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(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated trip function maintains RPS trip capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.1.1 for that trip function shall be taken immediately.

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LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
Deleted	C. When it is determined that a channel has failed in the unsafe condition, the other RPS channels that monitor the same variable shall be functionally tested immediately before the trip system containing the failure is tripped. The trip system containing the unsafe failure may be placed in the untripped condition during the period in which surveillance testing is being performed on the other RPS channels. The trip system may be in the untripped position for no more that eight hours per functional trip period for this testing.
D. Reactor Protection System Power Supply	D. Reactor Protection System Power Supply
1**Reactor Protection System Power Supply: One trip train* per RPS MG set may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the alternate source or de-energized within 30 minutes.	1 **The following RPS power supply (MG set) protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Underfrequency Time Delay	6 sec ± 1 sec

move to new page 36

Amendment No. ~~76~~, 99/101
June 21, 1984

LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS

2** One trip train* of the RPS alternate power supply may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the RPS MG set or de-energized within 30 minutes.

2** The following RPS alternate power supply protective devices shall be functionall tested at least once every s months and calibrated once each refueling outage.

Device	Acceptabl Settinc
Undervoltage	113 ± 2 Vo:
Overvoltage	131 ∓ 2 Vo:
Underfrequency	57 Hz ± .:
Undervoltage Time Delay	Max. 4 secc

* A trip train consists of one breaker, one undervoltage relay, one overvoltage relay, one underfrequency relay, one time delay relay (MG set only), and the associated logic.

~~** Effective upon installation of the protective trip devices.~~

move to new page 36

LIMITING CONDITIONS FOR OPERATION

3.1 Reactor Protection System (continued)

B. N/A

C. N/A

D. Reactor Protection System Power Supply

D.1 Reactor Protection System Power Supply:

One trip train* per RPS MG set may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the alternate source or de-energized within 30 minutes

D.2 One trip train* of the RPS alternate power supply may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the RPS MG set or de-energized within 30 minutes.

SURVEILLANCE REQUIREMENTS

4.1 Reactor Protection System (continued)

B. Deleted

C. Deleted

D. Reactor Protection System Power Supply

D.1 The following RPS power supply (MG set) protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Underfrequency Time Delay	6 sec ± 1 sec

D.2 The following RPS alternate power supply protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Undervoltage Time Delay	Max. 4 secs.

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* A trip train consists of one breaker, one undervoltage relay, one overvoltage relay, one underfrequency relay, one time delay relay (MG set only), and the associated logic.

Table 3.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Items	Minimum No. of Operable Instrument Channels per Trip System (1)	Trip Function	Trip Level Setting	Modes In which Function Must Be Operable			Number of Instrument Channels Provided by Design	Action (1)
				Refuel (7)	Startup	Run		
1	1	Mode Switch In Shutdown		x	x	x	1 Mode Switch (4 Sections)	A
2	1	Manual Scram		x	x	x	2 Instrument Channels	A
3	3	IRM High Flux	≤120/125 of Full Scale	x	x	(5)	8 Instrument Channels	A
4	3	IRM Inoperative		x	x	(5)	8 Instrument Channels	A
5	2	APRM High Flux	(0.66W+71%-0.66ΔW) (Clamp @ 120%) (12) (13)			x	6 Instrument Channels	A or B
6	2	APRM Inoperative	(11)	x	x	x	6 Instrument Channels	A or B
7	2	APRM Downscale	≥2.5 Indicated on Scale			(10)	6 Instrument Channels	A or B
8	2	APRM High Flux in Startup	≤15% Power	x	x		6 Instrument Channels	A
9	2	High Reactor Pressure	≤1055 psig	x(9)	x	x	4 Instrument Channels	A
10	2	High Drywell Pressure	≤2 psig	x(8)	x(8)	x	4 Instrument Channels	A
11	2	Reactor Low Water Level	≥0 in. Indicated Level	x	x	x	4 Instrument Channels	A

Table 3.1.1 (Continue d)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Item	Minimum No. of Operable Instrument Channels per Trip System (1)	Trip Function	Trip Level Setting	Modes in which Function Must be Operable: Refuel (7)	Startup	Run	Number of Instrument Channels Provided by Design	Action (1)
12	2	High Water Level in Scram Discharge Instrument Volume	≤50 Gallons	X(2)	X	X	4 Instrument Channels	A
13	2	Turbine Condenser Low Vacuum	≥23 in. Hg. Vacuum			X	4 Instrument Channels	A or C
14	2	Main Steam Line High Radiation	≤15 X Normal Full Power Background	X	X	X	4 Instrument Channels	A
15	4 8	Main Steam Line Isolation Valve Closure	≤10% Valve Closure			X(6)	8 16 Instrument Channels	A
16	2	Turbine Control Valve Fast Closure	500<P<850 psig Control Oil Pressure Between Fast Closure Solenoid and Disc Dump Valve			X(4)	4 Instrument Channels	A or D
17	4	Turbine Stop Valve Closure	≤10% Valve Closure			X(4)	8 Instrument Channels	A or D
18	2	RPS Channel Test Switches		X	X	X	4 Instrument Channels	A

Amendment No. 23, 34, 104, 117, 129
03/03/88

(Incorporated into Specification 3.1.1 on page 35)

NOTES FOR TABLE 3.1.1

1. There shall be two operable or tripped trip systems for each function. If the minimum number of operable sensor channels for a trip system cannot be met, the affected trip system shall be placed in the safe (tripped) condition, or the appropriate actions listed below shall be taken. (Replace with Insert 1 for page 39.)

   A. Initiate insertion of operable rods and complete insertion of all operable rods within four hours. (12 hours)

   B. Reduce power level to IRM range and place mode switch in the start up position within 8 hours. (6 hours)

   C. Reduce turbine load and close main steam line isolation valves within 8 hours. (6 hours)

   D. Reduce power to less than 30% rated. (within 4 hours)

2. Permissible to bypass, in refuel and shutdown positions of the reactor mode switch.

3. Deleted.

4. Bypassed when reactor thermal power is less than 30% of rated as indicated by turbine first stage pressure.

5. IRMs are bypassed when APRMs are onscale and the reactor mode switch is in the run position.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212 degrees F, only the following trip functions need to be operable.

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge instrument volume high level

8. Not required to be operable when primary containment integrity is not required.

9. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

Insert 1 for Page 39: Note 1 for Table 3.1.1

If the required actions and associated completion time of Specification 3.1.A, Actions 1 or 2 or 3 are not met, take the action listed below for the affected trip function as required by Table 3.1.1.

TABLE 4.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each refueling outage.
Manual Scram	A	Trip Channel and Alarm	Once/week Every 3 months.
RPS Channel Test Switch	A	Trip Channel and Alarm	Every refueling outage or after channel maintenance.
IRM			
High Flux	C	Trip Channel and Alarm (4)	One per week during refueling or startup and before each startup.
Inoperative	C	Trip Channel and Alarm (4)	Once per week during refueling or startup and before each startup.
APRM			
High Flux	B1	Trip Output Relays (4)	Once/week. Once/3 months
Inoperative	B1	Trip Output Relays (4)	Once/week.
Downscale	B1	Trip Output Relays (4)	Once/week.
Flow Bias	B1	Calibrate Flow Bias Signal (4)	Once/month (1).
High Flux in Startup or Refuel	C	Trip Output Relays (4)	Once per week during refueling or startup and before each startup.
High Reactor Pressure (6)	B2	Trip Channel and Alarm (4)	Every 1 month (1).
High Drywell Pressure (6)	B2	Trip Channel and Alarm (4)	Every 1 month (1).
Reactor Low Water Level (5) (6)	B2	Trip Channel and Alarm (4)	Every 1 month (1).

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117   3/14/86

Unit 2

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TABLE 4.1.1 (Cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

3

	Group (2)	Functional Test	Minimum Frequency (3)
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel and Alarm	Every 1 month.
Turbine Condenser Low Vacuum (6)	B2	Trip Channel and Alarm (4)	Every 1 month (1).
Main Steam Line High Radiation	B1	Trip Channel and Alarm (4)	Once/week.
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Every 1 month (1).
Turbine Control Valve EHC Oil Pressure	A	Trip Channel and Alarm	Every 1 month.
Turbine First Stage Pressure Permissive	A	Trip Channel and Alarm	Every 3 months (1).
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Every 1 month (1).

Once/3 months

NOTES FOR TABLE 4.1.1

Deleted

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the NRC prior to any change in the once-a-month frequency.

2. A description of each of the groups is included in the Bases of this Specification.

3. Functional tests are not required on the part of the system that is not required to be operable or are tripped.

   If tests are missed on parts not required to be operable or are tripped, then they shall be performed prior to returning the system to an operable status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the measurement channels.

5. The water level in the reactor vessel will be perturbed and the corresponding level indicator changes will be monitored. This perturbation test will be performed every month after completion of the functional test program.

6. These channels consist of analog transmitters, indicators and electronic trip units. Instrument checks shall be performed once per day.

TABLE 4.1.2

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration (4)	Minimum Frequency (2)
IRM High Flux	C	Comparison to APRM on Controlled Shutdown	Maximum frequency once per week.
APRM High Flux			
Output Signal	B1	Heat Balance	Twice per week.
Flow Bias Signal	B1	With Standard Pressure Source	Every eighteen months.
LPRM Signal	B1	TIP System Traverse	Every 6 weeks.
High Reactor Pressure	B2	Standard Pressure Source	Once per operating cycle.
High Drywell Pressure	B2	Standard Pressure Source	Once per operating cycle.
Reactor Low Water Level	B2	Pressure Standard	Once per operating cycle.
High Water Level in Scram Discharge Instrument Volume	A	Water Column	Every refueling outage.
Turbine Condenser Low Vacuum	B2	Standard Vacuum Source	Once per operating cycle.
Main Steam Line Isolation Valve Closure	A	Note (5)	Note (5)
Main Steam Line High Radiation	B1	Standard Current Source (3)	Every 3 months.
Turbine First State Pressure Permissive	A	Standard Pressure Source	Every 6 months.

Amendment No. 66, 104, 179
AUG 0 2 1993

TABLE 4.1.2 (Cont'd.)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration (4)	Minimum Frequency (2)
Turbine Control Valve Fast Closure Oil Pressure Trip	A	Standard Pressure Source	Once per operating cycle.
Turbine Stop Valve Closure	A	Note (5)	Note (5)

NOTES FOR TABLE 4.1.2

1. A description of three groups is included in the bases of this Specification.

2. Calibration test is not required on the part of the system that are not required to be operable or are tripped but is required prior to return to service.

3. The current source provides an instrument channel alignment. Calibration using a radiation source shall be made each refueling outage.

4. Response time is not a part of the routine instrument channel test but will be checked once per operating cycle.

5. Physical inspection and actuation of these position switches will be performed during the refueling outages.

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Relocated to page 35

Docket No. 50-278
License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 3B

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.1 (Unit 3)

List of Pages Affected:

35	Page replaced
36	Page replaced
36a	Page deleted
37	Table 3.1.1
38	Table 3.1.1
39	Table 3.1.1 (Notes)
41	Table 4.1.1
42	Table 4.1.1
43	Table 4.1.1 (Notes)
44	Table 4.1.2
45	Table 4.1.2
46	Table 4.1.2 (Notes)

LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the instrumentation and associated devices which initiate a reactor scram.

Objective

To assure the operability of the reactor protection system.

Specification:

A. When there is fuel in the vessel the setpoint, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch shall be as given in Table 3.1.1.

B. The designed system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 50 milliseconds. Otherwise, the affected trip system shall be placed in the tripped condition, or the action listed in Table 3.1.1 for the specific trip function shall be taken.

SURVEILLANCE REQUIREMENTS

4.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram.

Objective

To specify the type and frequency of surveillance to be applied to the protection instrumentation.

Specification:

A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1.1 and 4.1.2 respectively.

B. DELETED

Insert new page 35

Amendment No. ~~64~~, ~~69~~, ~~75~~, 184

OCT 1 8 1993

LIMITING CONDITIONS FOR OPERATION

3.1 Reactor Protection System (RPS)

A. The RPS instrumentation for each trip function in Table 3.1.1 shall be Operable; and, there shall be two Operable or tripped trip systems for each Trip Function.

The designed system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 50 milliseconds.

Applicability:

According to Table 3.1.1.

Conditions and Required Actions: (1)(2)

1. With one or more channel(s) required by Table 3.1.1 inoperable in one or more trip functions, place the inoperable channel or associated trip system in trip within 12 hours.

2. With one or more trip functions with one or more channels required by Table 3.1.1 inoperable in both trip systems, place channel in one trip system in trip or place one trip system in trip within 6 hours.

3. With one or more automatic trip functions or two or more manual trip functions (Mode Switch in Shutdown, Manual Scram and RPS Channel Test Switches) with RPS trip capability not maintained, restore RPS trip capability within one hour.

4. If the required actions and associated completion time of Action 1 or 2 or 3 are not met, take the action required by Table 3.1.1 for the Trip Function.

SURVEILLANCE REQUIREMENTS

4.1 Reactor Protection System

A. Each RPS instrument channel shall be demonstrated Operable by performance of a channel functional test and channel calibration at the Frequencies shown in Tables 4.1.1 and 4.1.2, respectively.

Response time measurements (from the opening of the sensor contact up to and including the opening of the trip actuator contacts) are not part of the normal instrument test. The RPS response time of each reactor trip function shall be demonstrated to be within its limits once per operating cycle.

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(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated trip function maintains RPS trip capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.1.1 for that trip function shall be taken immediately.

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LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
Deleted	C. When it is determined that a channel has failed in the unsafe condition, the other RPS channels that monitor the same variable shall be functionally tested immediately before the trip system containing the failure is tripped. The trip system containing the unsafe failure may be placed in the untripped condition during the period in which surveillance testing is being performed on the other RPS channels. The trip system may be in the untripped position for no more that eight hours per functional trip period for this testing.
D. <u>Reactor Protection System Power Supply</u>	D. <u>Reactor Protection System Power Supply</u>
1**Reactor Protection System Power Supply:	1 **The following RPS power supply (MG set) protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.
One trip train* per RPS MG set may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the alternate source or de-energized within 30 minutes.	

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Underfrequency Time Delay	6 sec ± 1 sec

move to new page 36

Amendment No. ~~76~~, 99/101
June 21, 1984

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
2e** One trip train* of the RPS alternate power supply may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the RPS MG set or de-energized within 30 minutes.	2** The following RPS alternate power supply protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ∓ 2 Volts
Underfrequency	57 Hz ± .2 H
Undervoltage Time Delay	Max. 4 second

* A trip train consists of one breaker, one undervoltage relay, one overvoltage relay, one underfrequency relay, one time delay relay (MG set only), and the associated logic.

** ~~Effective upon installation of the protective trip devices.~~

move to new page 36

LIMITING CONDITIONS FOR OPERATION

3.1 Reactor Protection System (continued)

B. N/A

C. N/A

D. Reactor Protection System Power Supply

D.1 Reactor Protection System Power Supply:

One trip train* per RPS MG set may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the alternate source or de-energized within 30 minutes

D.2 One trip train* of the RPS alternate power supply may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the RPS MG set or de-energized within 30 minutes.

SURVEILLANCE REQUIREMENTS

4.1 Reactor Protection System (continued)

B. Deleted

C. Deleted

D. Reactor Protection System Power Supply

D.1 The following RPS power supply (MG set) protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Underfrequency Time Delay	6 sec ± 1 sec

D.2 The following RPS alternate power supply protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Undervoltage Time Delay	Max. 4 secs.

* A trip train consists of one breaker, one undervoltage relay, one overvoltage relay, one underfrequency relay, one time delay relay (MG set only), and the associated logic.

Table 3.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Items	Minimum No. of Operable Instrument Channels per Trip System (1)	Trip Function	Trip Level Setting	Modes In which Function Must Be Operable: Refuel (7)	Startup	Run	Number of Instrument Channels Provided by Design	Action (1)
1	1	Mode Switch In Shutdown		x	x	x	1 Mode Switch (4 Sections)	A
2	1	Manual Scram		x	x	x	2 Instrument Channels	A
3	3	IRM High Flux	≤120/125 of Full Scale	x	x	(5)	8 Instrument Channels	A
4	3	IRM Inoperative		x	x	(5)	8 Instrument Channels	A
5	2	APRM High Flux	(0.66W+71%-0.66ΔW) (Clamp @ 120%) (12) (13)			x	6 Instrument Channels	A or B
6	2	APRM Inoperative	(11)	x	x	x	6 Instrument Channels	A or B
7	2	APRM Downscale	≥2.5 Indicated on Scale			(10)	6 Instrument Channels	A or B
8	2	APRM High Flux in Startup	≤15% Power	x	x		6 Instrument Channels	A
9	2	High Reactor Pressure	≤1055 psig	x(9)	x	x	4 Instrument Channels	A
10	2	High Drywell Pressure	≤2 psig	x(8)	x(8)	x	4 Instrument Channels	A
11	2	Reactor Low Water Level	≥0 in. Indicated Level	x	x	x	4 Instrument Channels	A

Amendment No. 11, 62, 77, 132, 150, 184
OCT 1 8 1993

Table 3.1.1 (.

REACTOR PROTECTION SYSTEM (SCRAM) ..STRUMENTATION REQUIREMENT

Item	Minimum No. of Operable Instrument Channels per Trip System (1)	Trip Function	Trip Level Setting	Modes in which Function Must be Operable: Refuel (7)	Startup	Run	Number of Instrument Channels Provided by Design	Action (1)
12	2	High Water Level in Scram Discharge Instrument Volume	$\leq$50 Gallons	X(2)	X	X	4 Instrument Channels	A
13	2	Turbine Condenser Low Vacuum	$\geq$23 in. Hg. Vacuum			X	4 Instrument Channels	A or C
14	2	Main Steam Line High Radiation	$\leq$15 X Normal Full Power Background	X	X	X	4 Instrument Channels	A
15	8 4	Main Steam Line Isolation Valve Closure	$\leq$10% Valve Closure			X(6)	16 8 Instrument Channels	A
16	2	Turbine Control Valve Fast Closure	500<P<850 psig Control Oil Pressure Between Fast Closure Solenoid and Disc Dump Valve			X(4)	4 Instrument Channels	A or D
17	4	Turbine Stop Valve Closure	$\leq$10% Valve Closure			X(4)	8 Instrument Channels	A or D
18	2	RPS Channel Test Switches		X	X	X	4 Instrument Channels	

Amendment No. 33,106,108,121,132
03/03/88

Incorporated into Specification 3.1.1 on page 35

NOTES FOR TABLE 3.1.1

1. There shall be two operable or tripped trip systems for each function. If the minimum number of operable sensor channels for a trip system cannot be met, the affected trip system shall be placed in the safe (tripped) condition, or the appropriate actions listed below shall be taken.

Replace with Insert 1 for page 39

   A. Initiate insertion of operable rods and complete insertion of all operable rods within four hours. 12 hours

   B. Reduce power level to IRM range and place mode switch in the start up position within 8 hours.

   C. Reduce turbine load and close main steam line isolation valves within 8 hours. 6 hours

   D. Reduce power to less than 30% rated. within 4 hours

2. Permissible to bypass, in refuel and shutdown positions of the reactor mode switch.

3. Deleted.

4. Bypassed when reactor thermal power is less than 30% of rated as indicated by turbine first stage pressure.

5. IRMs are bypassed when APRMs are onscale and the reactor mode switch is in the run position.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212 degrees F, only the following trip functions need to be operable.

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge instrument volume high level

8. Not required to be operable when primary containment integrity is not required.

9. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

Insert 1 for Page 39: Note 1 for Table 3.1.1

If the required actions and associated completion time of Specification 3.1.A, Actions 1 or 2 or 3 are not met, take the action listed below for the affected trip function as required by Table 3.1.1.

* ...ed when modification authorized by Amendment N... are ...pleted

** (...ive when modifications authorized by Amendme... 67 are completed

TABLE 4.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each refueling outage.
Manual Scram	A	Trip Channel and Alarm	Once/week Every 3 months.
RPS Channel Test Switch	A	Trip Channel and Alarm	Every refueling outage or after channel maintenance.
IRM			
High Flux	C	Trip Channel and Alarm (4)	One per week during refueling or startup and before each startup.
Inoperative	C	Trip Channel and Alarm (4)	Once per week during refueling or startup and before each startup.
APRM			Once/3 months
High Flux	B1	Trip Output Relays (4)	Once/week.
Inoperative	B1	Trip Output Relays (4)	Once/week.
Downscale	B1	Trip Output Relays (4)	Once/week.
Flow Bias	B1	Calibrate Flow Bias Signal (4)	Once/month (1).
High Flux in Startup or Refuel	C	Trip Output Relays (4)	Once per week during refueling or startup and before each startup.
High Reactor Pressure (6)	B2	Trip Channel and Alarm (4)	Every 1 month (1).
*High Drywell Pressure	A	Trip Channel and Alarm	Every 1 month (1).
**High Drywell Pressure (6)	B2	Trip Channel and Alarm (4)	Every 1 month (1).
Reactor Low Water Level (5) (6)	B2	Trip Channel and Alarm (4)	Every 1 month (1).

TABLE 4.1.1 (Cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency (3)
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel and Alarm	Every 1 month.
Turbine Condenser Low Vacuum (6)	B2	Trip Channel and Alarm (4)	Every 1 month (1).
Main Steam Line High Radiation	B1	Trip Channel and Alarm (4)	Once/week.
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Every 1 month (1).
Turbine Control Valve EHC Oil Pressure	A	Trip Channel and Alarm	Every 1 month.
Turbine First Stage Pressure Permissive	A	Trip Channel and Alarm	Every 3 months (1).
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Every 1 month (1).

Once/3 months

Deleted

NOTES FOR TABLE 4.1.1

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the NRC prior to any change in the once-a-month frequency.

2. A description of each of the groups is included in the Bases of this Specification.

3. Functional tests are not required on the part of the system that is not required to be operable or are tripped.

   If tests are missed on parts not required to be operable or are tripped, then they shall be performed prior to returning the system to an operable status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the measurement channels.

5. The water level in the reactor vessel will be perturbed and the corresponding level indicator changes will be monitored. This perturbation test will be performed every month after completion of the functional test program.

6. These channels consist of analog transmitters, indicators and electronic trip units. Instrument checks shall be performed once per day.

TABLE 4.1.2

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration (4)	Minimum Frequency (2)
IRM High Flux	C	Comparison to APRM on Controlled Shutdown	Maximum frequency once per week.
APRM High Flux			
Output Signal	B1	Heat Balance	Twice per week.
Flow Bias Signal	B1	With Standard Pressure Source	Every eighteen months.
LPRM Signal	B1	TIP System Traverse	Every 6 weeks.
High Reactor Pressure	B2	Standard Pressure Source	Once per operating cycle.
High Drywell Pressure	B2	Standard Pressure Source	Once per operating cycle.
Reactor Low Water Level	B2	Pressure Standard	Once per operating cycle.
High Water Level in Scram Discharge Instrument Volume	A	Water Column	Every refueling outage.
Turbine Condenser Low Vacuum	B2	Standard Vacuum Source	Once per operating cycle.
Main Steam Line Isolation Valve Closure	A	Note (5)	Note (5)
Main Steam Line High Radiation	B1	Standard Current Source (3)	Every 3 months.
Turbine First State Pressure Permissive	A	Standard Pressure Source	Every 6 months.

TABLE 4.1.2 (Cont'd.)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration (4)	Minimum Frequency (2)
Turbine Control Valve Fast Closure Oil Pressure Trip	A	Standard Pressure Source	Once per operating cycle.
Turbine Stop Valve Closure	A	Note (5)	Note (5)

NOTES FOR TABLE 4.1.2

1. A description of three groups is included in the bases of this Specification.

2. Calibration test is not required on the part of the system that are not required to be operable or are tripped but is required prior to return to service.
3. The current source provides an instrument channel alignment. Calibration using a radiation source shall be made each refueling outage.

4. Response time is not a part of the routine instrument channel test but will be checked once per operating cycle.

5. Physical inspection and actuation of these position switches will be performed during the refueling outages.

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Relocated to page 35

Docket No. 50-277
License No. DPR-44

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 4A

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.A (Unit 2)

List of Pages Affected:

57	Page replaced
61	Table 3.2.A
62	Table 3.2.A
63	Table 3.2.A (Notes)
80	Table 4.2.A
87	Notes of Tables 4.2.A through 4.2.F

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.2 PROTECTIVE INSTRUMENTATION	4.2 PROTECTIVE INSTRUMENTATION
Applicability:	Applicability:
Applies to the plant instrumentation which initiates and controls a protective function.	Applies to the surveillance requirement of the instrumentation that initiates and controls protective function.
Objective:	Objective:
To assure the operability of protective instrumentation.	To specify the type and frequency of surveillance to be applied to protective instrumentation.
Specifications:	Specifications:
A. Primary Containment Isolation Functions	A. Primary Containment Isolation Functions
When primary containment integrity is required, the limiting conditions of operation for the instrumentation that initiates primary containment isolation are given in Table 3.2.A.	Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2.A. System logic shall be functionally tested as indicated in Table 4.2.A.
B. Core and Containment Cooling Systems - Initiation & Control	B. Core and Containment Cooling Systems - Initiation & Control
The limiting conditions for operation for the instrumentation that initiates or controls the core and containment cooling systems are given in Table 3.2.B. This instrumentation must be operable when the system(s) it initiates or controls are required to be operable as specified in Section 3.5.	Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.B. System logic shall be functionally tested as indicated in Table 4.2.B.

See Section 3.2.B (moved to new page 57a)

Moved to new page 57

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation

A. Primary Containment Isolation Functions

The primary containment isolation instrumentation for each function in Table 3.2.A shall be Operable; and, there shall be two Operable or tripped trip systems for each trip function.

Applicability:

Whenever Primary Containment Integrity is required.

Conditions and Required Actions:
(1)(2)

1. With one or more channels required by Table 3.2.A inoperable, place channel in trip within 12 hours for Items 1, 4, and 5; and, place channel in trip within 24 hours for Items other than 1, 4, and 5.

2. With one or more automatic functions with primary containment isolation function not maintained, restore primary containment isolation capability within one hour.(3)

3. If the required action and associated completion time of Action 1 or 2 are not met, take the action required by Table 3.2.A for the function.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation

A. Primary Containment Isolation Functions

Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2.A.

System logic shall be functionally tested as indicated in Table 4.2.A.

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(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Function maintains primary containment isolation capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.2.A for that trip function shall be taken.

(3) This Action not applicable to Item 11, Reactor Cleanup System High Temperature.

TABLE 3.2.A PBAPS Unit 2

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Item	Minimum No. of Operable Instrument Channels per Trip System (1)	Instrument	Trip Level Setting	Number of Instrument Channels Provided By Design	Action (2)
1	2 (6)	Reactor Low Water Level	≥ 0" Indicated Level (3)	4 Inst. Channels	A
2	1	Reactor High Pressure (Shutdown Cooling Isolation)	≤ 75 psig	2 Inst. Channels	D
3	2	Reactor Low-Low-Low Water Level	at or above -160" indicated level (4)	4 Inst. Channels	A
4	2 (6)	High Drywell Pressure	≤ 2 psig	4 Inst. Channels	A
5	2	High Radiation Main Steam Line Tunnel	≤15 X Normal Rated Full (8) Power Background	4 Inst. Channels	B
6	2	Low Pressure Main Steam Line	≥ 850 psig (7)	4 Inst. Channels	B
7	2 (6)	High Flow Main Steam Line	≤ 140% of Rated Steam Flow	4 Inst. Channels	B
8	2	Main Steam Line Tunnel Exhaust Duct High Temperature	≤ 200 deg. F (9)	4 Inst. Channels	B

TABLE 3.2.A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Item	Minimum No. of Operable Instrument Channels per Trip System (1)	Instrument	Trip Level Setting	Number of Instrument Channels Provided By Design	Action (2)
9	2	Main Steam Line Leak Detection High Temperature	≤ 200 Deg. F	4 Inst. Channels	B
10	1	Reactor Cleanup System High Flow	≤ 300% of Rated Flow	2 Inst. Channels	C
11	1	Reactor Cleanup System High Temperature	≤ 200 Deg. F.	1 Inst. Channels	E
12	2	Reactor Pressure (Feedwater Flush System Interlock)	≤ 600 psig	4 Inst. Channels	F

(moved to page 57)

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NOTES FOR TABLE 3.2.A

1. Whenever Primary Containment integrity is required by Section 3.7, there shall be two operable or tripped trip systems for each function.

2. If the first column cannot be met for one of the trip systems, that trip system shall be tripped or the appropriate action listed below shall be taken:

{Insert 1 for page 63}

   A. Initiate an orderly shutdown and have the reactor in Cold Shutdown Condition in 24 hours.

   B. Initiate an orderly load reduction and have Main Steam Lines isolated within eight hours.

   12

   C. Isolate Reactor Water Cleanup System.

   within 1 hour

   D. Isolate Shutdown Cooling.

   E. Isolate Reactor Water Cleanup Filter Demineralizers unless the following provision is satisifed. The RWCU Filter Demineralizer may be used (the isolation overridden) to route the reactor water to the main condenser or waste surge tank, with the high temperature trip inoperable for up to 48 hours, provided the water inlet temperature is monitored once per hour and confirmed to be below 180 degrees F.

   F. Isolate Feedwater Flush System

3. Instrument setpoint corresponds to 538 inches above vessel zero.

4. Instrument setpoint corresponds to 378 inches above vessel zero.

5. Two required for each steam line.

6. These signals also start SBGTS and initiate secondary containment isolation.

7. Only required in Run Mode (interlocked with Mode Switch).

8. An alarm will be tripped in the control room to alert the control room operators to an increase in the main steam line tunnel radiation level.

Insert 1 for Page 63: Note 2 for Table 3.2.A.

If the required actions and associated completion time of Specification 3.2.A, Actions 1 or 2 are not met, take the action listed below for the affected Trip Function as required by Table 3.2.A.

TABLE 4.2.A

MINIMUM TEST AND CALIBRATION FREQUENCY FOR PCIS

	Instrument Channel (5)	Instrument Functional Test	Calibration Frequency	Instrument Check
1)	Reactor High Pressure (Shutdown Cooling Permissive)	(1)	Once/3 months	None
2)	Reactor Low-Low-Low Water Level (7)	(1)(3)	Once/operating cycle	Once/day
3)	Main Steam High Temp.	(1)(3)	Once/operating cycle	Once/day
4)	Main Steam High Flow (7)	(1)(3)	Once/operating cycle	Once/day
5)	Main Steam Low Pressure	(1)	Once/3 months	None
6)	Reactor Water Cleanup High Flow	(1)	Once/3 months	Once/day
7)	Reactor Water Cleanup High Temp.	(1)	Once/3 months	None
8)	Reactor Pressure (Feedwater Flush Permissive)	(1)(3)	Once/operating cycle	Once/day

Once/3 months

	Logic System Functional Test (4) (6)	Frequency
1)	Main Steam Line Isolation Vvs. Main Steam Line Drain Vvs. Reactor Water Sample Vvs.	Once/Operating Cycle
2)	RHR - Isolation Vv. Control Shutdown Cooling Vvs. Head Spray	Once/Operating Cycle
3)	Reactor Water Cleanup Isolation	Once/Operating Cycle
4)	Drywell Isolation Vvs. TIP Withdrawal Atmospheric Control Vvs. Sump Drain Valves	Once/Operating Cycle
5)	Standby Gas Treatment System Reactor Building Isolation	Once/Operating Cycle

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

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1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the AEC prior to any change in the once-a-month frequency.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

Docket No. 50-278
License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 4B

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.A (UNIT 3)

List of Pages Affected:

57	Page replaced
61	Table 3.2.A
62	Table 3.2.A
63	Table 3.2.A (Notes)
80	Table 4.2.A
87	Notes of Tables 4.2.A through 4.2.F

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.2 PROTECTIVE INSTRUMENTATION	4.2 PROTECTIVE INSTRUMENTATION
Applicability:	Applicability:
Applies to the plant instrumentation which initiates and controls a protective function.	Applies to the surveillance requirement of the instrumentation that initiates and controls protective function.
Objective:	Objective:
To assure the operability of protective instrumentation.	To specify the type and frequency of surveillance to be applied to protective instrumentation.
Specifications:	Specifications:
A. Primary Containment Isolation Functions	A. Primary Containment Isolation Functions
When primary containment integrity is required, the limiting conditions of operation for the instrumentation that initiates primary containment isolation are given in Table 3.2.A.	Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2.A. System logic shall be functionally tested as indicated in Table 4.2.A.
B. Core and Containment Cooling Systems - Initiation & Control	B. Core and Containment Cooling Systems - Initiation & Control
The limiting conditions for operation for the instrumentation that initiates or controls the core and containment cooling systems are given in Table 3.2.B. This instrumentation must be operable when the system(s) it initiates or controls are required to be operable as specified in Section 3.5.	Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.B. System logic shall be functionally tested as indicated in Table 4.2.B.
Moved to new page 57	See Section 2.2.B (moved to new page 57a)

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation

A. Primary Containment Isolation Functions

The primary containment isolation instrumentation for each function in Table 3.2.A shall be Operable; and, there shall be two Operable or tripped trip systems for each trip function.

Applicability:

Whenever Primary Containment Integrity is required.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.A inoperable, place channel in trip within 12 hours for Items 1, 4, and 5; and, place channel in trip within 24 hours for Items other than 1, 4, and 5.

2. With one or more automatic functions with primary containment isolation function not maintained, restore primary containment isolation capability within one hour.(3)

3. If the required action and associated completion time of Action 1 or 2 are not met, take the action required by Table 3.2.A for the function.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation

A. Primary Containment Isolation Functions

Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2.A.

System logic shall be functionally tested as indicated in Table 4.2.A.

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Function maintains primary containment isolation capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.2.A for that trip function shall be taken.

(3) This Action not applicable to Item 11, Reactor Cleanup System High Temperature.

Amendment No. 91,106,125,132
03/03/88

TABLE 3.2.A PBAPS Unit 3

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Item	Minimum No. of Operable Instrument Channels per Trip System (1)	Instrument	Trip Level Setting	Number of Instrument Channels Provided By Design	Action (2)
1	2 (6)	Reactor Low Water Level	≥ 0" Indicated Level (3)	4 Inst. Channels	A
2	1	Reactor High Pressure (Shutdown Cooling Isolation)	≤ 75 psig	2 Inst. Channels	D
3	2	Reactor Low-Low-Low Water Level	at or above -160" indicated level (4)	4 Inst. Channels	A
4	2 (6)	High Drywell Pressure	≤ 2 psig	4 Inst. Channels	A
5	2	High Radiation Main Steam Line Tunnel	≤15 X Normal Rated Full (8) Power Background	4 Inst. Channels	B
6	2	Low Pressure Main Steam Line	≥ 850 psig (7)	4 Inst. Channels	B
7	2 (5)	High Flow Main Steam Line	≤ 140% of Rated Steam Flow	4 Inst. Channels	B
8	2	Main Steam Line Tunnel Exhaust Duct High Temperature	≤ 200 deg. F (9)	4 Inst. Channels	B

Amendment No. 30,106,127,132
03/03/88

TABLE 3.2.A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Item	Minimum No. of Operable Instrument Channels per Trip System (1)	Instrument	Trip Level Setting	Number of Instrument Channels Provided By Design	Action (2)
9	2	Main Steam Line Leak Detection High Temperature	≤ 200 Deg. F	4 Inst. Channels	B
10	1	Reactor Cleanup System High Flow	≤ 300% of Rated Flow	2 Inst. Channels	C
11.	1	Reactor Cleanup System High Temperature	≤ 200 Deg. F.	1 Inst. Channels	E
12	2	Reactor Pressure (Feedwater Flush System Interlock)	≤ 600 psig	4 Inst. Channels	F

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NOTES FOR TABLE 3.2.A

1. Whenever Primary Containment integrity is required by Section 3.7, there shall be two operable or tripped trip systems for each function.

2. If the first column cannot be met for one of the trip systems, that trip system shall be tripped or the appropriate action listed below shall be taken:

Insert 1 for page 63

A. Initiate an orderly shutdown and have the reactor in Cold Shutdown Condition in 24 hours.

B. Initiate an orderly load reduction and have Main Steam Lines isolated within eight hours. 12

C. Isolate Reactor Water Cleanup System.

D. Isolate Shutdown Cooling. within 1 hour

E. Isolate Reactor Water Cleanup Filter Demineralizers unless the following provision is satisifed. The RWCU Filter Demineralizer may be used (the isolation overridden) to route the reactor water to the main condenser or waste surge tank, with the high temperature trip inoperable for up to 48 hours, provided the water inlet temperature is monitored once per hour and confirmed to be below 180 degrees F.

F. Isolate Feedwater Flush System

3. Instrument setpoint corresponds to 538 inches above vessel zero.

4. Instrument setpoint corresponds to 378 inches above vessel zero.

5. Two required for each steam line.

6. These signals also start SBGTS and initiate secondary containment isolation.

7. Only required in Run Mode (interlocked with Mode Switch).

8. An alarm will be tripped in the control room to alert the control room operators to an increase in the main steam line tunnel radiation level.

Insert 1 for Page 63: Note 2 for Table 3.2.A.

If the required actions and associated completion time of Specification 3.2.A, Actions 1 or 2 are not met, take the action listed below for the affected Trip Function as required by Table 3.2.A.

TABLE 4.2.A

MINIMUM TEST AND CALIBRATION FREQUENCY FOR PCIS

	Instrument Channel (5)	Instrument Functional Test	Calibration Frequency	Instrument Check
1)	Reactor High Pressure (Shutdown Cooling Permissive)	(1)	Once/3 months	None
2)	Reactor Low-Low-Low Water Level (7)	(1)(3)	Once/operating cycle	Once/day
3)	Main Steam High Temp.	(1)(3)	Once/operating cycle	Once/day
4)	Main Steam High Flow (7)	(1)(3)	Once/operating cycle	Once/day
5)	Main Steam Low Pressure	(1)	Once/3 months	None
6)	Reactor Water Cleanup High Flow	(1)	Once/3 months	Once/day
7)	Reactor Water Cleanup High Temp.	(1)	Once/3 months	None
8)	Reactor Pressure (Feedwater Flush Permissive)	(1)(3)	Once/operating cycle	Once/day

Once/3 months

	Logic System Functional Test (4) (6)	Frequency
1)	Main Steam Line Isolation Vvs. Main Steam Line Drain Vvs. Reactor Water Sample Vvs.	Once/Operating Cycle
2)	RHR - Isolation Vv. Control Shutdown Cooling Vvs.	Once/Operating Cycle
3)	Reactor Water Cleanup Isolation	Once/Operating Cycle
4)	Drywell Isolation Vvs. TIP Withdrawal Atmospheric Control Vvs. Sump Drain Valves	Once/Operating Cycle
5)	Standby Gas Treatment System Reactor Building Isolation	Once/Operating Cycle

Deleted

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the AEC prior to any change in the once-a-month frequency.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic trip units.

Docket No. 50-277
License No. DPR-44

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 5A

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.B (Unit 2)

List of Pages Affected:

57	(ECCS requirements relocated to Page 57a)		
57a	New page		
64	Table 3.2.B		
65	Table 3.2.B		
66	Table 3.2.B		
67	Table 3.2.B		
68	Table 3.2.B		
69	Table 3.2.B		
70	Table 3.2.B		
71	Table 3.2.B		
71a	Table 3.2.B		
71b	Table 3.2.B		
72	Table 3.2.B	(Notes)	
72a	Table 3.2.B	(Notes)	New page
81	Table 4.2.B		
81a	Table 4.2.B		
87	Notes of Tables 4.2.A through 4.2.F		

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.2 PROTECTIVE INSTRUMENTATION	4.2 PROTECTIVE INSTRUMENTATION
Applicability: Applies to the plant instrumentation which initiates and controls a protective function.	Applicability: Applies to the surveillance requirement of the instrumentation that initiates and controls protective function.
Objective: To assure the operability of protective instrumentation.	Objective: To specify the type and frequency of surveillance to be applied to protective instrumentation.
Specifications:	Specifications:
A. Primary Containment Isolation Functions When primary containment integrity is required, the limiting conditions of operation for the instrumentation that initiates primary containment isolation are given in Table 3.2.A.	A. Primary Containment Isolation Functions Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2.A. System logic shall be functionally tested as indicated in Table 4.2.A.
B. Core and Containment Cooling Systems - Initiation & Control The limiting conditions for operation for the instrumentation that initiates or controls the core and containment cooling systems are given in Table 3.2.B. This instrumentation must be operable when the system(s) it initiates or controls are required to be operable as specified in Section 3.5.	B. Core and Containment Cooling Systems - Initiation & Control Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.B. System logic shall be functionally tested as indicated in Table 4.2.B.
See Section 3.2.A (moved to new page 57)	moved to new page 57a

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

B. Core and Containment Cooling Systems - Initiation and Control

Core and containment cooling system initiation and control instrumentation for each Trip Function in Table 3.2.B shall be Operable; and, there shall be two Operable or tripped trip systems for each Trip Function except as noted in Table 3.2.B.

Applicability:

Each Trip Function listed in Table 3.2.B shall be Operable whenever the system(s) it initiates or controls are required to be Operable as specified in Section 3.5.

Conditions and Required Actions:

With one or more channel(s) required by Table 3.2.B inoperable in one or more Trip Functions, take the Action required by Table 3.2.B.

LIMITING CONDITIONS FOR OPERATION

4.2 Protective Instrumentation (Continued)

B. Core and Containment Cooling Systems - Initiation and Control

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.B.

System logic shall be functionally tested as indicated in Table 4.2.B.

TABLE 3.2.B

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1)	Trip Function (ACTION)	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (14)(15)	Reactor Low-Low Water Level	≥-48 in. indicated level	4 HPCI & RCIC Inst. Channels	Initiates HPCI & RCIC
2 (8)(11)(15)	Reactor Low-Low-Low Water Level	≥-160 in. indicated level (4)	4 Core Spray & RHR Instrument Channels 4 ADS Instrument Channels	1. In conjunction with Low Reactor Pressure initiates Core Spray and LPCI 2. In conjunction with confirmatory low level High Drywell Pressure, 120 second time delay and LPCI or Core Spray pump interlock initiates Auto Blowdown (ADS) 3. Initiates starting of Diesel Generators

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TABLE 3.2.B (CONTINUED)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System(1)	Trip Function (ACTION)	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
(9)(16) 2	Reactor High Water Level	≤+45 in. indicated level	2 Inst. Channels	Trips HPCI & RCIC turbines
(8)(15) 1	Reactor Low Level (inside shroud)	≥ 312 in. above vessel zero (2/3 core height)	2 Inst. Channels	Prevents inadvertent operation of containment spray during accident condition.
(8)(15) 2	Containment High Pressure	$1 < p < 2$ psig	4 Inst. Channels	Prevents inadvertent operation of containment spray during accident condition.
(11)(15) 1	Confirmatory Low Level	≥+6 in. indicated level	2 Inst. Channels	ADS Permissive
(8)(11)(14)(15) 2	High Drywell Pressure	≤ 2 psig	4 Inst. Channels	1. Initiates Core Spray; LPCI; HPCI 2. Initiates starting of Diesel Generators 3. Initiates Auto Blowdown (ADS) in conjunction with Low-Low-Low Reactor water level, 120 second time delay, and LPCI or Core Spray pump running.

TABLE 3.2.B (Cont'd)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1)	Trip Function (ACTION)	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9)(15)	Reactor Low Pressure	400-500 psig	4 Inst. Channels	Permissive for opening Core Spray and LPCI Admission valves. Coincident with high dry well pressure, starts LPCI and Core Spray pumps.
2 (9)(15)	Reactor Low Pressure	200-250 psig	4 Inst. Channels	Permissive for closing Recirculating Pump Discharge Valve.
1 (13)(16)	Reactor Low Pressure	50≤P≤75 psig	2 Inst. Channels	In conjunction with PCI signal permits closure of RHR (LPCI) injection valves.

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TABLE 3.2.B
INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9)(15)	Core Spray Pump	6 +/-1 sec.	4 timers	All pumps-loss of offsite power only
	Start Timer	13 sec. +/-7% of setting	2 timers	A&C pumps-offsite power available
		23 sec. +/-7% of setting	2 timers	B&D pumps-offsite power available
1 per 4kV bus (7)	480V Emergency Load Center Timer	3 +/-0.5 sec.	4 timers	All timers - loss of offsite power only
2 (9)(15)	LPCI Pump Start Timer (Four Pumps)	2 sec. +/-7% of setting 8 sec. +/-7% of setting	4 timers 4 timers	LPCI pumps A&B LPCI pumps C&D
1 (12)(15)	ADS Actuation Timer	90 </=t </=120 seconds	2 timers	In conjunction with Low Reactor Water Level, High Drywell Pressure and LPCI or Core Spray Pump running interlock, initiates ADS.
2 (12)(15)	ADS Bypass Timer*	8 </=t </=10 minutes	4 timers	In conjunction with low reactor water level, bypasses high drywell pressure initiation of ADS.
2 (12)(15)	RHR (LPCI) Pump Discharge Pressure Interlock	50 +/- 10 psig	4 channels	Defers ADS actuation pending confirmation of Low Pressure Core Cooling system operation (LPCI Pump running interlock).
2 (12)(15)	Core Spray Pump Discharge Pressure Interlock	185 +/- 10 psig	4 channels	Defers ADS actuation pending confirmation of Low Pressure Core cooling system operation (Core Spray Pump running interlock).

*Effective when modification associated with this amendment is complete.

TABLE 3.2.B (Cont'd)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (8)(16)	RHR (LPCI) Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8)(16)	Core Spray Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8)(16)	ADS Trip System bus power monitor	NA	3 Inst. Channels	Monitors availability of power to logic systems.
1 (8)(16)	HPCI Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8)(16)	RCIC Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.

TABLE 3.2.B (CONTINUED)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (1) (8)(16)	Core Spray Sparger to Reactor Pressure Vessel d/p	1 (plus or minus 1.5) psid	2 Inst. Channels	Alarm to detect core spray sparger pipe break.
2 (1) (10)(15)	Condensate Storage Tank Low Level	Greater than or equal to 5' above tank bottom	2 Inst. Channels	Provides interlock to HPCI pump suction valves.
2 (1) (10)(15)	Suppression Chamber High Level	Less than or equal to 5" above torus midpoint	2 Inst. Channels	Transfers HPCI pump suction to suppression chamber.
2 (6) (10)(15)	Condensate Storage Tank Low Level	Greater than or equal to 5' above tank bottom	2 Inst. Channels	Transfer RCIC pump suction to suppression chamber.

INSTRUMENTATION THAT INITIATES OR CONT[illegible] THE CORE AND CONTAINMENT
COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (13)(15)	RCIC Turbine High Flow	≤450" H_2O (2)	2 Inst. Channels	
1 (13)(15)	RCIC Turbine High Flow Time Delay	3 ± 1 seconds	2 Inst. Channels	
2 (13)(15)	RCIC Turbine Compartment Wall	≤200 deg. F (2)	4 Inst. } 16 Inst.	
6 (13)(15)	RCIC Steam Line Area Temp.	≤200 deg. F (2)	12 Inst. }	
2 (13)(15)	RCIC Steam Line Low Pressure	100> p> 50 psig (2)	4 Inst.	
1 (13)(15)	HPCI Turbine Steam Line High Flow	≤225" H_2O (3)	2 Inst. Channels	
1 (13)(15)	HPCI Turbine High Flow Time Delay	3 ± 1 seconds	2 Inst. Channels	

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July 2, 1984

TABLE 3.2.B (CONTINUED)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
4(5) (13)(15)	HPCI Steam Line Low Pressure	100>p>50 psig (3)	4 Inst.	
2 (13)(15)	HPCI Turbine Compartment Temperature	$\leq$200 deg.F (3)	4 Inst. } 16 Inst.	
4 (13)(15)	HPCI Steam Line Area Temperature	$\leq$200 deg.F (3)	8 Inst. } 16 Inst.	
2 (13)(15)	HPCI/RHR Valve Station Area Temperature	$\leq$200 deg.F (3)	4 Inst. } 16 Inst.	
1 (1)	LPCI Cross-Connect Position	NA	1 Inst..	Initiates annunciation when valve is not closed.
1 per 4KV Bus (1)	4KV Emergency Bus Undervoltage Relay (HGA)	25%(+5%)of Rated Voltage		1.Trips all loaded breakers. 2.Fast transfer permissive. 3.Dead bus start of diesel.
1 per 4KV Bus (1)	4KV Emergency Bus Sequential Loading Relay (SV)	95%(+0%,-10%)of Rated Voltage		Permits sequential starting of vital loads

TABLE 3.2.B (CONTINUED)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 per 4KV Bus (1)	Emergency Transformer Undervoltage (IAV) (Inverse time-voltage)	60% (±5%) of rated voltage. Test at zero volts in 1.8 seconds (±10%).		1. Trips emergency transfer feed to 4kV emergency bus. 2. Fast transfer permissive.
2 per 4KV Bus (1)	Degraded voltage (27N) ("non-LOCA" relay)	98% of rated voltage +0.3% of setting (4077 volts ± 12 volts) 0.9 - 1.1 second internal time delay 60 second ± 5% (±3 sec.) time delay		1. Trips emergency transformer feed to 4KV emergency bus. 2. Fast transfer permissive.
2 per 4KV Bus (1)	Degraded voltage (27N) ("LOCA" relay)	89% of rated voltage ± 0.3% of setting (3702 volts ± 11 volts) 0.9 - 1.1 second internal time delay 9 second ± 7% (± 0.6 sec) time delay		1. Trips emergency transformer feed to 4KV emergency bus. 2. Fast transfer permissive. 3. Safety injection signal required.

TABLE 3.2.B (CONTINUED) Unit 2

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 per 4 kV Bus (1)	Emergency Transformer Degraded voltage (Inverse time - voltage). (CV-6)	87% (±5%) of Rated Voltage. Tests at 2940 volts in 30 seconds (±10%)		1. Trips emergency transformer feed to 4kV emergency bus. 2. Fast transfer permissive.

NOTES FOR TABLE 3.2.B

Moved to new page 57a

1. Whenever any CSCS subsystem is required by Section 3.5 to be operable, there shall be two operable trip systems. If the first column cannot be met for one of the trip systems, that trip system shall be placed in the tripped condition or the reactor shall be placed in the Cold Shutdown Condition within 24 hours.

2. Close isolation valves in RCIC subsystem.

3. Close isolation valves in HPCI subsystem.

4. Instrument set point corresponds to 378 inches above vessel zero.

5. HPCI has only one trip system for these sensors.

Deleted.

6. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within one hour or declare the RCIC system inoperable.

7. The failure of a 480V Emergency Load Center timer could result in the failure of a 480V Emergency Load Center to re-energize following the loss of one or both offsite sources. Therefore, Technical Specification 3.9.B.7 will apply when a 480V Emergency Load Center timer is not operable.

Replace with new pages 72 and 72a and insert Notes 8, 9, 10, 11, 12, 13, 14, 15 and 16.

NOTES FOR TABLE 3.2.B

1. With one or more required channel(s) inoperable in one or more Trip Functions, place channel in trip within one hour or the reactor shall be placed in the Cold Shutdown Condition within 24 hours.

2. Close isolation valves in RCIC subsystem.

3. Close isolation valves in HPCI subsystem.

4. Instrument setpoint corresponds to 378 inches above vessel zero.

5. HPCI has only one trip system for these sensors.

6. Deleted

7. The failure of a 480V Emergency Load Center timer could result in the failure of a 480V Emergency Load Center to re-energize following the loss of one or both offsite sources. Therefore, Technical Specification 3.9.B.7 will apply when a 480V Emergency Load Center timer is not Operable.

8. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, place inoperable channel in trip; and,
   2. Within one hour from discovery of loss of feature initiation capability in both trip systems for feature(s) supported by this trip function, declare supported feature(s) inoperable (See Footnote (1)).
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated supported features inoperable immediately.

9. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, restore channel to Operable status; and,
   2. Within one hour from discovery of loss of initiation capability in both trip systems for feature(s) supported by this trip function, declare supported feature(s) inoperable(See Footnote (2)).
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated supported features inoperable immediately.

10. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place inoperable channel in trip or align affected (HPCI or RCIC) pump suction to suppression pool; and,
    2. Within one hour of discovery of loss of initiation capability, declare affected system (HPCI or RCIC) inoperable if associated pump suction is not aligned to suppression pool.
    3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated system inoperable immediately.

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(1) Only applicable to the High Drywell Pressure and Reactor Low-Low-Low Water Level functions.

(2) Not applicable to Reactor High Water level Function.

11. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS valves inoperable; and,
    2. Within 96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable, place inoperable channel in trip; and,
    3. Within 8 days from discovery of inoperable channel if both HPCI and RCIC are Operable, place inoperable channel in trip.
    4. If required actions and associated completion times of Action 1 or 2 or 3 are not met, declare ADS inoperable immediately.

12. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS valves inoperable; and,
    2. Within 96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable, restore channel to Operable status; and,
    3. Within 8 days from discovery of inoperable channel if both HPCI and RCIC are Operable, restore channel to Operable status.
    4. If required actions and associated completion times of Action 1 or 2 or 3 are not met, declare ADS inoperable immediately.

13. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place channel in trip; and,
    2. Within one hour from discovery of one or more automatic functions with primary containment isolation capability not maintained, restore primary isolation capability.
    3. If required actions and associated completion times of Action 1 or 2 are not met, isolate affected penetration flow path(s) within one hour.

14. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place inoperable channel in trip; and,
    2. Within one hour from discovery of loss of system (HPCI or RCIC) initiation capability, declare affected system (HPCI or RCIC) inoperable.
    3. If required actions and associated completion times of Action 1 or 2 are not met, declare affected system (HPCI or RCIC) inoperable immediately.

15. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of required Actions may be delayed for up to 6 hours provided associated Trip Function maintains trip capability.

16. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of required Actions may be delayed for up to 6 hours.

TABLE 4.2.B
MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Reactor Water Level (7)	(1) (3)	Once/operating cycle	Once/day
2) Drywell Pressure (7)	(1) (3)	Once/operating cycle	Once/day
3) Reactor Pressure (7)	(1) (3)	Once/operating cycle	Once/day
4) Reactor Pressure - PCIS/LPCI Interlock	(1)	Once/3 months	None
5) Auto Sequencing Timers	NA	Once/operating cycle	None
6) ADS - LPCI or CS Pump Disch. Pressure Interlocks	(1)	Once/3 months	None
7) Trip System Bus Power Monitors	(1)	NA	None
8) Core Spray Sparger d/p	(1)	Once/6 months	Once/day
9) Steam Line High Flow (HPCI & RCIC)	(1)	Once/3 months	None
10) Steam Line High Flow Timers (HPCI and RCIC)	NA	Once/operating cycle	None
11) Steam Line High Temp. (HPCI & RCIC)	(1) (3)	Once/operating cycle	Once/day
12) Safeguards Area High Temp.	(1)	Once/3 months	None

once / 3 months

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June 10, 1985

Once / 3 months

TABLE 4.2.B (CONTINUED)
MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
13) HPCI and RCIC Steam Line Low Pressure	(1)	Once/3 months	None
14) HPCI Suction Source Levels	(1)	Once/3 months	None
15) 4KV Emergency Power System Voltage Relays (HGA,SV)	Once/operating cycle	Once/5 years	None
16) ADS Relief Valves Bellows Pressure Switches	Once/operating cycle	Once/operating cycle	None
17) LPCI/Cross Connect Valve Position	Once/refueling cycle	N/A	N/A
18) Condensate Storage Tank Level (RCIC) (7)	Once/3 months	Once/operating cycle	Once/day
19) 4KV Emergency Power Source Degraded Voltage Relays (IAV,CV-6,ITE)	Once/month	Once/eighteen months	None

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

Deleted

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the AEC prior to any change in the once-a-month frequency.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

Docket No. 50-278
License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 5B

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.B (UNIT 3)

List of Pages Affected:

57	(ECCS requirements relocated to Page 57a)
57a	New page
64	Table 3.2.B
65	Table 3.2.B
66	Table 3.2.B
67	Table 3.2.B
68	Table 3.2.B
69	Table 3.2.B
70	Table 3.2.B
71	Table 3.2.B
71a	Table 3.2.B
71b	Table 3.2.B
72	Table 3.2.B (Notes)
72a	Table 3.2.B (Notes) New page
81	Table 4.2.B
81a	Table 4.2.B
87	Notes of Tables 4.2.A through 4.2.F

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.2 PROTECTIVE INSTRUMENTATION	4.2 PROTECTIVE INSTRUMENTATION
Applicability:	Applicability:
Applies to the plant instrumentation which initiates and controls a protective function.	Applies to the surveillance requirement of the instrumentation that initiates and controls protective function.
Objective:	Objective:
To assure the operability of protective instrumentation.	To specify the type and frequency of surveillance to be applied to protective instrumentation.
Specifications:	Specifications:
A. Primary Containment Isolation Functions	A. Primary Containment Isolation Functions
When primary containment integrity is required, the limiting conditions of operation for the instrumentation that initiates primary containment isolation are given in Table 3.2.A.	Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2.A. System logic shall be functionally tested as indicated in Table 4.2.A.
B. Core and Containment Cooling Systems - Initiation & Control	B. Core and Containment Cooling Systems - Initiation & Control
The limiting conditions for operation for the instrumentation that initiates or controls the core and containment cooling systems are given in Table 3.2.B. This instrumentation must be operable when the system(s) it initiates or controls are required to be operable as specified in Section 3.5.	Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.B. System logic shall be functionally tested as indicated in Table 4.2.B.
See Section 3.2.A (moved to new page 57)	moved to new page 57a

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

B. Core and Containment Cooling Systems - Initiation and Control

Core and containment cooling system initiation and control instrumentation for each Trip Function in Table 3.2.B shall be Operable; and, there shall be two Operable or tripped trip systems for each Trip Function except as noted in Table 3.2.B.

Applicability:

Each Trip Function listed in Table 3.2.B shall be Operable whenever the system(s) it initiates or controls are required to be Operable as specified in Section 3.5.

Conditions and Required Actions:

With one or more channel(s) required by Table 3.2.B inoperable in one or more Trip Functions, take the Action required by Table 3.2.B.

LIMITING CONDITIONS FOR OPERATION

4.2 Protective Instrumentation (Continued)

B. Core and Containment Cooling Systems - Initiation and Control

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.B.

System logic shall be functionally tested as indicated in Table 4.2.B.

TABLE 3.2.B

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (14)(15)	Reactor Low-Low Water Level	≥-48 in. indicated level	4 HPCI & RCIC Inst. Channels	Initiates HPCI & RCIC
2 (8)(11)(15)	Reactor Low-Low-Low Water Level	≥-160 in. indicated level (4)	4 Core Spray & RHR Instrument Channels 4 ADS Instrument Channels	1. In conjunction with Low Reactor Pressure initiates Core Spray and LPCI 2. In conjunction with confirmatory low level High Drywell Pressure, 120 second time delay and LPCI or Core Spray pump interlock initiates Auto Blowdown (ADS) 3. Initiates starting of Diesel Generators

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2/9/82

TABLE 3.2.B (CONTINUED)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

	Minimum No. Of Operable Instrument Channels Per Trip System (1) ACTION	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
(9)(16)	2	Reactor High Water Level	≤+45 in. indicated level	2 Inst. Channels	Trips HPCI & RCIC turbines
(8)(15)	1	Reactor Low Level (inside shroud)	≥+312 in. above vessel zero (2/3 core height)	2 Inst. Channels	Prevents inadvertent operation of containment spray during accident condition.
	2	Containment High Pressure	1 < p < 2 psig	4 Inst. Channels	Prevents inadvertent operation of containment spray during accident condition.
(11)(15)	1	Confirmatory Low Level	≥+6 in. indicated level	2 Inst. Channels	ADS Permissive
(8)(11) (14)(15)	2	High Drywell Pressure	≤ 2 psig	4 Inst. Channels	1. Initiates Core Spray; LPCI;HPCI 2. Initiates starting of Diesel Generators 3. Initiates Auto Blowdown (ADS) in conjunction with Low-Low-Low Reactor water level, 120 second time delay, and LPCI or Core Spray pump running.

TABLE 3.2.B (Cont'd)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1)	Trip Function (ACTION)	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9) (15)	Reactor Low Pressure	400-500 psig	4 Inst. Channels	Permissive for opening Core Spray and LPCI Admission valves. Coincident with high dry well pressure, starts LPCI and Core Spray pumps.
2 (9) (15)	Reactor Low Pressure	200-250 psig	4 Inst. Channels	Permissive for closing Recirculating Pump Discharge Valve.
1 (13) (15)	Reactor Low Pressure	50≤P≤75 psig	2 Inst. Channels	In conjunction with PCI signal permits closure of RHR (LPCI) injection valves.

Amendment No. 68/67 (5/5/80)

TABLE 3.2.B
INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1) ACTION	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9)(15)	Core Spray Pump	6 +/- 1 sec.	4 timers	All pumps-loss of offsite power only
	Start Timer	13 sec. +/-7% of setting	2 timers	A&C pumps-offsite power available
		23 sec. +/-7% of setting	2 timers	B&D pumps-offsite power available
1 per 4kV bus (7)	480V Emergency Load Center Timer	3 +/-0.5 sec.	4 timers	All timers - loss of offsite power only
2 (9)(15)	LPCI Pump Start Timer (Four Pumps)	2 sec. +/-7% of setting 8 sec. +/-7% of setting	4 timers 4 timers	LPCI pumps A&B LPCI pumps C&D
1 (12)(15)	ADS Actuation Timer	90</=t </=120 seconds	2 timers	In conjunction with Low Reactor Water Level, High Drywell Pressure and LPCI or Core Spray Pump running interlock, initiates ADS.
2 (12)(15)	ADS Bypass Timer	8 </=t </=10 minutes	4 timers	In conjunction with low reactor water level, bypasses high drywell pressure initiation of ADS.
2 (12)(15)	RHR (LPCI) Pump Discharge Pressure Interlock	50 +/- 10 psig	4 channels	Defers ADS actuation pending confirmation of Low Pressure Core Cooling system operation (LPCI Pump running interlock).
2 (12)(15)	Core Spray Pump Discharge Pressure Interlock	185 +/- 10 psig	4 channels	Defers ADS actuation pending confirmation of Low Pressure Core cooling system operation (Core Spray Pump running interlock)

TABLE 3.2.B (Cont'd)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1)	Trip Function (ACTION)	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1	RHR (LPCI) Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1	Core Spray Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1	ADS Trip System bus power monitor	NA	3 Inst. Channels	Monitors availability of power to logic systems.
1	HPCI Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1	RCIC Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
(8)(16)				

TABLE 3.2.B (CONTINUED)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (11)	Core Spray Sparger to Reactor Pressure Vessel d/p	1 (plus or minus 1.5) psid	2 Inst. Channels	Alarm to detect core spray sparger pipe break.
2 (11)	Condensate Storage Tank Low Level	Greater than or equal to 5' above tank bottom	2 Inst. Channels	Provides interlock to HPCI pump suction valves.
2 (11)	Suppression Chamber High Level	Less than or equal to 5" above torus midpoint	2 Inst. Channels	Transfers HPCI pump suction to suppression chamber.
2 (16)	Condensate Storage Tank Low Level	Greater than or equal to 5' above tank bottom	2 Inst. Channels	Transfer RCIC pump suction to suppression chamber.

(8)(15)

(8)(16)

TABLE 3.2.B (CONTIN...

INSTRUMENTATION THAT INITIATES OR CONTROL THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1	RCIC Turbine High Flow	≤450" H_2O (2)	2 Inst. Channels	
1	RCIC Turbine High Flow Time Delay	3 ± 1 seconds	2 Inst. Channels	
2	RCIC Turbine Compartment Wall	≤200 deg. F (2)	4 Inst. } 16 Inst.	
6	RCIC Steam Line Area Temp.	≤200 deg. F (2)	12 Inst. }	
2	RCIC Steam Line Low Pressure	100> p> 50 psig (2)	4 Inst.	
1	HPCI Turbine Steam Line High Flow	≤225" H_2O (3)	2 Inst. Channels	
1	HPCI Turbine High Flow Time Delay	3 ± 1 seconds	2 Inst. Channels	

(13) (15)

Amendment No. 100/102
July 2, 1984

TABLE 3.2.B (CONTINUED)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
4(5)	HPCI Steam Line Low Pressure	100>p>50 psig (3)	4 Inst.	
2 (13)(15)	HPCI Turbine Compartment Temperature	$\leq$200 deg.F (3)	4 Inst.)	
4	HPCI Steam Line Area Temperature	$\leq$200 deg.F (3)	8 Inst.) 16 Inst.	
2	HPCI/RHR Valve Station Area Temperature	$\leq$200 deg.F (3)	4 Inst.)	
1 (1)	LPCI Cross-Connect Position	NA	1 Inst..	Initiates annunciation when valve is not closed.
1 per 4KV Bus (1)	4KV Emergency Bus Undervoltage Relay (HGA)	25%(+5%)of Rated Voltage		1. Trips all loaded breakers. 2. Fast transfer permissive. 3. Dead bus start of diesel.
1 per 4KV Bus (1)	4KV Emergency Bus Sequential Loading Relay (SV)	95%(+0%,-10%)of Rated Voltage		Permits sequential starting of vital loads

TABLE 3.2.B (CONTINUED)

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. Of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 per 4KV Bus (1)	Emergency Transformer Undervoltage (IAV) (Inverse time-voltage)	60% (±5%) of rated voltage. Test at zero volts in 1.8 seconds (±10%).		1. Trips emergency transfer feed to 4kV emergency bus. 2. Fast transfer permissive.
2 per 4KV Bus (1)	Degraded voltage (27N) ("non-LOCA" relay)	98% of rated voltage +0.3% of setting (4077 volts ± 12 volts) 0.9 - 1.1 second internal time delay 60 second ± 5% (±3 sec.) time delay		1. Trips emergency transformer feed to 4KV emergency bus. 2. Fast transfer permissive.
2 per 4KV Bus (1)	Degraded voltage (27N) ("LOCA" relay)	89% of rated voltage ± 0.3% of setting (3702 volts ± 11 volts) 0.9 - 1.1 second internal time delay 9 second ± 7% (± 0.6 sec) time delay		1. Trips emergency transformer feed to 4KV emergency bus. 2. Fast transfer permissive. 3. Safety injection signal required.

TABLE 3.2.B (CONTINUED)

Unit 3

INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1) (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 per 4 kV Bus (1)	Emergency Transformer Degraded voltage (Inverse time - voltage). (CV-6)	87% (±5%) of Rated Voltage. Tests at 2940 volts in 30 seconds (±10%)		1. Trips emergency transformer feed to 4kV emergency bus. 2. Fast transfer permissive.

NOTES FOR TABLE 3.2.B

Moved to new page 57a

1. Whenever any CSCS subsystem is required by Section 3.5 to be operable, there shall be two operable trip systems. If the first column cannot be met for one of the trip systems, that trip system shall be placed in the tripped condition or the reactor shall be placed in the Cold Shutdown Condition within 24 hours.

2. Close isolation valves in RCIC subsystem.

3. Close isolation valves in HPCI subsystem.

4. Instrument set point corresponds to 378 inches above vessel zero.

5. HPCI has only one trip system for these sensors.

Deleted

6. With the number of OPERABLE channels less than required by the Minimum OPERABLE Channels per Trip System requirement, place at least one inoperable channel in the tripped condition within one hour or declare the RCIC system inoperable.

7. The failure of a 480V Emergency Load Center timer could result in the failure of a 480V Emergency Load Center to re-energize following the loss of one or both offsite sources. Therefore, Technical Specification 3.9.B.7 will apply when a 480V Emergency Load Center timer is not operable.

Replace with new pages 72 and 72a and insert Notes 8, 9, 10, 11, 12, 13, 14, 15 and 16.

Amendment No. ~~14~~, ~~115~~, ~~117~~, 176

APR 2 3 1993

NOTES FOR TABLE 3.2.B

1. With one or more required channel(s) inoperable in one or more Trip Functions, place channel in trip within one hour or the reactor shall be placed in the Cold Shutdown Condition within 24 hours.

2. Close isolation valves in RCIC subsystem.

3. Close isolation valves in HPCI subsystem.

4. Instrument setpoint corresponds to 378 inches above vessel zero.

5. HPCI has only one trip system for these sensors.

6. Deleted

7. The failure of a 480V Emergency Load Center timer could result in the failure of a 480V Emergency Load Center to re-energize following the loss of one or both offsite sources. Therefore, Technical Specification 3.9.B.7 will apply when a 480V Emergency Load Center timer is not Operable.

8. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, place inoperable channel in trip; and,
   2. Within one hour from discovery of loss of feature initiation capability in both trip systems for feature(s) supported by this trip function, declare supported feature(s) inoperable (See Footnote (1)).
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated supported features inoperable immediately.

9. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, restore channel to Operable status; and,
   2. Within one hour from discovery of loss of initiation capability in both trip systems for feature(s) supported by this trip function, declare supported feature(s) inoperable(See Footnote (2)).
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated supported features inoperable immediately.

10. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place inoperable channel in trip or align affected (HPCI or RCIC) pump suction to suppression pool; and,
    2. Within one hour of discovery of loss of initiation capability, declare affected system (HPCI or RCIC) inoperable if associated pump suction is not aligned to suppression pool.
    3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated system inoperable immediately.

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(1) Only applicable to the High Drywell Pressure and Reactor Low-Low-Low Water Level functions.

(2) Not applicable to Reactor High Water level Function.

11. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS valves inoperable; and,
    2. Within 96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable, place inoperable channel in trip; and,
    3. Within 8 days from discovery of inoperable channel if both HPCI and RCIC are Operable, place inoperable channel in trip.
    4. If required actions and associated completion times of Action 1 or 2 or 3 are not met, declare ADS inoperable immediately.

12. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS valves inoperable; and,
    2. Within 96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable, restore channel to Operable status; and,
    3. Within 8 days from discovery of inoperable channel if both HPCI and RCIC are Operable, restore channel to Operable status.
    4. If required actions and associated completion times of Action 1 or 2 or 3 are not met, declare ADS inoperable immediately.

13. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place channel in trip; and,
    2. Within one hour from discovery of one or more automatic functions with primary containment isolation capability not maintained, restore primary isolation capability.
    3. If required actions and associated completion times of Action 1 or 2 are not met, isolate affected penetration flow path(s) within one hour.

14. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place inoperable channel in trip; and,
    2. Within one hour from discovery of loss of system (HPCI or RCIC) initiation capability, declare affected system (HPCI or RCIC) inoperable.
    3. If required actions and associated completion times of Action 1 or 2 are not met, declare affected system (HPCI or RCIC) inoperable immediately.

15. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of required Actions may be delayed for up to 6 hours provided associated Trip Function maintains trip capability.

16. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of required Actions may be delayed for up to 6 hours.

TABLE 4.2.B

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Reactor Water Level (7)	(1) (3)	Once/operating cycle	Once/day
2) Drywell Pressure (7)	(1) (3)	Once/operating cycle	Once/day
3) Reactor Pressure (7)	(1) (3)	Once/operating cycle	Once/day
4) Reactor Pressure - PCIS/LPCI Interlock	(1)	Once/3 months	None
5) Auto Sequencing Timers	NA	Once/operating cycle	None
6) ADS - LPCI or CS Pump Disch. Pressure Interlocks	(1)	Once/3 months	None
7) Trip System Bus Power Monitors	(1)	NA	None
8) Core Spray Sparger d/p	(1)	Once/6 months	Once/day
9) Steam Line High Flow (HPCI & RCIC)	(1)	Once/3 months	None
10) Steam Line High Flow Timers (HPCI and RCIC)	NA	Once/operating cycle	None
11) Steam Line High Temp. (HPCI & RCIC)	(1) (3)	Once/operating cycle	Once/day
12) Safeguards Area High Temp.	(1)	Once/3 months	None

once/3 months

Amendment No. ~~8F~~, ~~97~~, ~~100~~, 109 /112
June 10, 1985

Once/3 months

TABLE 4.2.B (CONTINUED)
MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
13) HPCI and RCIC Steam Line Low Pressure	(1)	Once/3 months	None
14) HPCI Suction Source Levels	(1)	Once/3 months	None
15) 4KV Emergency Power System Voltage Relays (HGA,SV)	Once/operating cycle	Once/5 years	None
16) ADS Relief Valves Bellows Pressure Switches	Once/operating cycle	Once/operating cycle	None
17) LPCI/Cross Connect Valve Position	Once/refueling cycle	N/A	N/A
18) Condensate Storage Tank Level (RCIC) (7)	Once/3 months	Once/operating cycle	Once/day
19) 4KV Emergency Power Source Degraded Voltage Relays (IAV,CV-6,ITE)	Once/month	Once/eighteen months	None

Deleted

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the AEC prior to any change in the once-a-month frequency.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

Docket No. 50-277
License No. DPR-44

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 6A

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.C (Unit 2)

List of Pages Affected:

58	Page replaced
73	Table 3.2.C (Notes)
74	Table 3.2.C (Notes)
74a	Table 3.2.C (Notes)
83	Table 4.2.C
87	Notes of Tables 4.2.A through 4.2.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
. Control Rod Block Actuation	C. Control Rod Block Actuation
1. The limiting conditions of operation for the instrumentation that initiates control rod blocks are given in Table 3.2.C.	Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.C.
2. The minimum number of operable instrument channels specified in Table 3.2.C for the Rod Block Monitor may be reduced by one in one of the trip systems for maintenance and/or testing, provided that this condition does not last longer than 24 hours in any thirty day period.	System logic shall be functionally tested as indicated in Table 4.2.C.

Replace with new page 58

Amendment No. 102/104
December 31, 1984

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

C. Control Rod Block (CRB) Actuation

The Control Rod Block Actuation instrumentation for each function in Table 3.2.C shall be Operable; and, there shall be two Operable or tripped trip systems for each function except as noted in Table 3.2.C.

Applicability: (1)

The Rod Block Monitor (RBM) shall be Operable with setpoints as required by Table 3.2.C and the Core Operating Limits Report (COLR).

The APRM, IRM and SRM Control Rod Block (CRB) functions shall be Operable whenever the Reactor Mode Switch is in the Startup or Run positions except as follows:

The SRM and IRM functions are not required when the Reactor Mode Switch is in Run.

The APRM and RBM functions are not required to be Operable when the Reactor Mode Switch is in Startup except for the APRM Upscale (Startup Mode) which is not required to be Operable when the Reactor Mode Switch is in Run.

The scram discharge instrument volume high level rod block is required to be Operable whenever the Reactor Mode Switch is in the Startup or Run positions or in the Refuel position whenever more than one control rod is withdrawn.

Conditions and Required Actions:

With one or more channel(s) required by Table 3.2.C inoperable in one or more trip functions, take the Action required by Table 3.2.C.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

C. Control Rod Block (CRB) Actuation

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.C.

System logic shall be functionally tested as indicated in Table 4.2.C.

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(1) Section 3.3.B.5 is Applicable during operation with a limiting control rod pattern.

TABLE 3.2.C
INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

Minimum No. of Operable Instrument Channels Per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Action (14)
4 (2)	APRM Upscale (Flow Biased)	(0.66W+59%-0.66ΔW) (Clamp at 108% max)	6 Inst. Channels	(10)
4	APRM Upscale (Startup Mode)	≤12%	6 Inst. Channels	(10)
4	APRM Downscale	≥2.5 indicated on scale	6 Inst. Channels	(10)
1 (7)(11) 13	Rod Block Monitor (Power Biased)	(RTP ≥85%), S_{RB} ≤HTSP (65% ≤RTP <85%), S_{RB} ≤ITSP (30% ≤RTP <65%), S_{RB} ≤LTSP	2 Inst. Channels	(1) (12)
1 (7)(11)	Rod Block Monitor Downscale	≥DTSP	2 Inst. Channels	(1)
6	IRM Downscale (3)	≥2.5 indicated on scale	8 Inst. Channels	(10)
6	IRM Detector not in Startup Position	(8)	8 Inst. Channels	(10)
6	IRM Upscale	≤108 indicated on scale	8 Inst. Channels	(10)
2 (5)	SRM Detector not in Startup Position	(4)	4 Inst. Channels	(1)
2 (5)(6)	SRM Upscale	≤10^5 counts/sec.	4 Inst. Channels	(1)
1 (15)	Scram Discharge Instrument Volume High Level	≤25 gallons	1 Inst. Channel	(9)

Moved to new page 58

NOTES FOR TABLE 3.2.C

1. For the startup and run positions of the Reactor Mode Selector Switch, there shall be two operable or tripped trip systems for each function. The SRM and IRM blocks need not be operable in "Run" mode, and the APRM and RBM rod blocks need not be operable in "Startup" mode. If the first column cannot be met for one of the two trip systems, this condition may exist for up to seven days provided that during that time the operable system is functionally tested immediately and daily thereafter; if this condition lasts longer than seven days, the system shall be tripped. If the first column cannot be met for both trip systems, the systems shall be tripped.

2. W = Loop Recirculation flow in percent of design.

   Trip level setting is in percent of rated power (3293 MWt).

   ΔW is the difference between two loop and single loop effective recirculation drive flow rate at the same core flow. During single loop operation, the reduction in trip setting is accomplished by correcting the flow input of the flow biased rod block to preserve the original (two loop) relationship between the rod block setpoint and recirculation drive flow. $\Delta W = 0$ for two loop operation.

3. IRM downscale is bypassed when it is on its lowest range.

4. This function is bypassed when the count rate is $\geq$ 100 cps.

5. One of the four SRM inputs may be bypassed.

6. This SRM function is bypassed when the IRM range switches are on range 8 or above.

7. The trip is bypassed when the reactor power is $\leq$ 30%.

8. This function is bypassed when the mode switch is placed in Run.

Amendment No. ~~28~~, ~~48~~, ~~70~~, ~~78~~, ~~123~~, ~~134~~, 192

NOTES FOR TABLE 3.2.C (Cont.)

twelve hours

9. If the number of operable channels is less than required by the minimum operable channels per trip function requirement, place the inoperable channel in the tripped condition within one hour. This note is applicable in the "Run" mode, the "Startup" mode and the "Refuel" mode if more than one control rod is withdrawn.

10. For the Startup (for IRM rod block) and the Run (for APRM rod block) positions of the Reactor Mode Selector Switch and with the number of OPERABLE channels:

   a. One less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 7 days or place the inoperable channel in the tripped condition within the next hour.

   b. Two or more less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within one hour.

11. The values for HTSP, ITSP, LTSP, and DTSP are specified in the CORE OPERATING LIMITS REPORT.

12.

13.

14.

15.

Insert new Notes 12, 13, 14 and 15

Amendment No. ~~88~~, ~~91~~, ~~134~~, 192

Insert for Table 3.2.C Notes on Page 74a:

12. With one or more required Rod Block Monitor channel(s) inoperable:

    a. With one rod block monitor (RBM) channel inoperable, restore RBM channel to Operable status within 24 hours.
    b. If the required action and associated completion time in Action a above are not met, place one RBM channel in trip within 1 hour.
    c, With 2 RBM channels inoperable, place one RBM channel in trip within 1 hour.

13. Section 3.3.B.5 is Applicable during operation with a limiting control rod pattern.

14. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated function maintains control rod block capability.

15. The scram discharge instrument volume has only one trip system.

TABLE 4.2.C

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CONTROL ROD BLOCKS ACTUATION

Instrument Channel	Instrument Functional Test	Calibration	Instrument Check
1) APRM - Downscale	(1)(3)	Once/3 months	Once/day
2) APRM - Upscale	(1)(3)	Once/3 months	Once/day
3) IRM - Upscale	(2)(3)	Startup or Control Shutdown	(2)
4) IRM - Downscale	(2)(3)	Startup or Control Shutdown	(2)
5) RBM - Upscale	(1)(3)	Once/6 months	Once/day
6) RBM - Downscale	(1)(3)	Once/6 months	Once/day
7) SRM - Upscale	(2)(3)	Startup or Control Shutdown	(2)
8) SRM - Detector Not in Startup Position	(2)(3)	N/A	(2)
9) IRM - Detector Not in Startup Position	(2)(3)	N/A	(2)
10) Scram Discharge Instrument Volume - High Level	Quarterly	Once/Operating Cycle	N/A

Logic System Functional Test (4) (6)	Frequency
1) System Logic Check	Once/Operating Cycle

once / 3 months

Deleted

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the AEC prior to any change in the once-a-month frequency.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

Docket No. 50-278
License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 6B

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.C (UNIT 3)

List of Pages Affected:

58	Page replaced
73	Table 3.2.C (Notes)
74	Table 3.2.C (Notes)
74a	Table 3.2.C (Notes)
83	Table 4.2.C
87	Notes of Tables 4.2.A through 4.2.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
C. Control Rod Block Actuation	C. Control Rod Block Actuation
1. The limiting conditions of operation for the instrumentation that initiates control rod blocks are given in Table 3.2.C.	Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.C.
2. The minimum number of operable instrument channels specified in Table 3.2.C for the Rod Block Monitor may be reduced by one in one of the trip systems for maintenance and/or testing, provided that this condition does not last longer than 24 hours in any thirty day period.	System logic shall be functionally tested as indicated in Table 4.2.C.

Replace with new page 58

Amendment No. 102/104
December 31, 1984

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

C. Control Rod Block (CRB) Actuation

The Control Rod Block Actuation instrumentation for each function in Table 3.2.C shall be Operable; and, there shall be two Operable or tripped trip systems for each function except as noted in Table 3.2.C.

Applicability: (1)

The Rod Block Monitor (RBM) shall be Operable with setpoints as required by Table 3.2.C and the Core Operating Limits Report (COLR).

The APRM, IRM and SRM Control Rod Block (CRB) functions shall be Operable whenever the Reactor Mode Switch is in the Startup or Run positions except as follows:

The SRM and IRM functions are not required when the Reactor Mode Switch is in Run.

The APRM and RBM functions are not required to be Operable when the Reactor Mode Switch is in Startup except for the APRM Upscale (Startup Mode) which is not required to be Operable when the Reactor Mode Switch is in Run.

The scram discharge instrument volume high level rod block is required to be Operable whenever the Reactor Mode Switch is in the Startup or Run positions or in the Refuel position whenever more than one control rod is withdrawn.

Conditions and Required Actions:

With one or more channel(s) required by Table 3.2.C inoperable in one or more trip functions, take the Action required by Table 3.2.C.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

C. Control Rod Block (CRB) Actuation

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.C.

System logic shall be functionally tested as indicated in Table 4.2.C.

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(1) Section 3.3.B.5 is Applicable during operation with a limiting control rod pattern.

TABLE 3.2.C
INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

Minimum No. of Operable Instrument Channels Per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Action 14
4 (2)	APRM Upscale (Flow Biased)	(0.66W+59%-0.66ΔW) (Clamp at 108% max)	6 Inst. Channels	(10)
4	APRM Upscale (Startup Mode)	≤12%	6 Inst. Channels	(10)
4	APRM Downscale	≥2.5 indicated on scale	6 Inst. Channels	(10)
1 (7)(11)(13)	Rod Block Monitor (Power Biased)	(RTP ≥85%), S_{RB} ≤HTSP (65% ≤RTP <85%), S_{RB} ≤ITSP (30% ≤RTP <65%), S_{RB} ≤LTSP	2 Inst. Channels	(1) 12
1 (7)(11)(13)	Rod Block Monitor Downscale	≥DTSP	2 Inst. Channels	(1)
6	IRM Downscale (3)	≥2.5 indicated on scale	8 Inst. Channels	(10)
6	IRM Detector not in Startup Position	(8)	8 Inst. Channels	(10)
6	IRM Upscale	≤108 indicated on scale	8 Inst. Channels	(10)
2 (5)	SRM Detector not in Startup Position	(4)	4 Inst. Channels	(1)
2 (5)(6)	SRM Upscale	≤10^5 counts/sec.	4 Inst. Channels	(1)
1 (15)	Scram Discharge Instrument Volume High Level	≤25 gallons	1 Inst. Channel	(9)

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NOTES FOR TABLE 3.2.C

1. For the startup and run positions of the Reactor Mode Selector Switch, there shall be two operable or tripped trip systems for each function. The SRM and IRM blocks need not be operable in "Run" mode, and the APRM and RBM rod blocks need not be operable in "Startup" mode. If the first column cannot be met for one of the two trip systems, this condition may exist for up to seven days provided that during that time the operable system is functionally tested immediately and daily thereafter; if this condition lasts longer than seven days, the system shall be tripped. If the first column cannot be met for both trip systems, the systems shall be tripped.

2. W = Loop Recirculation flow in percent of design.

   Trip level setting is in percent of rated power (3293 MWt).

   ΔW is the difference between two loop and single loop effective recirculation drive flow rate at the same core flow. During single loop operation, the reduction in trip setting is accomplished by correcting the flow input of the flow biased rod block to preserve the original (two loop) relationship between the rod block setpoint and recirculation drive flow. $\Delta W = 0$ for two loop operation.

3. IRM downscale is bypassed when it is on its lowest range.

4. This function is bypassed when the count rate is ≥ 100 cps.

5. One of the four SRM inputs may be bypassed.

6. This SRM function is bypassed when the IRM range switches are on range 8 or above.

7. The trip is bypassed when the reactor power is ≤ 30%.

8. This function is bypassed when the mode switch is placed in Run.

twelve hours

NOTES FOR TABLE 3.2.C (Cont.)

9. If the number of operable channels is less than required by the minimum operable channels per trip function requirement, place the inoperable channel in the tripped condition within one hour. This note is applicable in the "Run" mode, the "Startup" mode and the "Refuel" mode if more than one control rod is withdrawn.

10. For the Startup (for IRM rod block) and the Run (for APRM rod block) positions of the Reactor Mode Selector Switch and with the number of OPERABLE channels:

    a. One less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 7 days or place the inoperable channel in the tripped condition within the next hour.

    b. Two or more less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within one hour.

11. The values for HTSP, ITSP, LTSP, and DTSP are specified in the CORE OPERATING LIMITS REPORT.

12

13

14

15

Insert new notes 12, 13, 14 and 15.

Amendment No. ~~88~~, ~~93~~, ~~155~~, 184

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Insert for Table 3.2.C Notes on Page 74a:

12. With one or more required Rod Block Monitor channel(s) inoperable:

    a. With one rod block monitor (RBM) channel inoperable, restore RBM channel to Operable status within 24 hours.
    b. If the required action and associated completion time in Action a above are not met, place one RBM channel in trip within 1 hour.
    c. With 2 RBM channels inoperable, place one RBM channel in trip within 1 hour.

13. Section 3.3.B.5 is Applicable during operation with a limiting control rod pattern.

14. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated function maintains control rod block capability.

15. The scram discharge instrument volume has only one trip system.

TABLE 4.2.C

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CONTROL ROD BLOCKS ACTUATION

	Instrument Channel	Instrument Functional Test	Calibration	Instrument Check
1)	APRM - Downscale	(1)(3)	Once/3 months	Once/day
2)	APRM - Upscale	(1)(3)	Once/3 months	Once/day
3)	IRM - Upscale	(2)(3)	Startup or Control Shutdown	(2)
4)	IRM - Downscale	(2)(3)	Startup or Control Shutdown	(2)
5)	RBM - Upscale	(1)(3)	Once/6 months	Once/day
6)	RBM - Downscale	(1)(3)	Once/6 months	Once/day
7)	SRM - Upscale	(2)(3)	Startup or Control Shutdown	(2)
8)	SRM - Detector Not in Startup Position	(2)(3)	N/A	(2)
9)	IRM - Detector Not in Startup Position	(2)(3)	N/A	(2)
10)	Scram Discharge Instrument Volume - High Level	Quarterly	Once/Operating Cycle	N/A

	Logic System Functional Test (4) (6)	Frequency
1)	System Logic Check	Once/Operating Cycle

Once/3 months

Deleted

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the AEC prior to any change in the once-a-month frequency.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

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License No. DPR-44

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 7A

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.D (Unit 2)

List of Pages Affected:

59	Page replaced
75	Table 3.2.D
84	Table 3.2.D
87	Notes of Tables 4.2.A through 4.2.F

LIMITING CONDITIONS FOR OPERATION

3.2.D. Radiation Monitoring Systems-Isolation and Initiation Functions

1. Reactor Building Isolation and Standby Gas Treatment System

The limiting conditions for operation are given in Table 3.2.D.

2. Main Control Room

The limiting conditions for operation are given in Table 3.2.D.

E. Drywell Leak Detection

The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Section 3.6.C, "Coolant Leakage".

SURVEILLANCE REQUIREMENTS

4.2.D. Radiation Monitoring Systems-Isolation and Initiation Functions

1. Reactor Building Isolation and Standby Gas Treatment System

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

System logic shall be functionally tested as indicated in Table 4.2.D.

2. Main Control Room

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

E. Drywell Leak Detection

Instrumentation shall be calibrated and checked as indicated in table 4.2.E.

Moved to new page 59a

Insert new page 59

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation
(Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions

D.1. Reactor Building Isolation and Standby Gas Treatment System

The Reactor Building Isolation and Standby Gas Treatment System instrumentation for each trip function in Table 3.2.D shall be Operable; and, there shall be two Operable or tripped trip systems for each trip function.

Applicability:

Refuel Area Exhaust Monitors and Reactor Building Area Exhaust Monitors shall be Operable whenever the associated systems are required to be Operable.

Main Stack Monitor shall be Operable whenever the containment is purging and primary containment integrity is required.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.D inoperable in one or more trip functions, place channel in trip within 24 hours.

2. With one or more automatic Functions with containment isolation capability not maintained, restore containment isolation capability within one hour.

3. If the required actions and associated completion times of Action 1 or 2 are not met, take the Action required by Table 3.2.D.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation
(Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions

D.1. Reactor Building Isolation and Standby Gas Treatment System

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

System logic shall be functionally tested as indicated in Table 4.2.D.

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(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Trip Function maintains isolation capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.2.D for that trip Function shall be taken.

PBAPS

TABLE 3.2.D
RADIATION MONITORING SYSTEMS THAT INITIATE AND/OR ISOLATE SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (1)	Trip Function	Trip Level Setting	No. of Instrument Channels Provided by Design	Action (2) (1)
2	Refuel Area Exhaust Monitor	Upscale, <16 mr/hr	4 Inst. Channels	A or B
2	Reactor Building Exhaust Monitors	Upscale, <16 mr/hr	4 Inst. Channels	B
1 (3)	Main Stack Monitor	Upscale, $\leq 10^6$ cps	2 Inst. Channels	C
2 (4) (2)	Main Control Room	Upscale, <400 cpm	4 Inst. Channels	D

Notes for Table 3.2.D

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1. Whenever the systems are required to be operable, the specified number of instrument channels shall be operable or placed in the tripped condition. If this cannot be met, the indicated action shall be taken.

1.

2. Action

   A. Cease operation of the refueling equipment.
   B. Isolate secondary containment and start the standby gas treatment system.
   C. Cease purging of primary containment, and close vent and purge valves greater than 2 inches in diameter.
   D. As described in LCO 3.11.A.5

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3. The trip function is required to be operable only when the containment is purging through the SGTS and containment integrity is required. If both radiation monitors are out of service, action shall be taken as indicated in Note 2, (C).

2.

4. The trip function is required to be operable whenever secondary containment is required on either unit.

PBAPS

TABLE 4.2.D

MINIMUM TEST & CALIBRATION FREQUENCY FOR RADIATION MONITORING SYSTEMS

	Instrument Channels	Instrument Functional Test	Calibration	Instrument Check (2)
1)	Refuel Area Exhaust Monitors - Upscale	(1)	Once/3 months	Once/day
2)	Reactor Building Area	(1)	Once/3 months	Once/day
3)	Main Stack Monitor	Once/3 months	Once/12 months as described in 4.8.C.4.a	Once/day
4)	Main Control Room	Once/3 months	Once/18 months as described in 4.11.A.5	Once/day

Once/3 months

Logic System Functional Test (4) (6)	Frequency
1) Reactor Building Isolation	Once/Operating Cycle
2) Standby Gas Treatment System Actuation	Once/Operating Cycle

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

Deleted

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the AEC prior to any change in the once-a-month frequency.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

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License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 7B

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.D (UNIT 3)

List of Pages Affected:

59	Page replaced
75	Table 3.2.D
84	Table 3.2.D
87	Notes of Tables 4.2.A through 4.2.F

LIMITING CONDITIONS FOR OPERATION

3.2.D. Radiation Monitoring Systems-Isolation and Initiation Functions

1. Reactor Building Isolation and Standby Gas Treatment System

The limiting conditions for operation are given in Table 3.2.D.

2. Main Control Room

The limiting conditions for operation are given in Table 3.2.D.

E. Drywell Leak Detection

The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Section 3.6.C, "Coolant Leakage".

Insert new page 59

SURVEILLANCE REQUIREMENTS

4.2.D. Radiation Monitoring Systems-Isolation and Initiation Functions

1. Reactor Building Isolation and Standby Gas Treatment System

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

System logic shall be functionally tested as indicated in Table 4.2.D.

2. Main Control Room

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

E. Drywell Leak Detection

Instrumentation shall be calibrated and checked as indicated in table 4.2.E.

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LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation
(Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions

D.1. Reactor Building Isolation and Standby Gas Treatment System

The Reactor Building Isolation and Standby Gas Treatment System instrumentation for each trip function in Table 3.2.D shall be Operable; and, there shall be two Operable or tripped trip systems for each trip function.

Applicability:

Refuel Area Exhaust Monitors and Reactor Building Area Exhaust Monitors shall be Operable whenever the associated systems are required to be Operable.

Main Stack Monitor shall be Operable whenever the containment is purging and primary containment integrity is required.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.D inoperable in one or more trip functions, place channel in trip within 24 hours.

2. With one or more automatic Functions with containment isolation capability not maintained, restore containment isolation capability within one hour.

3. If the required actions and associated completion times of Action 1 or 2 are not met, take the Action required by Table 3.2.D

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation
(Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions

D.1. Reactor Building Isolation and Standby Gas Treatment System

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

System logic shall be functionally tested as indicated in Table 4.2.D.

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Trip Function maintains isolation capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.2.D for that trip Function shall be taken.

PBAPS

TABLE 3.2.D
RADIATION MONITORING SYSTEMS THAT INITIATE AND/OR ISOLATE SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (1) (1)	Trip Function	Trip Level Setting	No. of Instrument Channels Provided by Design	Action (2) (1)
2	Refuel Area Exhaust Monitor	Upscale, <16 mr/hr	4 Inst. Channels	A or B
2	Reactor Building Exhaust Monitors	Upscale, <16 mr/hr	4 Inst. Channels	B
1 (3)	Main Stack Monitor	Upscale, $\leq 10^6$ cps	2 Inst. Channels	C
2 (4) (2)	Main Control Room	Upscale, <400 cpm	4 Inst. Channels	D

Notes for Table 3.2.D

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2 1. Whenever the systems are required to be operable, the specified number of instrument channels shall be operable or placed in the tripped condition. If this cannot be met, the indicated action shall be taken.

1. 2. Action

A. Cease operation of the refueling equipment.
B. Isolate secondary containment and start the standby gas treatment system.
C. Cease purging of primary containment, and close vent and purge valves greater than 2 inches in diameter.
D. As described in LCO 3.11.A.5

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2 3. The trip function is required to be operable only when the containment is purging through the SGTS and containment integrity is required. If both radiation monitors are out of service, action shall be taken as indicated in Note 2, (C).

4. The trip function is required to be operable whenever secondary containment is required on either unit.

2.

PBAPS

TABLE 4.2.D

MINIMUM TEST & CALIBRATION FREQUENCY FOR RADIATION MONITORING SYSTEMS

	Instrument Channels	Instrument Functional Test	Calibration	Instrument Check (2)
1)	Refuel Area Exhaust Monitors - Upscale	(1)	Once/3 months	Once/day
2)	Reactor Building Area	(1)	Once/3 months	Once/day
3)	Main Stack Monitor	Once/3 months	Once/12 months as described in 4.8.C.4.a	Once/day
4)	Main Control Room	Once/3 months	Once/18 months as described in 4.11.A.5	Once/day

Once/3 months

	Logic System Functional Test (4) (6)	Frequency
1)	Reactor Building Isolation	Once/Operating Cycle
2)	Standby Gas Treatment System Actuation	Once/Operating Cycle

Deleted

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

1. Initially once every month. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of PBAPS. The failure rate data must be reviewed and approved by the AEC prior to any change in the once-a-month frequency.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

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PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 8A

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.E (Unit 2)

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.F (Unit 2)

List of Pages Affected:

59	TS 3.2.D.2 moved to new page 59a
59	TS 3.2.E moved to new page 59a
59a	New page
60	TS 3.2.F moved to new page 59a
85	Table 4.2.E

LIMITING CONDITIONS FOR OPERATION

3.2.D. Radiation Monitoring Systems-Isolation and Initiation Functions

1. Reactor Building Isolation and Standby Gas Treatment System

The limiting conditions for operation are given in Table 3.2.D.

2. Main Control Room

The limiting conditions for operation are given in Table 3.2.D.

E. Drywell Leak Detection

The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Section 3.6.C, "Coolant Leakage".

SURVEILLANCE REQUIREMENTS

4.2.D. Radiation Monitoring Systems-Isolation and Initiation Functions

1. Reactor Building Isolation and Standby Gas Treatment System

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

System logic shall be functionally tested as indicated in Table 4.2.D.

2. Main Control Room

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

E. Drywell Leak Detection

Instrumentation shall be calibrated and checked as indicated in table 4.2.E.

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LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions (Continued)

D.2 Main Control Room

The limiting conditions for operation are given in Table 3.2.D.

E. Drywell Leak Detection

The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Section 3.6.C, "Coolant Leakage".

F. Surveillance Information Readouts

The limiting conditions for the instrumentation that provides surveillance information readouts are given in Table 3.2.F.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions (Continued)

D.2 Main Control Room

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

E. Drywell Leak Detection

Instrumentation shall be calibrated and checked as indicated in Table 4.2.E.

F. Surveillance Information Readouts

Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.

TABLE 4.2.E

MINIMUM TEST AND CALIBRATION FREQUENCY FOR DRYWELL LEAK DETECTION

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Equipment Drain Sump Flow Integrator	(1)	Once/3 months	Once/day
2) Floor Drain Sump Flow Integrator	(1)		
3) Drywell Atmosphere [illegible] Monitor			

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
F. Surveillance Information Readouts The limiting conditions for the instrumentation that provides surveillance information readouts are given in Table 3.2.F.	F. Surveillance Information Readouts Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.
G. Alternate Rod Insertion and Recirculation Pump Trip The limiting conditions for the instrumentation that initiates an Alternate Rod Insertion scram and trips the reactor recirculation pumps to limit the consequences of a failure to scram during an anticipated transient are given in Table 3.2.G. When in the RUN or STARTUP Mode, the required minimum number of instrument channels shall be operable with trip setpoints set consistent with the setting specified in Table 3.2.G. The manual and automatic actuation logic, and actuation devices of both trip systems shall be operable when in the RUN or STARTUP Mode.	G. Alternate Rod Insertion and Recirculation Pump Trip Instrumentation shall be functionally tested and calibrated as indicated on Table 4.2.G. System logic shall be functionally tested as indicated in Table 4.2.G.

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Insert new page 60

Amendment No. 141

03-22-89

TABLE 4.2.E

MINIMUM TEST AND CALIBRATION FREQUENCY FOR DRYWELL LEAK DETECTION

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Equipment Drain Sump Flow Integrator	(1)	Once/3 months	Once/day
2) Floor Drain Sump Flow Integrator	(1)	Once/3 months	Once/day
3) Drywell Atmosphere Radioactivity Monitor	(1)	Once/3 months	Once/day

Once/month

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License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 8B

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.E (Unit 3)

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.F (Unit 3)

List of Pages Affected:

59	TS 3.2.D.2 moved to new page 59a
59	TS 3.2.E moved to new page 59a
59a	New page
60	TS 3.2.F moved to new page 59a
85	Table 4.2.E

LIMITING CONDITIONS FOR OPERATION

3.2.D. Radiation Monitoring Systems-Isolation and Initiation Functions

1. Reactor Building Isolation and Standby Gas Treatment System

The limiting conditions for operation are given in Table 3.2.D.

2. Main Control Room

The limiting conditions for operation are given in Table 3.2.D.

E. Drywell Leak Detection

The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Section 3.6.C, "Coolant Leakage".

SURVEILLANCE REQUIREMENTS

4.2.D. Radiation Monitoring Systems-Isolation and Initiation Functions

1. Reactor Building Isolation and Standby Gas Treatment System

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

System logic shall be functionally tested as indicated in Table 4.2.D.

2. Main Control Room

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

E. Drywell Leak Detection

Instrumentation shall be calibrated and checked as indicated in table 4.2.E.

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LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions (Continued)

D.2 Main Control Room
The limiting conditions for operation are given in Table 3.2.D.

E. Drywell Leak Detection

The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Section 3.6.C, "Coolant Leakage".

F. Surveillance Information Readouts

The limiting conditions for the instrumentation that provides surveillance information readouts are given in Table 3.2.F.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions (Continued)

D.2 Main Control Room

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

E. Drywell Leak Detection

Instrumentation shall be calibrated and checked as indicated in Table 4.2.E.

F. Surveillance Information Readouts

Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.

LIMITING CONDITIONS FOR OPERATION

F. Surveillance Information Readouts

The limiting conditions for the instrumentation that provides surveillance information readouts are given in Table 3.2.F.

G. Alternate Rod Insertion and Recirculation Pump Trip

The limiting conditions for the instrumentation that initiates an Alternate Rod Insertion scram and trips the reactor recirculation pumps to limit the consequences of a failure to scram during an anticipated transient are given in Table 3.2.G. When in the RUN or STARTUP Mode, the required minimum number of instrument channels shall be operable with trip setpoints set consistent with the setting specified in Table 3.2.G. The manual and automatic actuation logic, and actuation devices of both trip systems shall be operable when in the RUN or STARTUP Mode.

SURVEILLANCE REQUIREMENTS

F. Surveillance Information Readouts

Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.

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G. Alternate Rod Insertion and Recirculation Pump Trip

Instrumentation shall be functionally tested and calibrated as indicated on Table 4.2.G.
System logic shall be functionally tested as indicated in Table 4.2.G.

Insert new page 60

TABLE 4.2.E

MINIMUM TEST AND CALIBRATION FREQUENCY FOR DRYWELL LEAK DETECTION

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Equipment Drain Sump Flow Integrator	(1)	Once/3 months	Once/day
2) Floor Drain Sump Flow Integrator	(1)	Once/3 months	Once/day
3) Drywell Atmosphere Radioactivity Monitor	(1)	Once/3 months	Once/day

Once / month

Docket No. 50-277
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PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 9A

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.G (Unit 2)

List of Pages Affected:

60	Page replaced
79	Table 3.2.G
88	Table 4.2.G

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

F. Surveillance Information Readouts

The limiting conditions for the instrumentation that provides surveillance information readouts are given in Table 3.2.F.

F. Surveillance Information Readouts

Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.

G. Alternate Rod Insertion and Recirculation Pump Trip

The limiting conditions for the instrumentation that initiates an Alternate Rod Insertion scram and trips the reactor recirculation pumps to limit the consequences of a failure to scram during an anticipated transient are given in Table 3.2.G. When in the RUN or STARTUP Mode, the required minimum number of instrument channels shall be operable with trip setpoints set consistent with the setting specified in Table 3.2.G. The manual and automatic actuation logic, and actuation devices of both trip systems shall be operable when in the RUN or STARTUP Mode.

G. Alternate Rod Insertion and Recirculation Pump Trip

Instrumentation shall be functionally tested and calibrated as indicated on Table 4.2.G.
System logic shall be functionally tested as indicated in Table 4.2.G.

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Insert new page 60

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03-22-89

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

G. Alternate Rod Insertion (ARI) and Recirculation Pump Trip (RPT)

Two trip systems consisting of two channels per trip system for each instrumentation function that initiates an Alternate Rod Insertion (ARI) scram and trips the reactor recirculation pumps (RPT) in Table 3.2.G shall be Operable; and, the manual and automatic actuation logic and actuation devices of both trip systems shall be Operable.

Applicability:

Whenever the Reactor Mode Switch is in the Startup or Run positions.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.G inoperable, restore channel to Operable status or place channel in trip within 14 days.(3)

2. With one instrument function with trip capability not maintained, restore trip capability within 72 hours.

3. With both instrument functions or an actuation device with trip capability not maintained, restore trip capability for one function within 1 hour.

4. If the required actions and associated completion times of Action 1, 2 or 3 are not met, place the reactor in shutdown or refuel mode within 8 hours.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

G. Alternate Rod Insertion (ARI) and Recirculation Pump Trip (RPT)

Each RPT and ARI instrumentation channel shall be demonstrated Operable by the performance of the Instrument Check, Instrument Functional Test, Channel Calibration and Logic System Functional Test at the Frequencies shown in Table 4.2.G.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Trip Function maintains ARI/RPT trip capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Condition 4 for that trip Function shall be taken.

(3) The action of placing the channel in trip is not applicable if the inoperable channel is the result of an inoperable breaker.

INSTRUMENTATION THAT INITIATES ALTERNATE ROD INSERTION
AND RECIRCULATION PUMP TRIP

Minimum No. of Operable Instrument Channels Per Trip System (1)(2)	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design Per Trip System	Action
1 2	Reactor High Pressure	≤ 1120 psig	2	(3)(4)
1 2	Reactor Low-Low Water Level	> -48 in. indicated level	2	(3)(4)

Notes for Table 3.2.G

1. With the manual or automatic actuation logic or actuation device of a trip system inoperable, declare the affected trip system(s) inoperable and take the actions of Note 3 or Note 4.

2. With the number of operable instrument channels less than the minimum number required by this table, declare the affected trip system(s) inoperable and take the actions of Note 3 or Note 4.

3. With one trip system inoperable, place the inoperable trip system in the tripped condition, if possible, within one hour. If the inoperable trip system is not in the tripped condition within 48 hours, be in the SHUTDOWN or REFUEL Mode within the next 8 hours.

4. With both trip systems inoperable, restore one trip system to an operable status and place the inoperable trip system in the tripped condition within 48 hours or restore both trip systems to operable status within 48 hours. Otherwise, be in the SHUTDOWN or REFUEL Mode within the next 8 hours.

TABLE 4.2.G

MINIMUM TEST AND CALIBRATION FREQUENCY FOR ALTERNATE ROD INSERTION AND RECIRCULATION PUMP TRIP

Instrument Channel	Instrument Check (1)	Instrument Functional Test (1)	Calibration Frequency (1)
Reactor High Pressure	Once/day	Once/month	Once/Operating Cycle
Reactor Low-Low Water Level	Once/day	Once/month	Once/Operating Cycle

Logic System Functional Test (2)	Frequency
Alternate Rod Insertion/Recirculation Pump Trip	Once/3 months
Alternate Rod Insertion/Recirculation Pump Trip including air venting and breaker trip (3)	Once/Operating Cycle

Once/3 months

Notes:

1. In accordance with Table 4.2.B. These instrument channels are the same ones used by the Core and Containment Cooling Systems.

2. The recirculation pumps need not be tripped.

3. This test, performed while shutdown, will include venting of the scram air header and tripping of the recirculation pump breakers. The test will also verify operability of the manual actuation logic.

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License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 9B

MARKUP OF CHANGES AND NEW PAGES FOR TS 3.2.G (Unit 3)

List of Pages Affected:

60	Page replaced
79	Table 3.2.G
88	Table 4.2.G

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
F. Surveillance Information Readouts The limiting conditions for the instrumentation that provides surveillance information readouts are given in Table 3.2.F.	F. Surveillance Information Readouts Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.
	moved to new page 59a
G. Alternate Rod Insertion and Recirculation Pump Trip The limiting conditions for the instrumentation that initiates an Alternate Rod Insertion scram and trips the reactor recirculation pumps to limit the consequences of a failure to scram during an anticipated transient are given in Table 3.2.G. When in the RUN or STARTUP Mode, the required minimum number of instrument channels shall be operable with trip setpoints set consistent with the setting specified in Table 3.2.G. The manual and automatic actuation logic, and actuation devices of both trip systems shall be operable when in the RUN or STARTUP Mode.	G. Alternate Rod Insertion and Recirculation Pump Trip Instrumentation shall be functionally tested and calibrated as indicated on Table 4.2.G. System logic shall be functionally tested as indicated in Table 4.2.G.

Insert new page 60

Amendment No. 143

03-22-89

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

G. Alternate Rod Insertion (ARI) and Recirculation Pump Trip (RPT)

Two trip systems consisting of two channels per trip system for each instrumentation function that initiates an Alternate Rod Insertion (ARI) scram and trips the reactor recirculation pumps (RPT) in Table 3.2.G shall be Operable; and, the manual and automatic actuation logic and actuation devices of both trip systems shall be Operable.

Applicability:

Whenever the Reactor Mode Switch is in the Startup or Run positions.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.G inoperable, restore channel to Operable status or place channel in trip within 14 days.(3)

2. With one instrument function with trip capability not maintained, restore trip capability within 72 hours.

3. With both instrument functions or an actuation device with trip capability not maintained, restore trip capability for one function within 1 hour.

4. If the required actions and associated completion times of Action 1, 2 or 3 are not met, place the reactor in shutdown or refuel mode within 8 hours.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

G. Alternate Rod Insertion and Recirculation Pump Trip

Each RPT and ARI instrumentation channel shall be demonstrated Operable by the performance of the Instrument Check, Instrument Functional Test, Channel Calibration and Logic System Functional Test at the Frequencies shown in Table 4.2.G.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Trip Function maintains ARI/RPT trip capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Condition 4 for that trip Function shall be taken.

(3) The action of placing the channel in trip is not applicable if the inoperable channel is the result of an inoperable breaker.

TABLE 3.2.G

INSTRUMENTATION THAT INITIATES ALTERNATE ROD INSERTION AND RECIRCULATION PUMP TRIP

Minimum No. of Operable Instrument Channels Per Trip System (1)(2)	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design Per Trip System	Action
1	Reactor High Pressure	$\leq$ 1120 psig	2	(3)(4)
1	Reactor Low-Low Water Level	$>$ -48 in. indicated level	2	(3)(4)

2

Notes for Table 3.2.G

1. With the manual or automatic actuation logic or actuation device of a trip system inoperable, declare the affected trip system(s) inoperable and take the actions of Note 3 or Note 4.

2. With the number of operable instrument channels less than the minimum number required by this table, declare the affected trip system(s) inoperable and take the actions of Note 3 or Note 4.

3. With one trip system inoperable, place the inoperable trip system in the tripped condition, if possible, within one hour. If the inoperable trip system is not in the tripped condition within 48 hours, be in the SHUTDOWN or REFUEL Mode within the next 8 hours.

4. With both trip systems inoperable, restore one trip system to an operable status and place the inoperable trip system in the tripped condition within 48 hours or restore both trip systems to operable status within 48 hours. Otherwise, be in the SHUTDOWN or REFUEL Mode within the next 8 hours.

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TABLE 4.2.G

MINIMUM TEST AND CALIBRATION FREQUENCY FOR ALTERNATE ROD INSERTION AND RECIRCULATION PUMP TRIP

Instrument Channel	Instrument Check (1)	Instrument Functional Test (1)	Calibration Frequency (1)
Reactor High Pressure	Once/day	Once/month	Once/Operating Cycle
Reactor Low-Low Water Level	Once/day	Once/month	Once/Operating Cycle

Once/3 months

Logic System Functional Test (2)	Frequency
Alternate Rod Insertion/Recirculation Pump Trip	Once/3 months
Alternate Rod Insertion/Recirculation Pump Trip including air venting and breaker trip (3)	Once/Operating Cycle

Notes:

1. In accordance with Table 4.2.B. These instrument channels are the same ones used by the Core and Containment Cooling Systems.

2. The recirculation pumps need not be tripped.

3. This test, performed while shutdown, will include venting of the scram air header and tripping of the recirculation pump breakers. The test will also verify operability of the manual actuation logic.

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PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 10A

MARKUP OF CHANGES AND NEW PAGES FOR THE BASES FOR TS 3.1 (Unit 2)

List of Pages Affected:

47
51
52
53
53a
55

3.1 BASES

The reactor protection system automatically initiates a reactor scram to:

1. Preserve the integrity of the fuel cladding.

2. Preserve the integrity of the reactor coolant system.

3. Minimize the energy which must be absorbed following a loss of coolant accident, and prevent inadvertant criticality.

V

When there is no fuel in the reactor, the scram serves no function; therefore, the reactor protection system is not required to be operable.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

e

Insert for page 47

The reactor protection system is of the dual channel type (Reference subsection 7.2 FSAR). The system is made up of two independent trip systems, each having two subchannels of tripping devices. Each subchannel has an input from at least one instrument channel which monitors a critical parameter.

The outputs of the subchannels are combined in a 1 out of 2 logic: i.e. an input signal on either one or both of the subchannels will cause a trip system trip. The outputs of the trip systems are arranged so that a trip on both systems is required to produce a reactor scram.

This system meets the intent of IEEE - 279 for Nuclear Power Plant Protection Systems. The system has a reliability greater than that of a 2 out of 3 system and somewhat less than that of a 1 out of 2 system.

With the exception of the Average Power Range Monitor (APRM) channels, the Intermediate Range Monitor (IRM) channels, the Main Steam Isolation Valve closure and the Turbine stop Valve closure, each subchannel has one instrument channel. When the minimum condition for operation on the number of operable instrument channels per untripped protection trip system is met or if it cannot be met and the affected protection trip system is placed in a tripped condition, the effectiveness of the protection system is preserved.

Three

The APRM instrument channels are provided for each protection trip system. APRM's A and E operate contacts in one subchannel and APRM's C and E operate contacts in the other subchannel. APRM's B, D and F are arranged similarly in

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INSERT: Bases page 47

Allowed out of service times for repair and surveillance testing for Reactor Protection System Instrumentation have been determined in accordance with General Electric report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," General Electric Company, March 1988.

3.0 BASES (Cont'd)

the other protection trip system. Each protection trip system has one more APRM than is necessary to meet the minimum number required per channel. This allows the bypassing of one APRM per protection trip system for maintenance, testing or calibration. Additional IRM channels have also been provided to allow for bypassing of one such channel. The bases for the scram setting for the IRM, APRM, high reactor pressure, reactor low water level, MSIV closure, generator load rejection, turbine stop valve closure and loss of condenser vacuum are discussed in Specification 2.1 and 2.2.

Instrumentation sensing drywell pressure is provided to detect a loss of coolant accident and initiate the core standby cooling equipment. A high drywell pressure scram is provided at the same setting as the core standby cooling systems (CSCS) initiation to minimize the energy which must be accommodated during a loss of coolant accident and to prevent return to criticality. This instrumentation is a backup to the reactor vessel water level instrumentation.

High radiation levels in the main steam line tunnel above that due to the normal nitrogen and oxygen radioactivity is an indication of leaking fuel. A scram is initiated whenever such radiation level exceeds fifteen times normal background. The purpose of this scram is to limit fission product release so that 10 CFR Part 100 guidelines are not exceeded. Discharge of excessive amounts of radioactivity to the site environs is prevented by the off-gas treatment system, which provides sufficient delay time to reduce fission product release rates to well below 10 CFR 20 guidelines.

A reactor mode switch is provided which actuates or bypasses the various scram functions appropriate to the particular plant operating status. Ref. paragraph 7.2.3.7 PSAR.

The manual scram function is active in all modes, thus providing for a manual means of rapidly inserting control rods during all modes of reactor operation.

The APRM (High flux in Start-up or Refuel) system provides protection against excessive power levels and short reactor periods in the start-up and intermediate power ranges.

The IRM system provides protection against short reactor periods in these ranges.

The control rod drive scram system is designed so that all of the water which is discharged from the reactor by a scram can be accommodated in the discharge piping. The scram discharge volume accommodates in excess of 50 gallons of water and is the low point in the piping. No credit was taken for this volume in the design of the discharge piping as concerns

3.1 BASES (Cont'd)

the amount of water which must be accommodated during a scram.

During normal operation the discharge volume is empty; however, should it fill with water, the water discharged to the piping from the reactor could not be accommodated which would result in slow scram times or partial control rod insertion. To preclude this occurrence, level switches have been provided in the instrument volume which alarm and scram the reactor when the volume of water reaches 50 gallons. As indicated above, there is sufficient volume in the piping to accommodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accommodate the discharged water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

A source range monitor (SRM) system is also provided to supply additional neutron level information during start-up but has no scram functions (reference paragraph 7.5.4 FSAR). Thus, the IRM and APRM are required in the "Refuel" and "Start/Hot Standby" modes. In the power range the APRM system provides required protection (reference paragraph 7.5.7 FSAR). Thus the IRM System is not required in the "Run" mode. The APRM's cover only the power range. The IRM's and APRM's provide adequate coverage in the start-up and intermediate range.

The high reactor pressure, high drywell pressure, reactor low water level and scram discharge volume high level scrams are required for Startup and Run modes of plant operation. They are, therefore, required to be operational for these modes of reactor operation.

The requirement to have the scram functions indicated in Table 3.1.1 operable in the Refuel mode assures that shifting to the Refuel mode during reactor power operation does not diminish the protection provided by the reactor protection system.

The turbine condenser low vacuum scram is only required during power operation and must be bypassed to start up the unit. The main condenser low vacuum trip is bypassed except in the run position of the mode switch.

Turbine stop valve closure occurs at 10% of valve closure. Below 220 psig turbine first stage pressure (30% of rated), the scram signal due to turbine stop valve closure is bypassed because the flux and pressure scrams are adequate to protect the reactor.

2.1 BASES (Cont'd.)

Turbine control valves fast closure initiates a scram based on pressure switches sensing Electro-Hydraulic Control (EHC) system oil pressure. The switches are located between fast closure solenoids and the disc dump valves, and are set relative ($500 < P < 850$ psig) to the normal EHC oil pressure of 1600 psig gauge that, based on the small system volume, they can rapidly detect valve closure or loss of hydraulic pressure. This scram signal is also bypassed when turbine first stage pressure is less than 220 psig.

that

The requirement taht the IRM's be inserted in the core when the APRM's read 2.5 indicated on the scale in the Startup and Refuel modes assures that there is proper overlap in the neutron monitoring system functions and thus, that adequate coverage is provided for all ranges of reactor operation.

4.1 BASIS

A. The minimum functional testing frequency used in this specification is based on a reliability analysis using the concepts developed in reference (6). This concept was specifically adapted to the one out of two taken twice logic of the reactor protection system. The analysis shows that the sensors are primarily responsible for the reliability of the reactor protection system. This analysis makes use of "unsafe failure" rate experience at conventional and nuclear power plants in a reliability model for the system. An "unsafe failure" is defined as one which negates channel operability and which, due to its nature, is revealed only when the channel is functionally tested or attempts to respond to a real signal. Failures such as blown fuses, ruptured bourdon tubes, faulted amplifiers, and faulted cables, which result in "upscale" or "downscale" readings on the reactor instrumentation are "safe" and will be easily recognized by the operators during operation because they are revealed by an alarm or a scram.

The channels listed in Tables 4.1.1 and 4.1.2 are divided into three groups for functional testing. These are:

A. On-Off sensors that provide a scram trip function.

B. Analog devices coupled with bi-stable trips that provide a scram function.

C. Devices which only serve a useful function during some restricted mode of operation, such as startup or shutdown, or for which the only practical test is one that can be performed at shutdown.

The sensors that make up group (A) are specifically selected from among the whole family of industrial on-off sensors that have earned an excellent reputation for reliable operation. During design, a goal of 0.99999 probability of success (at the 50% confidence level) was adopted to assure that a balanced and adequate design is achieved. The probability of success is primarily a function of the sensor failure rate and the test interval. A three-month test interval is planned for group (A) sensors. This is in keeping with good operating practices, and satisfies the design goal for the logic configuration utilized in the Reactor Protection System.

To satisfy the long-term objective of maintaining an adequate level of safety throughout the plant lifetime, a minimum goal of 0.9999 at the 95% confidence level is proposed. With the (1 out of 2) X (2) logic, this requires that each sensor have an availability of 0.993 at the 95% confidence level. This level of availability may be maintained by adjusting the test interval as a function of the observed failure history (6). To facilitate the implementation of this technique, Figure 4.1.1 is provided to indicate an appropriate trend in test interval. The procedure is as follows:

1. Like sensors are pooled into one group for the purpose of data acquisition.

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Channel functional test frequencies for Reactor Protection System Instrumentation have been determined in accordance with General Electric report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," General Electric Company, March 1988.

4.1 BASES (Cont'd.)

2. The factor M is the exposure hours and is equal to the number of sensors in a group, n, times the elapsed time T (M = nT).

3. The accumulated number of unsafe failures is plotted as an ordinate against M as an abscissa on Figure 4.1.1.

4. After a trend is established, the appropriate monthly test interval to satisfy the goal will be the test interval to the left of the plotted points.

5. A test interval of 1 month will be used initially until a trend is established, which is based on system availability analysis and good engineering judgment plus operating experience.

Group (B1)* devices utilize an analog sensor followed by an amplifier and a bi-stable trip circuit. The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. In the event of failure, repair or substitution can start immediately. An "as-is" failure is one that "sticks" mid-scale and is not capable of going either up or down in response to an out- of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track the other three. For purpose of analysis, it is assumed that this rare failure will be detected within two hours.

The bi-stable trip circuit which is a part of the Group (B1) devices can sustain unsafe failures which are revealed only on test. Therefore, it is necessary to test them periodically.

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(6) Reliability of Engineered Safety Features as a Function of Testing Frequency, I.M. Jacobs, "Nuclear Safety", Vol. 9, No. 4, July-Aug. 1968, pp. 310-312.

* See note following Group (B2)

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4.1 BASES (Cont'd)

A study was conducted of the instrumentation channels included in the Group (B1) devices to calculate their "unsafe" failure rates. The analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 20 X 10^{-6} failure/hour. The bi-stable trip circuits are predicted to have unsafe failure rate of less than 2 X 10^{-6} failures/hour. Considering the two hour monitoring interval for the analog devices as assumed above and a weekly test interval for the bi-stable trip circuits, the design reliability goal of 0.99999 is attained with ample margin.

The bi-stable devices are monitored during plant operation to record their failure history and establish a test interval using the curve of Figure 4.1.1. There are numerous identical bi-stable devices used throughout the plant's instrumentation system. Therefore, significant data on the failure rates for the bi-stable devices should be accumulated rapidly.

The frequency of calibration of the APRM Flow Biasing Network has been established as each refueling outage. The flow biasing network is functionally tested at least once per month and in addition, cross calibration checks of the flow input to the flow biasing network can be made during the functional test by direct meter reading. There are several instruments which must be calibrated and it will take several days to perform the calibration of the entire network. While the calibration is being performed, a zero flow signal will be sent to half of the APRM's resulting in a half scram and rod block condition. Thus, if the calibration were performed during operation, flux shaping would not be possible. Based on experience at other generating stations, drift of instruments such as those in the Flow Biasing Network, is not significant and therefore, to avoid spurious scrams, a calibration frequency of each refueling outage is established.

Group (B2)* devices utilize an analog sensor followed by an amplifier and a bi-stable trip circuit. The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. In the event of failure, repair or substitution can start immediately. An "as-is" failure is one that "sticks" mid-scale and is not capable of going either up or down in response to an out-of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track the other three. For purpose of analysis, it is assumed that this rare failure will be detected within twenty-four hours.

The bi-stable trip circuit which is a part of the Group (B2) devices can sustain unsafe failures which are revealed only on test. Therefore, it is necessary to test them periodically.

* See note following Group (B2)

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A study was conducted of the instrumentation channels included in Group (B2) devices to calculate their "unsafe" failure rates. The analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 2×10^{-5} failures/hour. The bistable trip circuits are predicted to have an unsafe failure rate of less than 9×10^{-6} failures/hour. Considering the twenty-four hour monitoring interval for the analog devices and a monthly test interval for the bi-stable trip circuits, the design reliability goal of 0.993 per channel is attained. As described in the above discussion for Group (A) devices, a per channel reliability of 0.993 yields an overall reliability of 0.9999 for this instrumentation.

<u>Note</u>: <u>Analog Loop</u> indicators for Group (B1) are located in the Control Room and therefore can be checked once per shift. <u>Analog Loop</u> indicators for Group (B2) are located in the plant adjacent to the applicable equipment and therefore can be checked once per day.

Group (C) devices are active only during a given portion of the operational cycle. For example, the IRM is active during startup and inactive during full-power operation. Thus, the only test that is meaningful is the one performed just prior to shutdown or startup; i.e., the tests that are performed just prior to use of the instrument.

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.

2. Vacuum tube or semi-conductor devices and detectors that drift or lose sensitivity.

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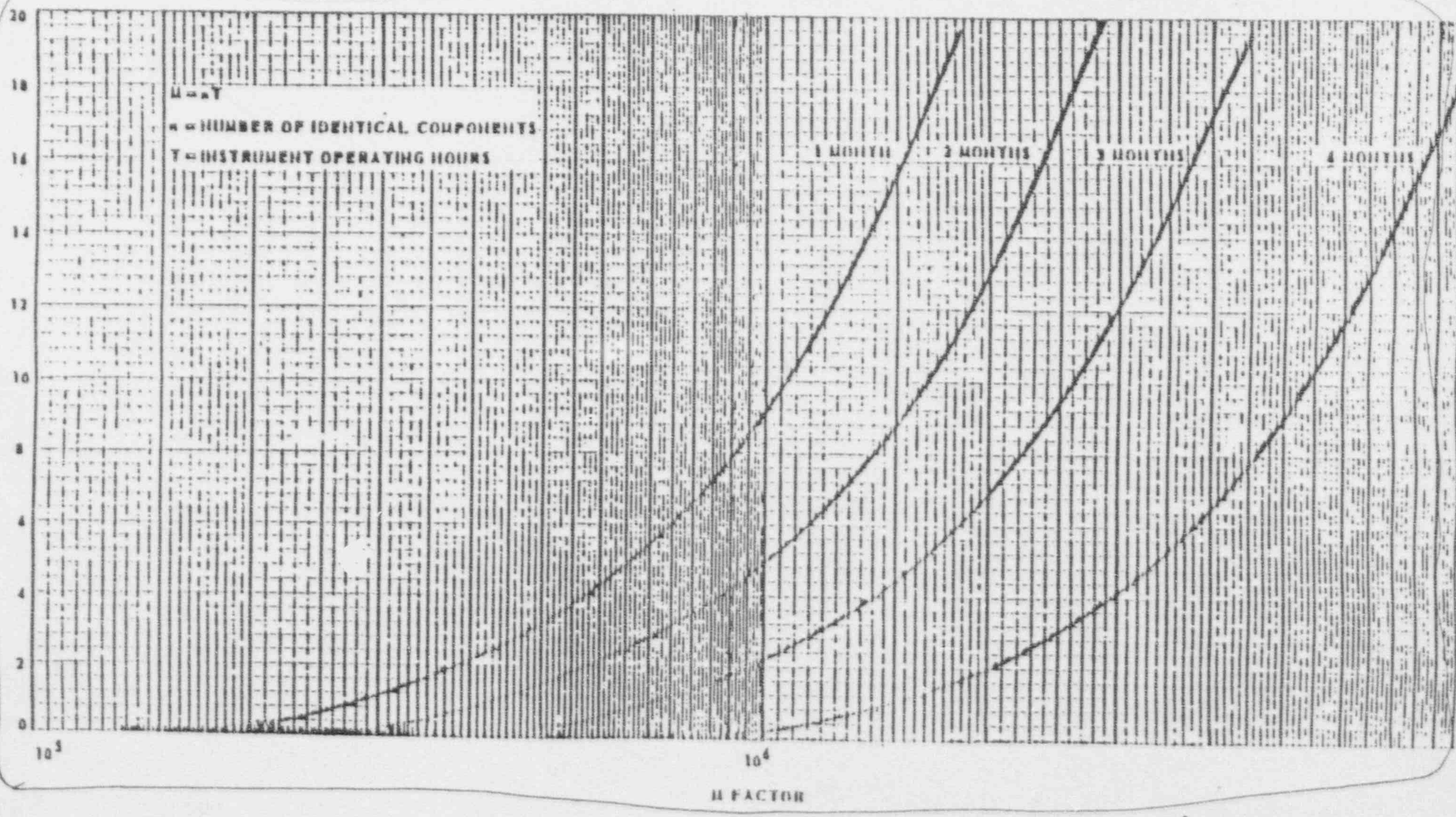

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Figure 4.1.1

Docket No. 50-278
License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 10B

MARKUP OF CHANGES AND NEW PAGES

FOR THE BASES FOR TS 3.1 (Unit 3)

List of Pages Affected:

47
51
52
53
53a
55

3.1 BASES

The reactor protection system automatically initiates a reactor scram to:

1. Preserve the integrity of the fuel cladding.

2. Preserve the integrity of the reactor coolant system.

3. Minimize the energy which must be absorbed following a loss of coolant accident, and present inadvertant criticality. v

When there is no fuel in the reactor, the scram serves no function; therefore, the reactor protection system is not required to be operable.

This specification provides the limiting conditions for operation necessary to preserve the ability of the system to perform its intended function even during periods when instrument channels may be out of service because of maintenance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Insert for Page 47

The reactor protection system is of the dual channel type (Reference subsection 7.2 FSAR). The system is made up of two independent trip systems, each having two subchannels of tripping devices. Each subchannel has an input from at least one instrument channel which monitors a critical parameter.

The outputs of the subchannels are combined in a 1 out of 2 logic; i.e. an input signal on either one or both of the subchannels will cause a trip system trip. The outputs of the trip systems are arranged so that a trip on both systems is required to produce a reactor scram.

This system meets the intent of IEEE - 279 for Nuclear Power Plant Protection Systems. The system has a reliability greater than that of a 2 out of 3 system and somewhat less than that of a 1 out of 2 system.

With the exception of the Average Power Range Monitor (APRM) channels, the Intermediate Range Monitor (IRM) channels, the Main Steam Isolation Valve closure and the Turbine Stop Valve closure, each subchannel has one instrument channel. When the minimum condition for operation on the number of operable instrument channels per untripped protection trip system is met or if it cannot be met and the affected protection trip system is placed in a tripped condition, the effectiveness of the protection system is preserved.

Three

The APRM instrument channels are provided for each protection trip system. APRM's A and E operate contacts in one subchannel and APRM's C and E operate contacts in the other subchannel. APRM's B, D and F are arranged similarly in

INSERT: Bases page 47

Allowed out of service times for repair and surveillance testing for Reactor Protection System Instrumentation have been determined in accordance with General Electric report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," General Electric Company, March 1988.

3.0 BASES (Cont'd)

the other protection trip system. Each protection trip system has one more APRM than is necessary to meet the minimum number required per channel. This allows the bypassing of one APRM per protection trip system for maintenance, testing or calibration. Additional IRM channels have also been provided to allow for bypassing of one such channel. The bases for the scram setting for the IRM, APRM, high reactor pressure, reactor low water level, MSIV closure, generator load rejection, turbine stop valve closure and loss of condenser vacuum are discussed in Specification 2.1 and 2.2.

Instrumentation sensing drywell pressure is provided to detect a loss of coolant accident and initiate the core standby cooling equipment. A high drywell pressure scram is provided at the same setting as the core standby cooling systems (CSCS) initiation to minimize the energy which must be accommodated during a loss of coolant accident and to prevent return to criticality. This instrumentation is a backup to the reactor vessel water level instrumentation.

High radiation levels in the main steam line tunnel above that due to the normal nitrogen and oxygen radioactivity is an indication of leaking fuel. A scram is initiated whenever such radiation level exceeds fifteen times normal background. The purpose of this scram is to limit fission product release so that 10 CFR Part 100 guidelines are not exceeded. Discharge of excessive amounts of radioactivity to the site environs is prevented by the off-gas treatment system, which provides sufficient delay time to reduce fission product release rates to well below 10 CFR 20 guidelines.

A reactor mode switch is provided which actuates or bypasses the various scram functions appropriate to the particular plant operating status. Ref. paragraph 7.2.3.7 FSAR.

The manual scram function is active in all modes, thus providing for a manual means of rapidly inserting control rods during all modes of reactor operation.

The APRM (High flux in Start-up or Refuel) system provides protection against excessive power levels and short reactor periods in the start-up and intermediate power ranges.

The IRM system provides protection against short reactor periods in these ranges.

The control rod drive scram system is designed so that all of the water which is discharged from the reactor by a scram can be accommodated in the discharge piping. The scram discharge volume accommodates in excess of 50 gallons of water and is the low point in the piping. No credit was taken for this volume in the design of the discharge piping as concerns

3.1 BASES (Cont'd)

the amount of water which must be accomodated during a scram.

During normal operation the discharge volume is empty; however, should it fill with water, the water discharged to the piping from the reactor could not be accomodated which would result in slow scram times or partial control rod insertion. To preclude this occurrence, level switches have been provided in the instrument volume which alarm and scram the reactor when the volume of water reaches 50 gallons. As indicated above, there is sufficient volume in the piping to accomodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accomodate the discharged water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

A source range monitor (SRM) system is also provided to supply additional neutron level information during start-up but has no scram functions (reference paragraph 7.5.4 FSAR). Thus, the IRM and APRM are required in the "Refuel" and "Start/Hot Standby" modes. In the power range the APRM system provides required protection (reference paragraph 7.5.7 FSAR). Thus the IRM System is not required in the "Run" mode. The APRM's cover only the power range. The IRMs and APRMs provide adequate coverage in the start-up and intermediate range.

The high reactor pressure, high drywell pressure, reactor low water level and scram discharge volume high level scrams are required for Startup and Run modes of plant operation. They are, therefore, required to be operational for these modes of reactor operation.

The requirement to have the scram functions indicated in Table 3.1.1 operable in the Refuel mode assures that shifting to the Refuel mode during reactor power operation does not diminish the protection provided by the reactor protection system.

The turbine condenser low vacuum scram is only required during power operation and must be bypassed to start up the unit. The main condenser low vacuum trip is bypassed except in the run position of the mode switch.

Turbine stop valve closure occurs at 10% of valve closure. Below 30% of rated reactor thermal power the scram signal due to turbine stop valve closure is bypassed because the flux and pressure scrams are adequate to protect the reactor.

Amendment No. 121, 193

MAR 1 7 1994

3.1 BASES (Cont'd.)

Turbine control valves fast closure initiates a scram based on pressure switches sensing Electro-Hydraulic Control (EHC) system oil pressure. The switches are located between fast closure solenoids and the disc dump valves, and are set relative (500<P<850 psig) to the normal EHC oil pressure of 1600 psig gauge that, based on the small system volume, they can rapidly detect valve closure or loss of hydraulic pressure. This scram signal is also bypassed when reactor thermal power is less than 30% of rated as indicated by turbine first stage pressure.

The requirement that the IRM's be inserted in the core when the APRM's read 2.5 indicated on the scale in the Startup and Refuel modes assures that there is proper overlap in the neutron monitoring system functions and thus, that adequate coverage is provided for all ranges of reactor operation.

Amendment No. 193

APR 0 7 1994

4.1 BASES

A. ... minimum functional testing frequency used in this specification is based on a reliability analysis using the concepts developed in reference (6). This concept was specifically adapted to the one out of two taken twice logic of the reactor protection system. The analysis shows that the sensors are primarily responsible for the reliability of the reactor protection system. This analysis makes use of "unsafe failure" rate experience at conventional and nuclear power plants in a reliability model for the system. An "unsafe failure" is defined as one which negates channel operability and which, due to its nature, is revealed only when the channel is functionally tested or attempts to respond to a real signal. Failures such as blown fuses, ruptured bourdon tubes, faulted amplifiers, and faulted cables, which result in "upscale" or "downscale" readings on the reactor instrumentation are "safe" and will be easily recognized by the operators during operation because they are revealed by an alarm or a scram.

The channels listed in Tables 4.1.1 and 4.1.2 are divided into three groups for functional testing. These are:

A. On-Off sensors that provide a scram trip function.

B. Analog devices coupled with bi-stable trips that provide a scram function.

C. Devices which only serve a useful function during some restricted mode of operation, such as startup or shutdown, or for which the only practical test is one that can be performed at shutdown.

The sensors that make up group (A) are specifically selected from among the whole family of industrial on-off sensors that have earned an excellent reputation for reliable operation. During design, a goal of 0.99999 probability of success (at the 50% confidence level) was adopted to assure that a balanced and adequate design is achieved. The probability of success is primarily a function of the sensor failure rate and the test interval. A three-month test interval is planned for group (A) sensors. This is in keeping with good operating practices, and satisfies the design goal for the logic configuration utilized in the Reactor Protection System.

To satisfy the long-term objective of maintaining an adequate level of safety throughout the plant lifetime, a minimum goal of 0.9999 at the 95% confidence level is proposed. With the (1 out of 2) X (2) logic, this requires that each sensor have an availability of 0.993 at the 95% confidence level. This level of availability may be maintained by adjusting the test interval as a function of the observed failure history (6). To facilitate the implementation of this technique, Figure 4.1.1 is provided to indicate an appropriate trend in test interval. The procedure is as follows:

1. Like sensors are pooled into one group for the purpose of data acquisition.

Replace with Insert for page 51

INSERT: Bases page 51

Channel functional test frequencies for Reactor Protection System Instrumentation have been determined in accordance with General Electric report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," General Electric Company, March 1988.

4.1 BASES (Cont'd.)

2. The factor M is the exposure hours and is equal to the number of sensors in a group, n, times the elapsed time T (M = nT).

3. The accumulated number of unsafe failures is plotted as an ordinate against M as an abscissa on Figure 4.1.1.

4. After a trend is established, the appropriate monthly test interval to satisfy the goal will be the test interval to the left of the plotted points.

5. A test interval of 1 month will be used initially until a trend is established, which is based on system availability analysis and good engineering judgment plus operating experience.

Group (B1)* devices utilize an analog sensor followed by an amplifier and a bi-stable trip circuit. The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. In the event of failure, repair or substitution can start immediately. An "as-is" failure is one that "sticks" mid-scale and is not capable of going either up or down in response to an out- of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track the other three. For purpose of analysis, it is assumed that this rare failure will be detected within two hours.

The bi-stable trip circuit which is a part of the Group (B1) devices can sustain unsafe failures which are revealed only on test. Therefore, it is necessary to test them periodically.

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(6) Reliability of Engineered Safety Features as a Function of Testing Frequency, I.M. Jacobs, "Nuclear Safety", Vol. 9, No. 4, July-Aug. 1968, pp. 310-312.

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* See note following Group (B2)

4.1 BASES (Cont'd)

A study was conducted of the instrumentation channels included in the Group (B1) devices to calculate their "unsafe" failure rates. The analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 20 X 10-6 failure/hour. The bi-stable trip circuits are predicted to have unsafe failure rate of less than 2 X 10^{-6} failures/hour. Considering the two hour monitoring interval for the analog devices as assumed above and a weekly test interval for the bi-stable trip circuits, the design reliability goal of 0.99999 is attained with ample margin.

The bi-stable devices are monitored during plant operation to record their failure history and establish a test interval using the curve of Figure 4.1.1. There are numerous identical bi-stable devices used throughout the plant's instrumentation system. Therefore, significant data on the failure rates for the bi-stable devices should be accumulated rapidly.

The frequency of calibration of the APRM Flow Biasing Network has been established as each refueling outage. The flow biasing network is functionally tested at least once per month and in addition, cross calibration checks of the flow input to the flow biasing network can be made during the functional test by direct meter reading. There are several instruments which must be calibrated and it will take several days to perform the calibration of the entire network. While the calibration is being performed, a zero flow signal will be sent to half of the APRM's resulting in a half scram and rod block condition. Thus, if the calibration were performed during operation, flux shaping would not be possible. Based on experience at other generating stations, drift of instruments, such as those in the Flow Biasing Network, is not significant and therefore, to avoid spurious scrams, a calibration frequency of each refueling outage is established.

Group (B2)* devices utilize an analog sensor followed by an amplifier and a bistable trip circuit. The sensor and amplifier are active components and a failure is almost always accompanied by an alarm and an indication of the source of trouble. In the event of failure, repair or substitution can start immediately. An "as-is" failure is one that "sticks" mid-scale and is not capable of going either up or down in response to an out-of-limits input. This type of failure for analog devices is a rare occurrence and is detectable by an operator who observes that one signal does not track the

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* See note following Group (B2)

Amendment No. 30/29
(01/03/77)

A study was conducted of the instrumentation channels included in Group (B2) devices to calculate their "unsafe" failure rates. The analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 2 X 10^{-5} failures/hour. The bistable trip circuits are predicted to have an unsafe failure rate of less than 9 X 10^{-6} failures/hour. Considering the twenty-four hour monitoring interval for the analog devices and a monthly test interval for the bi-stable trip circuits, the design reliability goal of 0.993 per channel is attained. As described in the above discussion for Group (A) devices, a per channel reliability of 0.993 yields an overall reliability of 0.9999 for this instrumentation.

Note: Analog Loop indicators for Group (B1) are located in the Control Room and therefore can be checked once per shift. Analog Loop indicators for Group (B2) are located in the plant adjacent to the applicable equipment and therefore can be checked once per day.

Group (C) devices are active only during a given portion of the operational cycle. For example, the IRM is active during startup and inactive during full-power operation. Thus, the only test that is meaningful is the one performed just prior to shutdown or startup; i.e., the tests that are performed just prior to use of the instrument.

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.

2. Vacuum tube or semi-conductor devices and detectors that drift or lose sensitivity.

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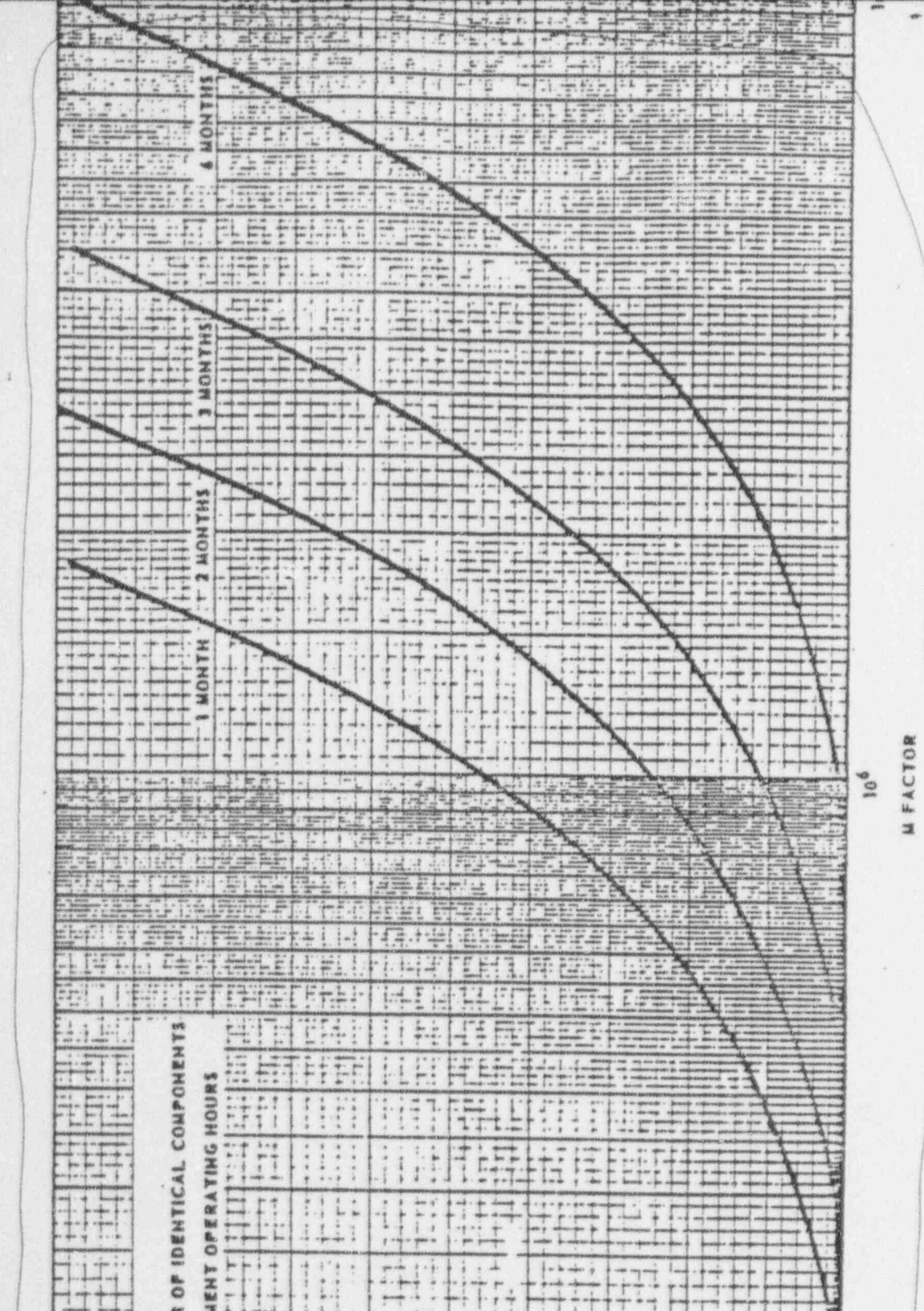

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Figure 4.1.1

APRIL 1973

Docket No. 50-277
License No. DPR-44

PEACH BOTTOM ATOMIC POWER STATION, UNIT 2
TECHNICAL SPECIFICTIONS CHANGE REQUEST 90-03

ATTACHMENT 11A

MARKUP OF CHANGES AND NEW PAGES FOR
THE BASES FOR TS 3.2.A THROUGH 3.2.G (Unit 2)

List of Pages Affected:

89
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96
98

3.2 BASES

In addition to reactor protection instrumentation which initiates a reactor scram, protective instrumentation has been provided which initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the core cooling systems, control rod block and standby gas treatment systems. The objectives of the Specifications are (i) to assure the effectiveness of the protective instrumentation when required even during periods when portions of such systems are out-of-service for maintenance, and (ii) to prescribe the trip settings required to assure adequate performance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Insert for Page 89

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2.A which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary system isolation is connected in a dual bus arrangement.

The low water level instrumentation set to trip at zero inches indicated level (538 inches above vessel zero) closes all isolation valves except those in Groups 1, 4 and 5. Details of valve grouping and required closing times are given in Specification 3.7. For valves which isolate at this level, this trip setting is adequate to prevent the core from being uncovered in the case of a break in the largest line assuming a 60 second valve closing time. Required closing times are less than this.

The low-low reactor water level instrumentation is set to trip when reactor water level is minus 48 inches indicated level (490 inches above vessel zero). This trip initiates HPCI, RCIC, Alternate Rod Insertion and trips the recirculation pumps. The low-low-low reactor water level instrumentation is set to trip when the reactor water level is minus 160 inches indicated level (378 inches above vessel zero). This trip closes Main Steam Line Isolation Valves, Main Steam Drain Valves and Recirc Sample Valves (Group 1), activates the remainder of the CSCS subsystem, and starts

"This page is effective upon completion of the ATWS Rule ARI/RPT Modification (Modification 865)."

INSERT: Bases page 89

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for Isolation Instrumentation have been determined in accordance with General Electric reports NEDC-30851P-A, Supplement 2, "Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," and NEDC-31677P-A,"Technical Specification Improvement Analyses for BWR Isolation Actuation Instrumentation." The AOT is 12 hours for Table 3.2.A Items 1, 4, and 5 because these items have instrumentation that is common to the RPS. Other Table 3.2.A Items have an AOT of 24 hours.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for ECCS Actuation Instrumentation have been determined in accordance with General Electric reports NEDC-30936P-A,"BWR Owners' Group Technical Specification Improvement Methodology with Demonstration for BWR ECCS Actuation Instrumentation," Parts 1 and 2, and RE-022,"Technical Specification Improvement Analysis for the Emergency core Cooling System Actuation Instrumentation for Peach Bottom Atomic Power Station, Units 2 and 3."

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for miscellaneous instruments have been determined in accordance with General Electric report GENE-770-06-1,"Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," and the associated NRC Safety Evaluation Report dated July 21, 1992.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for RCIC instrumentation have been determined in accordance with General Electric report GENE-770-06-2,"Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," and the associated NRC Safety Evaluation Report dated September 13, 1991.

3.2 BASES (Cont'd)

the emergency diesel generators. These trip level settings were chosen to be high enough to prevent spurious actuation but low enough to initiate CSCS operation and primary system isolation so that post-accident cooling can be accomplished and the guidelines of 10 CFR 100 will not be exceeded. For large breaks up to the complete circumferential break of a 28-inch recirculation line and with the trip setting given above, CSCS initiation and primary system isolation are initiated in time to meet the above criteria. Reference paragraph 6.5.3.1 FSAR.

The high drywell pressure instrumentation is a diverse signal for malfunctions to the water level instrumentation and in addition to initiating CSCS, it causes isolation of Group 2 and 3 isolation valves. For the breaks discussed above, this instrumentation will generally initiate CSCS operation before the low-low-low water level instrumentation; thus the results given above are applicable here also. See Spec. 3.7 for Isolation Valve Closure Group. The water level instrumentation initiates protection for the full spectrum of loss-of-coolant accidents and causes isolation of all isolation valves except Groups 4 and 5.

Venturis are provided in the main steam lines as a means of measuring steam flow and also limiting the loss of mass inventory from the vessel during a steam line break accident. The primary function of the instrumentation is to detect a break in the main steam line. For the worst case accident, main steam line break outside the drywell, a trip setting of 140% of rated steam flow in conjunction with the flow limiters and main steam line valve closure, limits the mass inventory loss such that fuel is not uncovered, fuel temperatures peak at approximately 1000 degrees F and release of radioactivity to the environs is below CFR 100 guidelines. Reference Section 14.6.5 FSAR.

Temperature monitoring instrumentation is provided in the main steam line tunnel exhaust duct and along the steam line in the turbine building to detect leaks in these areas. Trips are provided on this instrumentation and when exceeded, cause closure of isolation valves. See Spec. 3.7 for Valve Group. The setting is 200 degrees F for the main steam line tunnel detector. For large breaks, the high steam flow instrumentation is a backup to the temperature instrumentation.

High radiation monitors in the main steam line tunnel have been provided to detect gross fuel failure as in the control rod drop accident. With the established setting of 15 times normal background, and main steam line isolation valve closure, fission product release is limited so that 10 CFR 100 guidelines are not exceeded for this accident. Reference Section 14.6.2 FSAR.

3.2 BASES (Cont'd)

Pressure instrumentation is provided to close the main steam isolation valves in RUN Mode when the main steam line pressure drops below 850 psig. The Reactor Pressure Vessel thermal transient due to an inadvertent opening of the turbine bypass valves when not in the RUN Mode is less severe than the loss of feedwater analyzed in section 14.5 of the FSAR; therefore, closure of the Main Steam Isolation valves for thermal transient protection when not in RUN Mode is not required.

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI steam piping. Tripping of this instrumentation results in actuation of HPCI isolation valves. Tripping logic for the high flow is 1 out of 2 logic. Temperature is monitored at four (4) locations with four (4) temperature sensors at each location. Two (2) sensors at each location are powered by "A" DC control bus and two (2) by "B" DC control bus. Each pair of sensors, e.g., "A" or "B" at each location are physically separated and the tripping of either "A" or "B" bus sensor will actuate HPCI isolation valves. The trip settings of ≤ 300% of design flow for high flow and 200 degrees F for high temperature are such that core uncovery is prevented and fission product release is within limits.

The RCIC high flow and temperature instrumentation are arranged the same as that for the HPCI. The trip setting of ≤ 300% for high flow and 200 degrees F for temperature are based on the same criteria as the HPCI.

The Reactor Water Cleanup System high flow instrumentation is arranged similar to that for the HPCI System. The trip settings are such that core uncovery is prevented and fission product release is maintained within limits. The high temperature instrumentation downstream of the non-regenerative heat exchanger is provided to protect the ion exchange resin in the demineralizer from damage due to high temperature. Such damage could impair the resins' ability to remove impurities from the primary coolant and possibly result in the release of previously captured impurities back into the coolant in large concentrations.

The instrumentation which initiates CSCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion, the Specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed. An exception to this is when logic functional testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to the fuel cladding integrity safety limit. The trip logic for this function is 1 out of n: e.g., any trip on one of 6 APRM's, 8 IRM's, or 4 SRM's will result in a rod block.

The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met. The minimum instrument channel requirements for the RBM may be reduced by one for maintenance, testing or calibration. This time period is only 3% of the operating time in a month and does not significantly increase the risk of preventing an inadvertent control rod withdrawal.

3.2 BASES (Cont'd)

The APRM rod block function is flow biased and prevents a significant reduction in MCPR, especially during operation at reduced flow. The APRM provides gross core protection: i.e., limits the gross core power increase from withdrawal of control rods in the normal withdrawal sequence. The trips are set so that MCPR is maintained greater than the fuel cladding integrity safety limit.

The RBM rod block function provides local protection of the core: i.e., the prevention of boiling transition in the local region of the core, for a single rod withdrawal error from a limiting control rod pattern.

The IRM rod block function provides local as well as gross core protection. The scaling arrangement is such that trip setting is less than a factor of 10 above the indicated level.

The downscale indication on an APRM or IRM is an indication the instrument has failed or the instrument is not sensitive enough. In either case the instrument will not respond to changes in the control rod motion and thus, control rod motion is prevented. The downscale trips are set at 2.5 indicated on scale.

The flow comparator and scram discharge volume high level components have only one logic channel and are not required for safety. The flow comparator must be bypassed when operating with one recirculation water pump.

The refueling interlocks also operate one logic channel, and are required for safety only when the mode switch is in the refueling position.

For effective emergency core cooling for small pipe breaks, the HPCI system must function since reactor pressure does not decrease rapidly enough to allow either core spray or LPCI to operate in time. The automatic pressure relief function is provided as a backup to the HPCI in the event the HPCI does not provide this function when necessary and minimize spurious operation. The trip settings given in the specification are adequate to assure the above criteria are met. The specification preserves the effectiveness of the system during periods of maintenance, testing, or calibration, and also minimizes the risk of inadvertent operation: i.e., only one instrument channel out of service.

3.2 BASES (Cont'd)

Four sets of two radiation monitors are provided which initiate the Reactor Building Isolation function and operation of the standby gas treatment system. Four instrument channels monitor the radiation from the refueling area ventilation exhaust ducts and four instrument channels monitor the building ventilation below the refueling floor. Each set of instrument channels is arranged in a 1 out of 2 twice trip logic.

Trip settings of less than 16 mr/hr for the monitors in the refueling area ventilation exhaust ducts are based upon initiating normal ventilation isolation and standby gas treatment system operation so that none of the activity released during the refueling accident leaves the Reactor Building via the normal ventilation path but rather all the activity is processed by the standby gas treatment system.

Two channels of nonsafety-related radiation monitors are provided in the main stack. Trip signals from these monitors are required only when purging the containment through the SGTS and containment integrity is required. The trip signals isolate primary containment vent and purge valves greater than 2 inches in diameter to prevent accidental releases of radioactivity offsite when the valves are open. This signal is added to fulfill the requirements of item II.E.4.2(7) of NUREG-0737.

Flow integrators are used to record the integrated flow of liquid from the drywell sumps. The integrated flow is indicative of reactor coolant leakage. A Drywell Atmosphere Radioactivity Monitor is provided to give supporting information to that supplied by the reactor coolant leakage monitoring system. (See Bases for 3.6.C and 4.6.C)

Some of the surveillance instrumentation listed in Table 3.2.F are required to meet the accident monitoring requirements of NUREG-0737, Clarification of TMI Action Plan Requirements. This instrumentation and the applicable NUREG-0737 requirements are:

1. Wide range drywell pressure (II.F.1.4)
2. Subatmospheric drywell pressure (II.F.1.4)
3. Wide range suppression chamber water level (II.F.1.5)
4. Main stack high range radiation monitor (II.F.1.1)
5. Reactor building roof vent high range radiation monitor (II.F.1.1)
6. Drywell hydrogen concentration analyzer and monitor (II.F.1.6)
7. Drywell high range radiation monitors (II.F.1.3)
8. Reactor Water Level - wide and fuel range (II.F.2)
9. Safety-Relief Valve position indication (II.D.3)

3.2 BASES (Cont'd.)

The recirculation pump trip limits the consequences of an anticipated transient without scram (ATWS) event. The response of the plant to this postulated event is within the bounds of study events given in General Electric Company Topical Report, NEDO-10349, dated March, 1971. An alternate rod insertion scram limits the consequences of a Reactor Protection System failure to scram during an anticipated transient. The ARI/RPT System is electrically diverse from the RPS logic and actuation circuitry, which significantly reduces the potential for ATWS events caused by common mode electrical failures in RPS. The ARI/RPT system is required by 10 CFR 50.62.

In the event of a loss of the reactor building ventilation system, radiant heating in the vicinity of the main steam lines raises the ambient temperature above 200 degrees F. Restoration of the main steam line tunnel ventilation flow momentarily exposes the temperature sensors to high gas temperatures. The momentary temperature increase can cause an unnecessary main steam line isolation and reactor scram. Permission is provided to increase the temperature trip setpoint to 250 degrees F for 30 minutes during restoration of ventilation system to avoid an unnecessary plant transient.

The Emergency Aux. Power Source Degraded Voltage trip function prevents damage to safety-related equipment in the event of a sustained period of low voltage. The voltage supply to each of the 4kV buses will be monitored by undervoltage relaying. With a degraded voltage condition on the off-site source, the undervoltage sensing relays operate to initiate a timing sequence.

The timing sequence provides constant and inverse time voltage characteristics. Degraded voltage protection includes: (1) An instantaneous relay (27N) initiated at 98% voltage which initiates a 60 second time delay relay which is inhibited (locked out) from initiating transfer in the presence of a safety injection signal; (2) An instantaneous relay (27N) initiated at 89% voltage which intiates a 9 second time delay relay which requires the presence of a safety injection signal to initiate transfer; (3) An inverse time voltage relay (CV-6) initiated at 87% voltage with a maximum 60 second delay and operates at 70% voltage in 30 seconds; and (4) An inverse time voltage relay (IAV) initiated at approximately 60% voltage and operates at 1.8 seconds at zero volts.

When the timing sequence is completed, the corresponding 4kV emergency circuit breakers are tripped and the emergency buses are transferred to the alternate source. The 60-second timing sequences were selected to prevent unnecessary transfers during motor starts and to allow the automatic tapchanger on the startup transformer to respond to the voltage condition. The 9-second timing sequence is necessary to prevent separation of the emergency buses from the off-site source during motor starting transients, yet still be contained within the time envelope in FSAR Table 8.5.1.

4.2 BASES

The instrumentation listed in Table 4.2.A thru 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 is generally applied 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.

Those instruments which, when tripped, result in a rod block have their contacts arranged in a 1 out of n logic, and all are capable of being bypassed. For such a tripping arrangement with bypass capability provided, there is an optimum test interval that should be maintained in order to maximize the reliability of a given channel (7). This takes account of the fact that testing degrades reliability and the optimum interval between tests is approximately given by:

$$i = \sqrt{\frac{2t}{r}}$$

~~Insert for Page 94~~

Where: i = the optimum interval between tests.

t = the time the trip contacts are disabled from performing their function while the test is in progress.

r = the expected failure rate of the relays.

To test the trip relays requires that the channel be bypassed, the test made, and the system returned to its initial state. It is assumed this task requires an estimated 30 minutes to complete in a thorough and workmanlike manner and that the relays have a failure rate of 10^{-6} failures per hour. Using this data and the above operation, the optimum test interval is

$$i = \sqrt{\frac{2(0.5)}{10^{-6}}} = 1 \times 10^3 \text{ hours}$$

$$= 40 \text{ days}$$

<u>For additional margin a test interval of once per month will be used initially.</u>

(7) UCRL-50451, Improving Availability and Readiness of Field Equipment Through Periodic Inspection. Benjamin Epstein, Albert Shiff, July 16, 1968, page 10, Equation (24), Lawrence Radiation Laboratory.

4.2 BASES: (Cont'd.)

The sensors and electronic apparatus have not been included here as these are analog devices with readouts in the control room and the sensors and electronic apparatus can be checked by comparison with other like instruments. The checks which are made on a daily basis are adequate to assure operability of the sensors and electronic apparatus, and the test interval given above provides for optimum testing of the relay circuits.

The above calculated test interval optimizes each individual channel, considering it to be independent of all others. As an example, assume that there are two channels with an individual technician assigned to each. Each technician tests his channel at the optimum frequency, but the two technicians are not allowed to communicate so that one can advise the other that his channel is under test. Under these conditions, it is possible for both channels to be under test simultaneously. Now, assume that the technicians are required to communicate and that two channels are never tested at the same time.

Forbidding simultaneous testing improves the availability of the system over that which would be achieved by testing each channel independently. These one out of n trip systems will be tested one at a time in order to take advantage of this inherent improvement in availability.

Optimizing each channel independently may not truly optimize the system considering the overall rules of system operation. However, true system optimization is a complex problem. The optimums are broad, not sharp, and optimizing the individual channels is generally adequate for the system.

The formula given above minimizes the unavailability of a single channel which must be bypassed during testing. The minimization of the availability is illustrated by Curve No. 1 of Figure 4.2.2 which assumes that a channel has a failure rate of 0.1×10^{-6}/hour and that 0.5 hours is required to test it. The unavailability is a minimum at a test interval i, of 3.16×10^{3} hours.

If two similar channels are used in a 1 out of 2 configuration, the test interval for minimum unavailability changes as a function of the rules for testing. The simplest case is to test each one independent of the other. In this

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case, there is assumed to be a finite probability that both may be bypassed at one time. This case is shown by Curve No. 2. Note that the unavailability is lower as expected for a redundant system and the minimum occurs at the same test interval. Thus, if the two channels are tested independently, the equation above yields the test interval for minimum unavailability.

A more usual case is that the testing is not done independently. If both channels are bypassed and tested at the same time, the result is shown in Curve No. 3. Note that the minimum occurs at about 40,000 hours, much longer than for cases 1 and 2. Also, the minimum is not nearly as low as Case 2 which indicates that this method of testing does not take full advantage of the redundant channel. Bypassing both channels for simultaneous testing should be avoided.

The most likely case would be to stipulate that one channel be bypassed, tested, and restored, and then immediately following, the second channel be bypassed, tested, and restored. This is shown by Curve No. 4. Note that there is no true minimum. The curve does have a definite knee and very little reduction in system unavailability is achieved by testing at a shorter interval than computed by the equation for a single channel.

The best test procedure of all those examined is to perfectly stagger the tests. That is, if the test interval is four months, test one or the other channel every two months. This is shown in Curve No. 5. The difference between Cases 4 and 5 is negligible. There may be other arguments, however, that more strongly support the perfectly staggered tests, including reductions in human error.

The conclusions to be drawn are these:

1. A 1 out of n system may be treated the same as a single channel in terms of choosing a test interval; and

2. more than one channel should not be bypassed for testing at any one time.

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4.2 BASES (Cont'd)

The radiation monitors in the refueling area ventilation duct which initiate building isolation and standby gas treatment operation are arranged in a 1 out of 2 twice logic system. The bases given above for the rod blocks apply here also and were used to arrive at the functional testing frequency. The air ejector off-gas monitors are connected in a 2 out of 2 logic arrangement Based on the experience with instruments of similar design, a testing interval of once every three months has been found adequate.

Radiation monitors in the main stack which initiate containment isolation are not safety-related and are required only during containment purging through the SGTS and when containment integrity is required, an activity which occurs infrequently. Therefore, a twelve (12) month calibration interval is appropriate.

The automatic pressure relief instrumentation can be considered to be a 1 out of 2 logic system and the discussion above applies also.

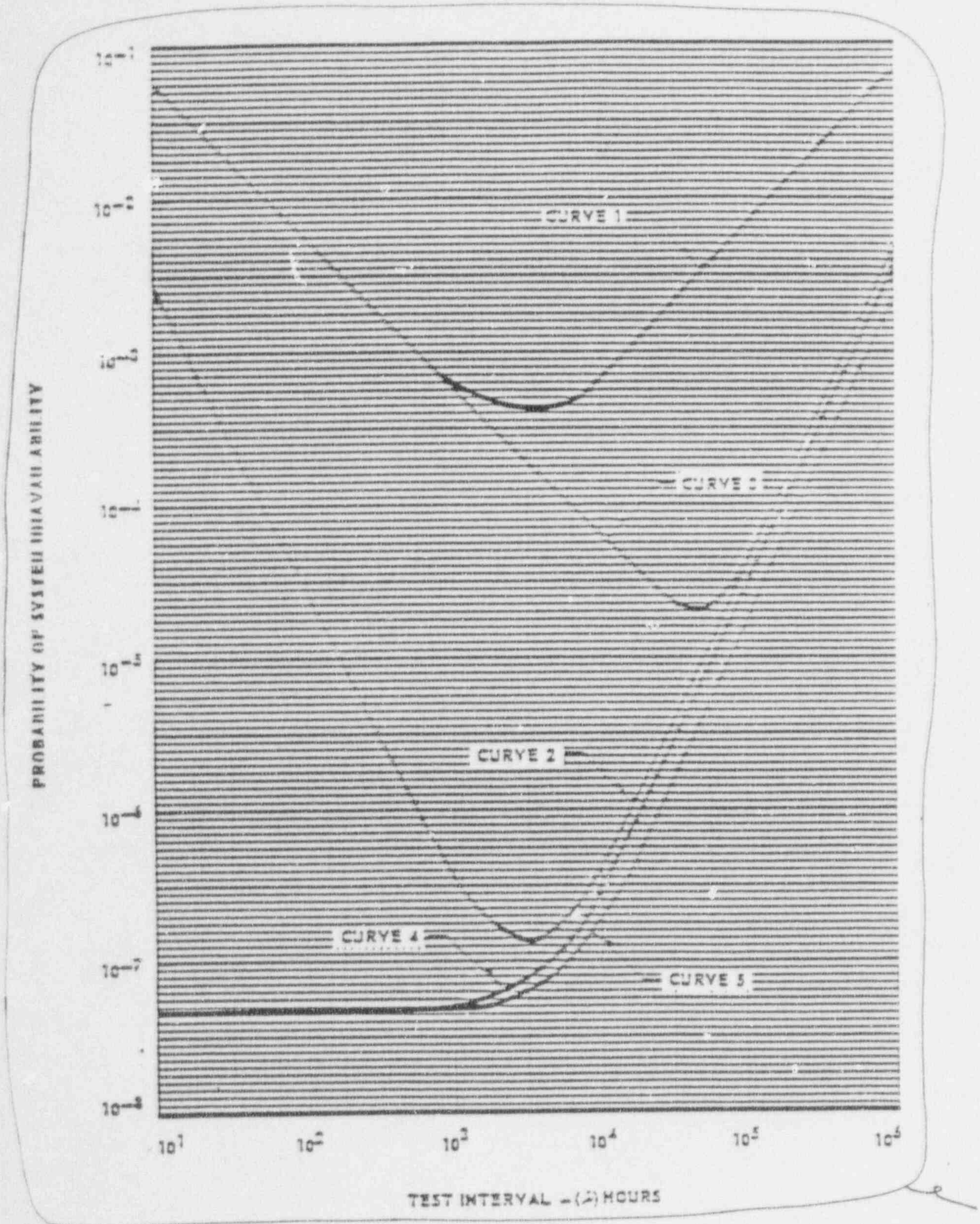

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Figure 4.2.2

Docket No. 50-278
License No. DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 11

MARKUP OF CHANGES AND NEW PAGES FOR

THE BASES FOR TS 3.2.A THROUGH 3.2.G (Unit 3)

List of Pages Affected:

89
91
94
95
96
98

3.2 BASES

In addition to reactor protection instrumentation which initiates a reactor scram, protective instrumentation has been provided which initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the core cooling systems, control rod block and standby gas treatment systems. The objectives of the Specifications are (i) to assure the effectiveness of the protective instrumentation when required even during periods when portions of such systems are out-of-service for maintenance, and (ii) to prescribe the trip settings required to assure adequate performance. When necessary, one channel may be made inoperable for brief intervals to conduct required functional tests and calibrations.

Insert for Page 89

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2.A which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary system isolation is connected in a dual bus arrangement.

The low water level instrumentation set to trip at zero inches indicated level (538 inches above vessel zero) closes all isolation valves except those in Groups 1, 4 and 5. Details of valve grouping and required closing times are given in Specification 3.7. For valves which isolate at this level, this trip setting is adequate to prevent the core from being uncovered in the case of a break in the largest line assuming a 60 second valve closing time. Required closing times are less than this.

The low-low reactor water level instrumentation is set to trip when reactor water level is minus 48 inches indicated level (490 inches above vessel zero). This trip initiates HPCI, RCIC, Alternate Rod Insertion and trips the recirculation pumps. The low-low-low reactor water level instrumentation is set to trip when the reactor water level is minus 160 inches indicated level (378 inches above vessel zero). This trip closes Main Steam Line Isolation Valves, Main Steam Drain Valves and Recirc Sample Valves (Group 1), activates the remainder of the CSCS subsystem, and starts

"This page is effective upon completion of the ATWS Rule ARI/RPT Modification (Modification 865)." e

INSERT: Bases page 89

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for Isolation Instrumentation have been determined in accordance with General Electric reports NEDC-30851P-A, Supplement 2, "Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," and NEDC-31677P-A,"Technical Specification Improvement Analyses for BWR Isolation Actuation Instrumentation." The AOT is 12 hours for Table 3.2.A Items 1, 4, and 5 because these items have instrumentation that is common to the RPS. Other Table 3.2.A Items have an AOT of 24 hours.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for ECCS Actuation Instrumentation have been determined in accordance with General Electric reports NEDC-30936P-A,"BWR Owners' Group Technical Specification Improvement Methodology with Demonstration for BWR ECCS Actuation Instrumentation," Parts 1 and 2, and RE-022,"Technical Specification Improvement Analysis for the Emergency core Cooling System Actuation Instrumentation for Peach Bottom Atomic Power Station, Units 2 and 3."

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for miscellaneous instruments have been determined in accordance with General Electric report GENE-770-06-1,"Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," and the associated NRC Safety Evaluation Report dated July 21, 1992.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for RCIC instrumentation have been determined in accordance with General Electric report GENE-770-06-2,"Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," and the associated NRC Safety Evaluation Report dated September 13, 1991.

3.2 BASES (Cont'd)

the emergency diesel generators. These trip level settings were chosen to be high enough to prevent spurious actuation but low enough to initiate CSCS operation and primary system isolation so that post-accident cooling can be accomplished and the guidelines of 10 CFR 100 will not be exceeded. For large breaks up to the complete circumferential break of a 28-inch recirculation line and with the trip setting given above, CSCS initiation and primary system isolation are initiated in time to meet the above criteria. Reference paragraph 6.5.3.1 FSAR.

The high drywell pressure instrumentation is a diverse signal for malfunctions to the water level instrumentation and in addition to initiating CSCS, it causes isolation of Group 2 and 3 isolation valves. For the breaks discussed above, this instrumentation will generally initiate CSCS operation before the low-low-low water level instrumentation; thus the results given above are applicable here also. See Spec. 3.7 for Isolation Valve Closure Group. The water level instrumentation initiates protection for the full spectrum of loss-of-coolant accidents and causes isolation of all isolation valves except Groups 4 and 5.

Venturis are provided in the main steam lines as a means of measuring steam flow and also limiting the loss of mass inventory from the vessel during a steam line break accident. The primary function of the instrumentation is to detect a break in the main steam line. For the worst case accident, main steam line break outside the drywell, a trip setting of 140% of rated steam flow in conjunction with the flow limiters and main steam line valve closure, limits the mass inventory loss such that fuel is not uncovered, fuel temperatures peak at approximately 1000 degrees F and release of radioactivity to the environs is below CFR 100 guidelines. Reference Section 14.6.5 FSAR.

Temperature monitoring instrumentation is provided in the main steam line tunnel exhaust duct and along the steam line in the turbine building to detect leaks in these areas. Trips are provided on this instrumentation and when exceeded, cause closure of isolation valves. See Spec. 3.7 for Valve Group. The setting is 200 degrees F for the main steam line tunnel detector. For large breaks, the high steam flow instrumentation is a backup to the temperature instrumentation.

High radiation monitors in the main steam line tunnel have been provided to detect gross fuel failure as in the control rod drop accident. With the established setting of 15 times normal background, and main steam line isolation valve closure, fission product release is limited so that 10 CFR 100 guidelines are not exceeded for this accident. Reference Section 14.6.2 FSAR.

3.2 BASES (Cont'd)

Pressure instrumentation is provided to close the main steam isolation valves in RUN Mode when the main steam line pressure drops below 850 psig. The Reactor Pressure Vessel thermal transient due to an inadvertent opening of the turbine bypass valves when not in the RUN Mode is less severe than the loss of feedwater analyzed in section 14.5 of the FSAR; therefore, closure of the Main Steam Isolation valves for thermal transient protection when not in RUN Mode is not required.

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI steam piping. Tripping of this instrumentation results in actuation of HPCI isolation valves. Tripping logic for the high flow is 1 out of 2 logic. Temperature is monitored at four (4) locations with four (4) temperature sensors at each location. Two (2) sensors at each location are powered by "A" DC control bus and two (2) by "B" DC control bus. Each pair of sensors, e.g., "A" or "B" at each location are physically separated and the tripping of either "A" or "B" bus sensor will actuate HPCI isolation valves. The trip settings of ≤ 300% of design flow for high flow and 200 degrees F for high temperature are such that core uncovery is prevented and fission product release is within limits.

The RCIC high flow and temperature instrumentation are arranged the same as that for the HPCI. The trip setting of ≤ 300% for high flow and 200 degrees F for temperature are based on the same criteria as the HPCI.

The Reactor Water Cleanup System high flow instrumentation is arranged similar to that for the HPCI System. The trip settings are such that core uncovery is prevented and fission product release is maintained within limits. The high temperature instrumentation downstream of the non-regenerative heat exchanger is provided to protect the ion exchange resin in the demineralizer from damage due to high temperature. Such damage could impair the resins' ability to remove impurities from the primary coolant and possibly result in the release of previously captured impurities back into the coolant in large concentrations.

The instrumentation which initiates CSCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion, the Specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed. An exception to this is when logic functional testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to the fuel cladding integrity safety limit. The trip logic for this function is 1 out of n: e.g., any trip on one of 6 APRM's, 8 IRM's, or 4 SRM's will result in a rod block.

The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met. ~~The minimum instrument channel requirements for the RBM may be reduced by one for maintenance, testing or calibration. This time period is only 3% of the operating time in a month and does not significantly increase the risk of preventing an inadvertent control rod withdrawal.~~

3.2 BASES (Cont'd)

The APRM rod block function is flow biased and prevents a significant reduction in MCPR, especially during operation at reduced flow. The APRM provides gross core protection: i.e., limits the gross core power increase from withdrawal of control rods in the normal withdrawal sequence. The trips are set so that MCPR is maintained greater than the fuel cladding integrity safety limit.

The RBM rod block function provides local protection of the core; i.e., the prevention of boiling transition in the local region of the core, for a single rod withdrawal error from a limiting control rod pattern.

The IRM rod block function provides local as well as gross core protection. The scaling arrangement is such that trip setting is less than a factor of 10 above the indicated level.

The downscale indication on an APRM or IRM is an indication the instrument has failed or the instrument is not sensitive enough. In either case the instrument will not respond to changes in the control rod motion and thus, control rod motion is prevented. The downscale trips are set at 2.5 indicated on scale.

The flow comparator and scram discharge volume high level components have only one logic channel and are not required for safety. The flow comparator must be bypassed when operating with one recirculation water pump.

The refueling interlocks also operate one logic channel, and are required for safety only when the mode switch is in the refueling position.

For effective emergency core cooling for small pipe breaks, the HPCI system must function since reactor pressure does not decrease rapidly enough to allow either core spray or LPCI to operate in time. The automatic pressure relief function is provided as a backup to the HPCI in the event the HPCI does not provide this function when necessary and minimize spurious operation. The trip settings given in the specification are adequate to assure the above criteria are met. The specification preserves the effectiveness of the system during periods of maintenance, testing, or calibration, and also minimizes the risk of inadvertent operation; i.e., only one instrument channel out of service.

3.2 BASES (Cont'd)

Four sets of two radiation monitors are provided which initiate the Reactor Building Isolation function and operation of the standby gas treatment system. Four instrument channels monitor the radiation from the refueling area ventilation exhaust ducts and four instrument channels monitor the building ventilation below the refueling floor. Each set of instrument channels is arranged in a 1 out of 2 twice trip logic.

Trip settings of less than 16 mr/hr for the monitors in the refueling area ventilation exhaust ducts are based upon initiating normal ventilation isolation and standby gas treatment system operation so that none of the activity released during the refueling accident leaves the Reactor Building via the normal ventilation path but rather all the activity is processed by the standby gas treatment system.

Two channels of nonsafety-related radiation monitors are provided in the main stack. Trip signals from these monitors are required only when purging the containment through the SGTS and containment integrity is required. The trip signals isolate primary containment vent and purge valves greater than 2 inches in diameter to prevent accidental releases of radioactivity offsite when the valves are open. This signal is added to fulfill the requirements of item II.E.4.2(7) of NUREG-0737.

Four channels of in-duct radiation monitors are provided which initiate the Main Control Room Emergency Ventilation System. Each set of instrument channels are arranged in a one (1) out of two (2) twice trip logic.

Flow integrators are used to record the integrated flow of liquid from the drywell sumps. The integrated flow is indicative of reactor coolant leakage. A Drywell Atmosphere Radioactivity Monitor is provided to give supporting information to that supplied by the reactor coolant leakage monitoring system. (See Bases for 3.6.C and 4.6.C)

Some of the surveillance instrumentation listed in Table 3.2.F are required to meet the accident monitoring requirements of NUREG-0737, Clarification of TMI Action Plan Requirements. This instrumentation and the applicable NUREG-0737 requirements are:

1. Wide range drywell pressure (II.F.1.4)
2. Subatmospheric drywell pressure (II.F.1.4)
3. Wide range suppression chamber water level (II.F.1.5)
4. Main stack high range radiation monitor (II.F.1.1)
5. Reactor building roof vent high range radiation monitor (II.F.1.1)
6. Drywell hydrogen concentration analyzer and monitor (II.F.1.6)
7. Drywell high range radiation monitors (II.F.1.3)
8. Reactor Water Level - wide and fuel range (II.F.2)
9. Safety-Relief Valve position indication (II.D.3)

3.2 BASES (Cont'd.)

The recirculation pump trip limits the consequences of an anticipated transient without scram (ATWS) event. The response of the plant to this postulated event is within the bounds of study events given in General Electric Company Topical Report, NEDO-10349, dated March, 1971. An alternate rod insertion scram limits the consequences of a Reactor Protection System failure to scram during an anticipated transient. The ARI/RPT System is electrically diverse from the RPS logic and actuation circuitry, which significantly reduces the potential for ATWS events caused by common mode electrical failures in RPS. The ARI/RPT system is required by 10 CFR 50.62.

In the event of a loss of the reactor building ventilation system, radiant heating in the vicinity of the main steam lines raises the ambient temperature above 200 degrees F. Restoration of the main steam line tunnel ventilation flow momentarily exposes the temperature sensors to high gas temperatures. The momentary temperature increase can cause an unnecessary main steam line isolation and reactor scram. Permission is provided to increase the temperature trip setpoint to 250 degrees F for 30 minutes during restoration of ventilation system to avoid an unnecessary plant transient.

The Emergency Aux. Power Source Degraded Voltage trip function prevents damage to safety-related equipment in the event of a sustained period of low voltage. The voltage supply to each of the 4kV buses will be monitored by undervoltage relaying. With a degraded voltage condition on the off-site source, the undervoltage sensing relays operate to initiate a timing sequence.

The timing sequence provides constant and inverse time voltage characteristics. Degraded voltage protection includes: (1) An instantaneous relay (27N) initiated at 98% voltage which initiates a 60 second time delay relay which is inhibited (locked out) from initiating transfer in the presence of a safety injection signal; (2) An instantaneous relay (27N) initiated at 89% voltage which intiates a 9 second time delay relay which requires the presence of a safety injection signal to initiate transfer; (3) An inverse time voltage relay (CV-6) initiated at 87% voltage with a maximum 60 second delay and operates at 70% voltage in 30 seconds; and (4) An inverse time voltage relay (IAV) initiated at approximately 60% voltage and operates at 1.8 seconds at zero volts.

When the timing sequence is completed, the corresponding 4kV emergency circuit breakers are tripped and the emergency buses are transferred to the alternate source. The 60-second timing sequences were selected to prevent unnecessary transfers during motor starts and to allow the automatic tapchanger on the startup transformer to respond to the voltage condition. The 9-second timing sequence is necessary to prevent separation of the emergency buses from the off-site source during motor starting transients, yet still be contained within the time envelope in FSAR Table 8.5.1.

4.2 BASES

The instrumentation listed in Table 4.2.A thru 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 is generally applied 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.

Those instruments which, when tripped, result in a rod block have their contacts arranged in a 1 out of n logic, and all are capable of being bypassed. For such a tripping arrangement with bypass capability provided, there is an optimum test interval that should be maintained in order to maximize the reliability of a given channel (7). This takes account of the fact that testing degrades reliability and the optimum interval between tests is approximately given by:

$$i = \sqrt{\frac{2t}{r}}$$

Where: i = the optimum interval between tests.

t = the time the trip contacts are disabled from performing their function while the test is in progress.

r = the expected failure rate of the relays.

To test the trip relays requires that the channel be bypassed, the test made, and the system returned to its initial state. It is assumed this task requires an estimated 30 minutes to complete in a thorough and workmanlike manner and that the relays have a failure rate of 10^{-6} failures per hour. Using this data and the above operation, the optimum test interval is

$$i = \sqrt{\frac{2(0.5)}{10^{-6}}} = 1 \times 10^{3} \text{ hours}.$$

$$= 40 \text{ days}$$

For additional margin a test interval of once per month will be used initially.

Insert for Page 94

(7) UCRL-50451, Improving Availability and Readiness of Field Equipment Through Periodic Inspection, Benjamin Epstein, Albert Shiff, July 16, 1968, page 10, Equation (24), Lawrence Radiation Laboratory.

4.2 BASES: (Cont'd.)

The sensors and electronic apparatus have not been included here as these are analog devices with readouts in the control room and the sensors and electronic apparatus can be checked by comparison with other like instruments. The checks which are made on a daily basis are adequate to assure operability of the sensors and electronic apparatus, and the test interval given above provides for optimum testing of the relay circuits.

The above calculated test interval optimizes each individual channel, considering it to be independent of all others. As an example, assume that there are two channels with an individual technician assigned to each. Each technician tests his channel at the optimum frequency, but the two technicians are not allowed to communicate so that one can advise the other that his channel is under test. Under these conditions, it is possible for both channels to be under test simultaneously. Now, assume that the technicians are required to communicate and that two channels are never tested at the same time.

Forbidding simultaneous testing improves the availability of the system over that which would be achieved by testing each channel independently. These one out of n trip systems will be tested one at a time in order to take advantage of this inherent improvement in availability.

Optimizing each channel independently may not truly optimize the system considering the overall rules of system operation. However, true system optimization is a complex problem. The optimums are broad, not sharp, and optimizing the individual channels is generally adequate for the system.

The formula given above minimizes the unavailability of a single channel which must be bypassed during testing. The minimization of the availability is illustrated by Curve No. 1 of Figure 4.2.2 which assumes that a channel has a failure rate of 0.1×10^{-6}/hour and that 0.5 hours is required to test it. The unavailability is a minimum at a test interval i, of 3.16×10^{3} hours.

If two similar channels are used in a 1 out of 2 configuration, the test interval for minimum unavailability changes as a function of the rules for testing. The simplest case is to test each one independent of the other. In this

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4.2 BASES (Cont'd.)

case, there is assumed to be a finite probability that both may be bypassed at one time. This case is shown by Curve No. 2. Note that the unavailability is lower as expected for a redundant system and the minimum occurs at the same test interval. Thus, if the two channels are tested independently, the equation above yields the test interval for minimum unavailability.

A more usual case is that the testing is not done independently. If both channels are bypassed and tested at the same time, the result is shown in Curve No. 3. Note that the minimum occurs at about 40,000 hours, much longer than for cases 1 and 2. Also, the minimum is not nearly as low as Case 2 which indicates that this method of testing does not take full advantage of the redundant channel. Bypassing both channels for simultaneous testing should be avoided.

The most likely case would be to stipulate that one channel be bypassed, tested, and restored, and then immediately following, the second channel be bypassed, tested, and restored. This is shown by Curve No. 4. Note that there is no true minimum. The curve does have a definite knee and very little reduction in system unavailability is achieved by testing at a shorter interval than computed by the equation for a single channel.

The best test procedure of all those examined is to perfectly stagger the tests. That is, if the test interval is four months, test one or the other channel every two months. This is shown in Curve No. 5. The difference between Cases 4 and 5 is negligible. There may be other arguments, however, that more strongly support the perfectly staggered tests, including reductions in human error.

The conclusions to be drawn are these:

1. A 1 out of n system may be treated the same as a single channel in terms of choosing a test interval; and

2. more than one channel should not be bypassed for testing at any one time.

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4.2 BASES (cont'd)

The radiation monitors in the refueling area ventilation duct which initiate building isolation and standby gas treatment operation are arranged in a 1 out of 2 twice logic system. The bases given above for the rod blocks apply here also and were used to arrive at the functional testing frequency. The air ejector off-gas monitors are connected in a 2 out of 2 logic arrangement. Based on the experience with instruments of similar design, a testing interval of once every three months has been found adequate.

Radiation monitors in the main stack which initiate containment isolation are not safety-related and are required only during containment purging through the SGTS and when containment integrity is required, an activity which occurs infrequently. Therefore, a twelve (12) month calibration interval is appropriate.

The Control Room Intake Air Radiation Monitors are safety-related and are required to be operable at all times when secondary containment is required. The calibration interval is as described in Section 4.11.A.

The automatic pressure relief instrumentation can be considered to be a 1 out of 2 logic system and the discussion above applies also.

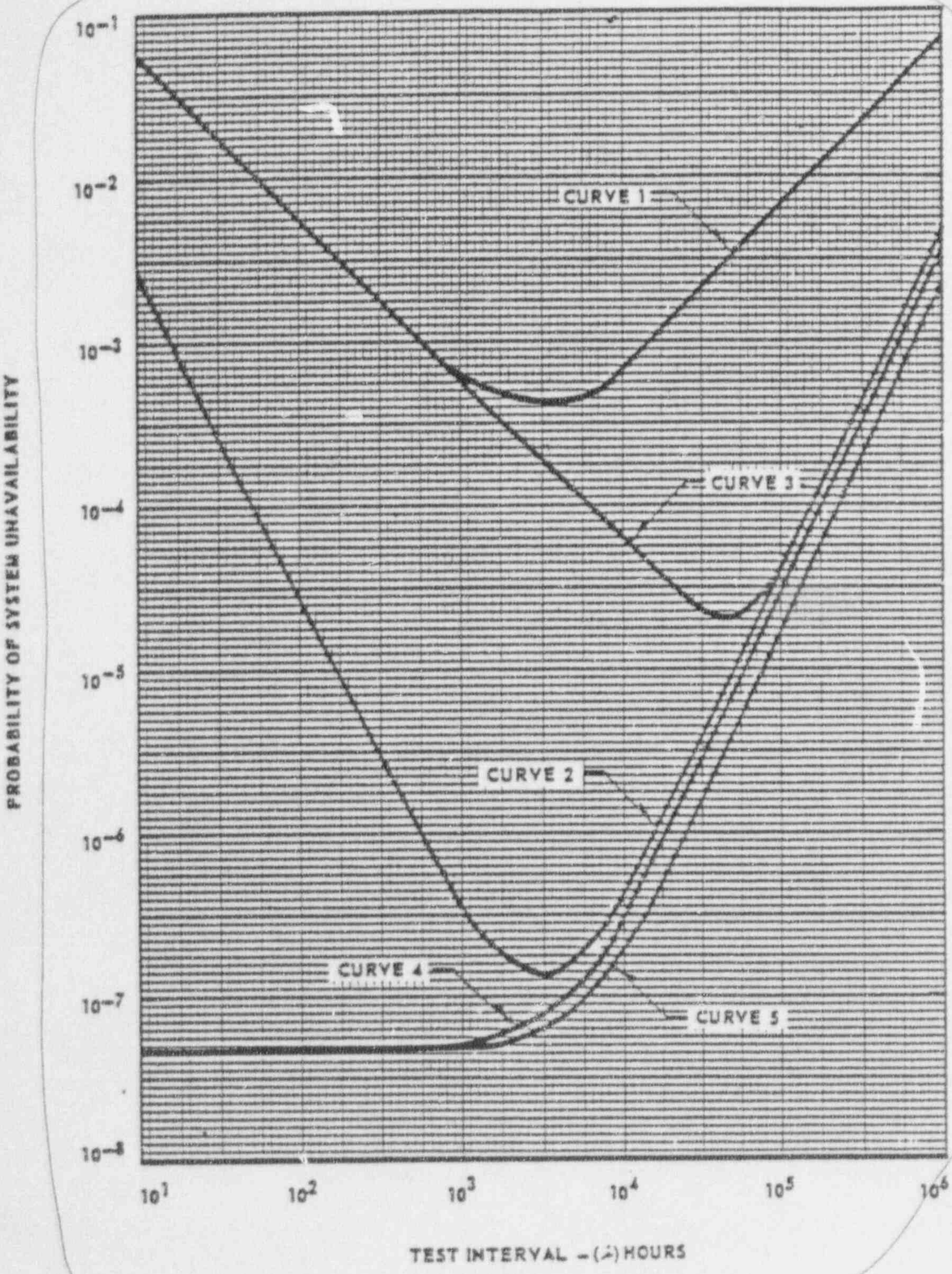

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Figure 4.2.2

Docket Nos. 50-277
50-278
License Nos. DPR-44
DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 12

RE-TYPED REPLACEMENT PAGES FOR ALL

PAGES AFFECTED BY TSCR 90-03

LIMITING CONDITIONS FOR OPERATION

3.1 Reactor Protection System (RPS)

A. The RPS instrumentation for each trip function in Table 3.1.1 shall be Operable; and, there shall be two Operable or tripped trip systems for each Trip Function.

The designed system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 50 milliseconds.

Applicability:

According to Table 3.1.1.

Conditions and Required Actions: (1)(2)

1. With one or more channel(s) required by Table 3.1.1 inoperable in one or more trip functions, place the inoperable channel or associated trip system in trip within 12 hours.

2. With one or more trip functions with one or more channels required by Table 3.1.1 inoperable in both trip systems, place channel in one trip system in trip or place one trip system in trip within 6 hours.

3. With one or more automatic trip functions or two or more manual trip functions (Mode Switch in Shutdown, Manual Scram and RPS Channel Test Switches) with RPS trip capability not maintained, restore RPS trip capability within one hour.

4. If the required actions and associated completion time of Action 1 or 2 or 3 are not met, take the action required by Table 3.1.1 for the Trip Function.

SURVEILLANCE REQUIREMENTS

4.1 Reactor Protection System

A. Each RPS instrument channel shall be demonstrated Operable by performance of a channel functional test and channel calibration at the Frequencies shown in Tables 4.1.1 and 4.1.2, respectively.

Response time measurements (from the opening of the sensor contact up to and including the opening of the trip actuator contacts) are not part of the normal instrument test. The RPS response time of each reactor trip function shall be demonstrated to be within its limits once per operating cycle.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated trip function maintains RPS trip capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.1.1 for that trip function shall be taken immediately.

LIMITING CONDITIONS FOR OPERATION

3.1 Reactor Protection System (continued)

B. N/A

C. N/A

D. Reactor Protection System Power Supply

D.1 Reactor Protection System Power Supply:

One trip train* per RPS MG set may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the alternate source or de-energized within 30 minutes.

D.2 One trip train* of the RPS alternate power supply may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the RPS MG set or de-energized within 30 minutes.

SURVEILLANCE REQUIREMENTS

4.1 Reactor Protection System (continued)

B. Deleted

C. Deleted

D. Reactor Protection System Power Supply

D.1 The following RPS power supply (MG set) protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Underfrequency Time Delay	6 sec ± 1 sec

D.2 The following RPS alternate power supply protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Undervoltage Time Delay	Max. 4 secs.

* A trip train consists of one breaker, one undervoltage relay, one overvoltage relay, one underfrequency relay, one time delay relay (MG set only), and the associated logic.

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Table 3.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Item	Minimum No. of Operable Instrument Channels per Trip System	Trip Function	Trip Level Setting	Modes In which Function Must Be Operable: Refuel (7)	Startup	Run	Number of Instrument Channels Provided by Design	Action (1)
1	1	Mode Switch In Shutdown		x	x	x	1 Mode Switch (4 Sections)	A
2	1	Manual Scram		x	x	x	2 Instrument Channels	A
3	3	IRM High Flux	≤120/125 of Full Scale	x	x	(5)	8 Instrument Channels	A
4	3	IRM Inoperative		x	x	(5)	8 Instrument Channels	A
5	2	APRM High Flux	(0.66W+71%-0.66ΔW) (Clamp @ 120%) (12) (13)			x	6 Instrument Channels	A or B
6	2	APRM Inoperative	(11)	x	x	x	6 Instrument Channels	A or B
7	2	APRM Downscale	≥2.5 Indicated on Scale			(10)	6 Instrument Channels	A or B
8	2	APRM High Flux in Startup	≤15% Power	x	x		6 Instrument Channels	A
9	2	High Reactor Pressure	≤1055 psig	x (9)	x	x	4 Instrument Channels	A
10	2	High Drywell Pressure	≤2 psig	x (8)	x (8)	x	4 Instrument Channels	A
11	2	Reactor Low Water Level	≥0 in. Indicated Level	x	x	x	4 Instrument Channels	A

PBAPS

UNIT 2

Table 3.1.1 (continued)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Item	Minimum No. of Operable Instrument Channels per Trip System	Trip Function	Trip Level Setting	Modes in which Function Must Be Operable: Refuel (7)	Startup	Run	Number of Instrument Channels Provided by Design	Action (1)
12	2	High Water Level in Scram Discharge Volume	$\leq$ 50 Gallons	X (2)	X	X	4 Instrument Channels	A
13	2	Turbine Condenser Low Vacuum	$\geq$ 23 IN. Hg. Vacuum			X	4 Instrument Channels	A or C
14	2	Main Steam Line High Radiation	$\leq$ 15 X Normal Full Power Background	X	X	X	4 Instrument Channels	A
15	8	Main Steam Line Isolation Valve Closure	$\leq$ 10% Valve Closure			X (6)	16 Instrument Channels	A
16	2	Turbine Control Valve Fast Closure	$500 < P < 850$ psig control Oil Pressure Between Fast Closure Solenoid and Disc Dump Valve			X (4)	4 Instrument Channels	A or D
17	4	Turbine Stop Valve Closure	$\leq$ 10% Valve Closure			X (4)	8 Instrument Channels	A or D
18	2	RPS Channel Test Switches		X	X	X	4 Instrument Channels	A

NOTES FOR TABLE 3.1.1

1. If the required actions and associated completion time of Specification 3.1.A, Actions 1 or 2 or 3 are not met, take the action listed below for the affected trip function as required by Table 3.1.1.

   A. Initiate insertion of operable rods and complete insertion of all operable rods within 12 hours.

   B. Reduce power level to IRM range and place mode switch in the start up position within 6 hours.

   C. Reduce turbine load and close main steam line isolation valves within 6 hours.

   D. Reduce power to less than 30% rated within 4 hours.

2. Permissible to bypass, in refuel and shutdown positions of the reactor mode switch.

3. Deleted.

4. Bypassed when reactor thermal power is less than 30% of rated as indicated by turbine first stage pressure.

5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212 degrees F, only the following trip functions need to be operable:

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge instrument volume high level

8. Not required to be operable when primary containment integrity is not required.

9. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

TABLE 4.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each refueling outage.
Manual Scram	A	Trip Channel and Alarm	Every 3 months.
RPS Channel Test Switch	A	Trip Channel and Alarm	Once/week or after channel maintenance.
IRM			
High Flux	C	Trip Channel and Alarm (4)	One per week during refueling or startup and before each startup.
Inoperative	C	Trip Channel and Alarm (4)	One per week during refueling or startup and before each startup.
APRM			
High Flux	B1	Trip Output Relays (4)	Once/3 months
Inoperative	B1	Trip Output Relays (4)	Once/3 months
Downscale	B1	Trip Output Relays (4)	Once/3 months
Flow Bias	B1	Calibrate Flow Bias Signal (4)	Once/month
High Flux in Startup or Refuel	C	Trip Output Relays (4)	One per week during refueling or startup and before each startup.
High Reactor Pressure (6)	B2	Trip Channel and Alarm (4)	Once/3 months
High Drywell Pressure (6)	B2	Trip Channel and Alarm (4)	Once/3 months
Reactor Low Water Level (5)(6)	B2	Trip Channel and Alarm (4)	Once/3 months

TABLE 4.1.1 (Continued)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency (3)
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel and Alarm	Once/3 months
Turbine Condenser Low Vacuum (6)	B2	Trip Channel and Alarm (4)	Once/3 months
Main Steam Line High Radiation	B1	Trip Channel and Alarm (4)	Once/3 months
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Once/3 months
Turbine Control Valve EHC Oil Pressure	A	Trip Channel and Alarm	Once/3 months
Turbine First Stage Pressure Permissive	A	Trip Channel and Alarm	Once/3 months
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Once/3 months

NOTES FOR TABLE 4.1.1

1. Deleted.

2. A description of each of the groups is included in the Bases of this Specification.

3. Functional tests are not required on the part of the system that is not required to be operable or are tripped.

   If tests are missed on parts not required to be operable or are tripped, then they shall be performed prior to returning the system to an operable status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the measurement channels.

5. The water level in the reactor vessel will be perturbed and the corresponding level indicator changes will be monitored. This perturbation test will be performed every month after completion of the functional test program.

6. These channels consist of analog transmitters, indicators and electronic trip units. Instrument checks shall be performed once per day.

TABLE 4.1.2

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration	Minimum Frequency (2)
IRM High Flux	C	Comparison to APRM on Controlled Shutdown	Maximum frequency once per week.
APRM High Flux			
Output Signal	B1	Heat Balance	Twice per week.
Flow Bias Signal	B1	With Standard Pressure Source	Every eighteen months.
LPRM Signal	B1	TIP System Traverse	Every 6 weeks.
High Reactor Pressure	B2	Standard Pressure Source	Once per operating cycle.
High Drywell Pressure	B2	Standard Pressure Source	Once per operating cycle.
Reactor Low Water Level	B2	Pressure Standard	Once per operating cycle.
High Water Level in Scram Discharge Instrument Volume	A	Water Column	Every refueling outage.
Turbine Condenser Low Vacuum	B2	Standard Vacuum Source	Once per operating cycle.
Main Steam Line Isolation Valve Closure	A	Note (5)	Note (5)
Main Steam Line High Radiation	B1	Standard Current Source (3)	Every 3 months.
Turbine First State Pressure Permissive	A	Standard Pressure Source	Every 6 months.

TABLE 4.1.2 (Cont'd.)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration	Minimum Frequency (2)
Turbine Control Valve Fast Closure Oil Pressure Trip	A	Standard Pressure Source	Once per operating cycle.
Turbine Stop Valve Closure	A	Note (5)	Note (5)

NOTES FOR TABLE 4.1.2

1. A description of these groups is included in the bases of this Specification.

2. Calibration test is not required on the part of the system that are not required to be operable or are tripped but is required prior to return to service.

3. The current source provides an instrument channel alignment. Calibration using a radiation source shall be made each refueling outage.

4. Deleted.

5. Physical inspection and actuation of these position switches will be performed during the refueling outages.

BASES

The reactor protection system automatically initiates a reactor scram to:

1. Preserve the integrity of the fuel cladding.

2. Preserve the integrity of the reactor coolant system.

3. Minimize the energy which must be absorbed following a loss of coolant accident, and prevent inadvertent criticality.

When there is not fuel in the reactor, the scram serves no function; therefore, the reactor protection system is not required to be operable.

Allowed out of service times for repair and surveillance testing for Reactor Protection System Instrumentation have been determined in accordance with General Electric report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," General Electric Company, March 1988.

The reactor protection system is of the dual channel type (Reference subsection 7.2 FSAR). The system is made up of two independent trip systems, each having two subchannels of tripping devices. Each subchannel has an input from at least one instrument channel which monitors a critical parameter.

The outputs of the subchannels are combined in a 1 out of 2 logic; i.e., an input signal on either one or both the subchannels will cause a trip system trip. The outputs of the trip systems are arranged so that a trip on both systems is required to produce a reactor scram.

This system meets the intent of IEEE - 279 for Nuclear Power Plant Protection Systems. The system has a reliability greater than that of a 2 out of 3 system and somewhat less than that of a 1 out of 2 system.

With the exception of the Average Power Range Monitor (APRM) channels, the Intermediate Range Monitor (IRM) channels, the Main Steam Isolation Valve closure and the Turbine stop valve closure, each subchannel has one instrument channel. When the minimum condition for operation on the number of operable instrument channels per untripped protection trip system is met or if it cannot be met and the affected protection trip system is placed in a tripped condition, the effectiveness of the protection system is preserved.

Three APRM instrument channels are provided for each protection trip system. APRM's A and E operate contacts in one subchannel and APRM's C and E operate contacts in the other subchannel. APRM's B, D and F are arranged similarly in

4.1 Bases

A. Channel functional test frequencies for Reactor Protection System Instrumentation have been determined in accordance with General Electric report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," General Electric Company, March 1988.

4.1 Bases (Con'td.)

Intentionally Left Blank

4.1 Bases (Con'td.)

Intentionally Left Blank

4.1 Bases (Con'td.)

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.

2. Vacuum tube or semi-conductor devices and detectors that drift or lose sensitivity.

4.1 Bases (Con'td.)

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LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation

A. Primary Containment Isolation Functions

The primary containment isolation instrumentation for each function in Table 3.2.A shall be Operable; and, there shall be two Operable or tripped trip systems for each trip function.

Applicability:

Whenever Primary Containment Integrity is required.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.A inoperable, place channel in trip within 12 hours for Items 1, 4, and 5; and, place channel in trip within 24 hours for Items other than 1, 4, and 5.

2. With one or more automatic functions with primary containment isolation function not maintained, restore primary containment isolation capability within one hour.(3)

3. If the required action and associated completion time of Action 1 or 2 are not met, take the action required by Table 3.2.A for the function.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation

A. Primary Containment Isolation Functions

Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2.A.

System logic shall be functionally tested as indicated in Table 4.2.A.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Function maintains primary containment isolation capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.2.A for that trip function shall be taken.

(3) This Action not applicable to Item 11, Reactor Cleanup System High Temperature.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

B. Core and Containment Cooling Systems - Initiation and Control

Core and containment cooling system initiation and control instrumentation for each Trip Function in Table 3.2.B shall be Operable; and, there shall be two Operable or tripped trip systems for each Trip Function except as noted in Table 3.2.B.

Applicability:

Each Trip Function listed in Table 3.2.B shall be Operable whenever the system(s) it initiates or controls are required to be Operable as specified in Section 3.5.

Conditions and Required Actions:

With one or more channel(s) required by Table 3.2.B inoperable in one or more Trip Functions, take the Action required by Table 3.2.B.

LIMITING CONDITIONS FOR OPERATION

4.2 Protective Instrumentation (Continued)

B. Core and Containment Cooling Systems - Initiation and Control

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.B.

System logic shall be functionally tested as indicated in Table 4.2.B.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

C. Control Rod Block (CRB) Actuation

The Control Rod Block Actuation instrumentation for each function in Table 3.2.C shall be Operable; and, there shall be two Operable or tripped trip systems for each function except as noted in Table 3.2.C.

Applicability: (1)

The Rod Block Monitor (RBM) shall be Operable with setpoints as required by Table 3.2.C and the Core Operating Limits Report (COLR).

The APRM, IRM and SRM Control Rod Block (CRB) functions shall be Operable whenever the Reactor Mode Switch is in the Startup or Run positions except as follows:

The SRM and IRM functions are not required when the Reactor Mode Switch is in Run.

The APRM and RBM functions are not required to be Operable when the Reactor Mode Switch is in Startup except for the APRM Upscale (Startup Mode) which is not required to be Operable when the Reactor Mode Switch is in Run.

The scram discharge instrument volume high level rod block is required to be Operable whenever the Reactor Mode Switch is in the Startup or Run positions or in the Refuel position whenever more than one control rod is withdrawn.

Conditions and Required Actions:

With one or more channel(s) required by Table 3.2.C inoperable in one or more trip functions, take the Action required by Table 3.2.C.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

C. Control Rod Block (CRB) Actuation

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.C.

System logic shall be functionally tested as indicated in Table 4.2.C.

(1) Section 3.3.B.5 is Applicable during operation with a limiting control rod pattern.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation
(Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions

D.1. Reactor Building Isolation and Standby Gas Treatment System

The Reactor Building Isolation and Standby Gas Treatment System instrumentation for each trip function in Table 3.2.D shall be Operable; and, there shall be two Operable or tripped trip systems for each trip function.

Applicability:

Refuel Area Exhaust Monitors and Reactor Building Area Exhaust Monitors shall be Operable whenever the associated systems are required to be Operable.

Main Stack Monitor shall be Operable whenever the containment is purging and primary containment integrity is required.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.D inoperable in one or more trip functions, place channel in trip within 24 hours.

2. With one or more automatic Functions with containment isolation capability not maintained, restore containment isolation capability within one hour.

3. If the required actions and associated completion times of Action 1 or 2 are not met, take the Action required by Table 3.2.D.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation
(Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions

D.1. Reactor Building Isolation and Standby Gas Treatment System

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

System logic shall be functionally tested as indicated in Table 4.2.D.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Trip Function maintains isolation capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.2.D for that trip Function shall be taken.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Syste‥s-Isolation and Initiation Functions (Continued)

D.2 Main Control Room

The limiting conditions for operation are given in Table 3.2.D.

E. Drywell Leak Detection

The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Section 3.6.C, "Coolant Leakage".

F. Surveillance Information Readouts

The limiting conditions for the instrumentation tha‛ provides surveillance information readouts are given in Table 3.2.F.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions (Continued)

D.2 Main Control Room

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

E. Drywell Leak Detection

Instrumentation shall be calibrated and checked as indicated in Table 4.2.E.

F. Surveillance Information Readouts

Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

G. Alternate Rod Insertion (ARI) and Recirculation Pump Trip (RPT)

Two trip systems consisting of two channels per trip system for each instrumentation function that initiates an Alternate Rod Insertion (ARI) scram and trips the reactor recirculation pumps (RPT) in Table 3.2.G shall be Operable; and, the manual and automatic actuation logic and actuation devices of both trip systems shall be Operable.

Applicability:

Whenever the Reactor Mode Switch is in the Startup or Run positions.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.G inoperable, restore channel to Operable status or place channel in trip within 14 days.(3)

2. With one instrument function with trip capability not maintained, restore trip capability within 72 hours.

3. With both instrument functions or an actuation device with trip capability not maintained, restore trip capability for one function within 1 hour.

4. If the required actions and associated completion times of Action 1, 2 or 3 are not met, place the reactor in shutdown or refuel mode within 8 hours.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

G. Alternate Rod Insertion (ARI) and Recirculation Pump Trip (RPT)

Each RPT and ARI instrumentation channel shall be demonstrated Operable by the performance of the Instrument Check, Instrument Functional Test, Channel Calibration and Logic System Functional Test at the Frequencies shown in Table 4.2.G.

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(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Trip Function maintains ARI/RPT trip capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Condition 4 for that trip Function shall be taken.

(3) The action of placing the channel in trip is not applicable if the inoperable channel is the result of an inoperable breaker.

Table 3.2.A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Item	Minimum No. of Operable Instrument Channels per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Action (2)
1	2 (6)	Reactor Low Water Level	≥ 0" Indicated Level (3)	4 Inst. Channels	A
2	1	Reactor High Pressure (Shutdown Cooling Isolation)	≤ 75 psig	2 Inst. Channels	D
3	2	Reactor Low-Low-Low Water Level	at or above -160" indicated level (4)	4 Inst. Channels	A
4	2 (6)	High Drywell Pressure	≤ 2 psig	4 Inst. Channels	A
5	2	High Radiation Main Steam Line Tunnel	≤ 15 X Normal Rated Full Power Background (8)	4 Inst. Channels	B
6	2	Low Pressure Main Steam Line	≥ 850 psig (7)	4 Inst. Channels	B
7	2 (5)	High Flow Main Steam Line	≤ 140% of Rated Steam Flow	4 Inst. Channels	B
8	2	Main Steam Line Tunnel Exhaust Duct High Temperature	≤ 200 Deg. F (9)	4 Inst. Channels	B

Table 3.2.A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Item	Minimum No. of Operable Instrument Channels per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Action (2)
9	2	Main Steam Line Leak Detection High Temperature	≤ 200 Deg. F	4 Inst. Channels	B
10	1	Reactor Cleanup System High Flow	≤ 300% of Rated Flow	2 Inst. Channels	C
11	1	Reactor Cleanup System High Temperature	≤ 200 Deg. F	1 Inst. Channels	E
12	2	Reactor Pressure (Feedwater Flush System Interlock)	≤ 600 psig	4 Inst. Channels	F

NOTES FOR TABLE 3.2.A

1. Deleted

2. If the required actions and associated completion time of Specification 3.2.A, Actions 1 or 2 are not met, take the action listed below for the affected Trip Function as required by Table 3.2.A.

   A. Initiate an orderly shutdown and have the reactor in Cold Shutdown Condition in 24 hours.

   B. Initiate an orderly load reduction and have Main Steam Lines isolated within 12 hours.

   C. Isolate Reactor Water Cleanup System within 1 hour.

   D. Isolate Shutdown Cooling within 1 hour.

   E. Isolate Reactor Water Cleanup Filter Demineralizers unless the following provision is satisfied. The RWCU Filter Demineralizer may be used (the isolation overridden) to route the reactor water to the main condenser or waste surge tank, with the high temperature trip inoperable for up to 48 hours, provided the water inlet temperature is monitored once per hour and confirmed to be below 180 degrees F.

   F. Isolate Feedwater Flush System within 1 hour.

3. Instrument setpoint corresponds to 538 inches above vessel zero.

4. Instrument setpoint corresponds to 378 inches above vessel zero.

5. Two required for each steam line.

6. These signals also start SBGTS and initiate secondary containment isolation.

7. Only required in Run Mode (Interlocked with Mode Switch).

8. An alarm will be tripped in the control room to alert the control room operators to an increase in the main steam line tunnel radiation level.

TABLE 3.2.B
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (14) (15)	Reactor Low-Low Water Level	≥ -48 in. indicated level	4 HPCI & RCIC Inst. Channels	Initiates HPCI & RCIC.
2 (8) (11) (15)	Reactor Low-Low-Low Water Level	≥ -160 in. indicated level (4)	4 Core Spray & RHR Instrument Channels 4 ADS Instrument Channels	1. In conjunction with Low Reactor Pressure initiates Core Spray and LPCI. 2. In conjunction with confirmatory low level, High Drywell Pressure, 120 second time delay, and LPCI or Core Spray pump interlock initiates Auto Blowdown (ADS). 3. Initiates start.ng of Diesel Generators.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9) (16)	Reactor High Water Level	≤ +45 in. indicated level	2 Inst. Channels	Trips HPCI & RCIC turbines.
1 (8) (15)	Reactor Low Level (inside shroud)	≥ +312 in. above vessel zero (2/3 core height)	2 Inst. Channels	Prevents inadvertent operation of containment spray during accident conditions.
2 (8) (15)	Containment High Pressure	$1 < P < 2$ psig	4 Inst. Channels	Prevents inadvertent operation of containment spray during accident conditions.
1 (11) (15)	Confirmatory Low Level	≥ +6 in. indicated level	2 Inst. Channels	ADS Permissive.
2 (8) (11) (14) (15)	High Drywell Pressure	≤ 2 psig	4 Inst. Channels	1. Initiates Core Spray; LPCI; HPCI. 2. Initiates starting of Diesel Generators. 3. Initiates Auto Blowdown (ADS) in conjunction with Low-Low-Low Reactor water level, 120 second time delay, and LPCI or Core Spray pump running.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9) (15)	Reactor Low Pressure	400 - 500 psig	4 Inst. Channels	Permissive for opening Core Spray and LPCI Admission valves. Coincident with high drywell pressure, starts LPCI and Core Spray pumps.
2 (9) (15)	Reactor Low Pressure	200 - 250 psig	4 Inst. Channels	Permissive for closing Recirculation Pump Discharge Valve.
1 (13) (16)	Reactor Low Pressure	$50 \leq P \leq 75$ psig	2 Inst. Channels	In conjunction with PCI signal permits closure of RHR (LPCI) injection valves.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9) (15)	Core Spray Pump Start Timer	6 ± 1 sec. 13 sec. ± 7% of setting 23 sec. ± 7% of setting	4 timers 2 timers 2 timers	All pumps - loss of offsite power only. A & C pumps - offsite power available. B & D pumps - offsite power available.
1 per 4kV bus (7)	480V Emergency Load Center Timer	3 ± 0.5 sec.	4 timers	All timers - loss of offsite power only.
2 (9) (15)	LPCI Pump Start Timer (Four Pumps)	2 sec. ± 7% of setting 8 sec. ± 7% of setting	4 timers 4 timers	LPCI pumps A & B. LPCI pumps C & D.
1 (12) (15)	ADS Actuation Timer	90 $\leq t \leq$ 120 seconds	2 timers	In conjunction with Low Reactor Water Level, High Drywell Pressure and LPCI or Core Spray Pump running interlock, initiates ADS.
2 (12) (15)	ADS Bypass Timer	8 $\leq t \leq$ 10 minutes	4 timers	In conjunction with Low Reactor Water Level, bypasses high drywell pressure initiation of ADS.
2 (12) (15)	RHR (LPCI) Pump Discharge Pressure Interlock	50 ± 10 psig	4 channels	Defers ADS actuation pending confirmation of Low Pressure Core Cooling system operation (LPCI Pump running interlock).
2 (12) (15)	Core Spray Pump Discharge Pressure Interlock	185 ± 10 psig	4 channels	Defers ADS actuation pending confirmation of Low Pressure Core Cooling system operation (Core Spray Pump running interlock).

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (8) (16)	RHR (LPCI) Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8) (16)	Core Spray Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8) (16)	ADS Trip System bus power monitor	NA	3 Inst. Channels	Monitors availability of power to logic systems.
1 (8) (16)	HPCI Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8) (16)	RCIC Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (8) (16)	Core Spray Sparger to Reactor Pressure Vessel d/p	1 (plus or minus 1.5) psid	2 Inst. Channels	Alarm to detect core spray sparger pipe break.
2 (10) (15)	Condensate Storage Tank Low Level	Greater than or equal to 5' above tank bottom	2 Inst. Channels	Provides interlock to HPCI pump suction valves.
2 (10) (15)	Suppression Chamber High Level	Less than or equal to 5" above torus midpoint	2 Inst. Channels	Transfers HPCI pump suction to suppression chamber.
2 (10) (15)	Condensate Storage Tank Low Level	Greater than or equal to 5' above tank bottom	2 Inst. Channels	Transfers RCIC pump suction to suppression chamber.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (13) (15)	RCIC Turbine High Flow	$\leq$ 450" H_2O (2)	2 Inst. Channels	
1 (13) (15)	RCIC Turbine High Flow Time Delay	3 ± 1 seconds	2 Inst. Channels	
2 (13) (15)	RCIC Turbine Compartment Wall	$\leq$ 200 deg. F (2)	4 Inst.)) 16 Inst.	
6 (13) (15)	RCIC Steam Line Area Temp.	$\leq$ 200 deg. F (2)	) 12 Inst.)	
2 (13) (15)	RCIC Steam Line Low Pressure	100 〉 p 〉 50 psig (2)	4 Inst.	
1 (13) (15)	HPCI Turbine Steam Line High Flow	$\leq$ 225" H_2O (3)	2 Inst. Channels	
1 (13) (15)	HPCI Turbine High Flow Time Delay	3 ± 1 seconds	2 Inst. Channels	

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Inst. Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
4 (5) (13) (15)	HPCI Steam Line Low Pressure	100 ⟩p ⟩50 psig (3)	4 Inst.	
2 (13) (15)	HPCI Turbine Compartment Temperature	≤200 deg. F (3)	4 Inst.)))	
4 (13) (15)	HPCI Steam Line Area Temperature	≤200 deg. F (3)	8 Inst.) 16 Inst.)	
2 (13) (15)	HPCI/RHR Valve Station Area Temperature	≤200 deg. F (3)	4 Inst.))	
1 (1)	LPCI Cross-Connect Position	NA	1 Inst.	Initiates annunciation when valve is not closed.
1 per 4 kV bus (1)	4 kV Emergency Bus Undervoltage Relay (HGA)	25% (±5%) of Rated Voltage		1. Trips all loaded breakers. 2. Fast transfer permissive. 3. Dead bus start of diesel.
1 per 4 kV bus (1)	4 kV Emergency Bus Sequential Loading Relay (SV)	95% (+0%, -10%) of Rated Voltage		Permits sequential starting of vital loads.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 per 4 kV bus (1)	Emergency Transformer Undervoltage (IAV) (Inverse time-voltage)	60% (±5%) of rated voltage. Test at zero volts in 1.8 seconds (±10%).		1. Trips emergency transfer feed to 4kV emergency bus. 2. Fast transfer permissive.
2 per 4 kV bus (1)	Degraded voltage (27N) ("non-LOCA" relay)	98% of rated voltage ±0.3% of setting (4077 volts ± 12 volts) 0.9 - 1.1 second internal time delay 60 second ± 5% (±3 sec.) time delay		1. Trips emergency transformer feed to 4kV emergency bus. 2. Fast transfer permissive.
2 per 4 kV bus (1)	Degraded voltage (27N) ("LOCA" relay)	89% of rated voltage ±0.3% of setting (3702 volts ± 11 volts) 0.9 - 1.1 second internal time delay 9 second ± 7%(±0.6 sec.) time delay		1. Trips emergency transformer feed to 4kV emergency bus. 2. Fast transfer permissive. 3. Safety injection signal required.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 per 4 kV bus (1)	Emergency Transformer Degraded voltage (Inverse time - voltage). (CV-6)	87% (±5%) of Rated Voltage. Tests at 2940 volts in 30 seconds (±10%)		1. Trips emergency transformer feed to 4kV emergency bus. 2. Fast transfer permissive.

NOTES FOR TABLE 3.2.B

1. With one or more required channel(s) inoperable in one or more Trip Functions, place channel in trip within one hour or the reactor shall be placed in the Cold Shutdown Condition within 24 hours.

2. Close isolation valves in RCIC subsystem.

3. Close isolation valves in HPCI subsystem.

4. Instrument setpoint corresponds to 378 inches above vessel zero.

5. HPCI has only one trip system for these sensors.

6. Deleted

7. The failure of a 480V Emergency Load Center timer could result in the failure of a 480V Emergency Load Center to re-energize following the loss of one or both offsite sources. Therefore, Technical Specification 3.9.B.7 will apply when a 480V Emergency Load Center timer is not Operable.

8. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, place inoperable channel in trip; and,
   2. Within one hour from discovery of loss of feature initiation capability in both trip systems for feature(s) supported by this trip function, declare supported feature(s) inoperable (See Footnote (1)).
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated supported features inoperable immediately.

9. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, restore channel to Operable status; and,
   2. Within one hour from discovery of loss of initiation capability in both trip systems for feature(s) supported by this trip function, declare supported feature(s) inoperable(See Footnote (2)).
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated supported features inoperable immediately.

10. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, place inoperable channel in trip or align affected (HPCI or RCIC) pump suction to suppression pool; and,
   2. Within one hour of discovery of loss of initiation capability, declare affected system (HPCI or RCIC) inoperable If associated pump suction is not aligned to suppression pool.
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated system inoperable immediately.

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(1) Only applicable to the High Drywell Pressure and Reactor Low-Low-Low Water Level functions.

(2) Not applicable to Reactor High Water level Function.

11. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS valves inoperable; and,
    2. Within 96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable, place inoperable channel in trip; and,
    3. Within 8 days from discovery of inoperable channel if both HPCI and RCIC are Operable, place inoperable channel in trip.
    4. If required actions and associated completion times of Action 1 or 2 or 3 are not met, declare ADS inoperable immediately.

12. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS valves inoperable; and,
    2. Within 96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable, restore channel to Operable status; and,
    3. Within 8 days from discovery of inoperable channel if both HPCI and RCIC are Operable, restore channel to Operable status.
    4. If required actions and associated completion times of Action 1 or 2 or 3 are not met, declare ADS inoperable immediately.

13. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place channel in trip; and,
    2. Within one hour from discovery of one or more automatic functions with primary containment isolation capability not maintained, restore primary isolation capability.
    3. If required actions and associated completion times of Action 1 or 2 are not met, isolate affected penetration flow path(s) within one hour.

14. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place inoperable channel in trip; and,
    2. Within one hour from discovery of loss of system (HPCI or RCIC) initiation capability, declare affected system (HPCI or RCIC) inoperable.
    3. If required actions and associated completion times of Action 1 or 2 are not met, declare affected system (HPCI or RCIC) inoperable immediately.

15. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of required Actions may be delayed for up to 6 hours provided associated Trip Function maintains trip capability.

16. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of required Actions may be delayed for up to 6 hours.

TABLE 3.2.C
INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

Minimum No. of Operable Instrument Channels Per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Action
4 (2)	APRM Upscale (Flow Biased)	(0.66W+59%-0.66ΔW) (Clamp at 108% max)	6 Inst. Channels	(10) (14)
4	APRM Upscale (Startup Mode)	≤ 12%	6 Inst. Channels	(10) (14)
4	APRM Downscale	≥ 2.5 indicated on scale	6 Inst. Channels	(10) (14)
1 (7) (11) (13)	Rod Block Monitor (Power Biased)	(RTP ≥85%), S_{RB} ≤HTSP (65% ≤RTP <85%), S_{RB} ≤ITSP (30% ≤RTP <65%), S_{RB} ≤LTSP	2 Inst. Channels	(12) (14)
1 (7) (11) (13)	Rod Block Monitor Downscale	≥ DTSP	2 Inst. Channels	(12) (14)
6	IRM Downscale (3)	≥ 2.5 indicated on scale	8 Inst. Channels	(10)
6	IRM Detector not in Startup Position	(8)	8 Inst. Channels	(10)
6	IRM Upscale	≤ 108 indicated on scale	8 Inst. Channels	(10)
2 (5)	SRM Detector not in Startup Position	(4)	4 Inst. Channels	(1)
2 (5) (6)	SRM Upscale	≤ 10^5 counts/sec.	4 Inst. Channels	(1)
1 (15)	Scram Discharge Instrument Volume High Level	≤ 25 gallons	1 Inst. Channel	(9)

NOTES FOR TABLE 3.2.C

1. If the first column cannot be met for one of the two trip systems, this condition may exist for up to seven days provided that during that time the operable system is functionally tested immediately and daily thereafter; if this condition lasts longer than seven days, the system shall be tripped. If the first column cannot be met for both trip systems, the systems shall be tripped.

2. W = Loop Recirculation flow in percent of design.

   Trip level setting is in percent of rated power (3293 MWt).

   ΔW is the difference between two loop and single loop effective recirculation drive flow rate at the same core flow. During single loop operation, the reduction in trip setting is accomplished by correcting the flow input of the flow biased rod block to preserve the original (two loop) relationship between the rod block setpoint and recirculation drive flow. $\Delta W = 0$ for two loop operation.

3. IRM downscale is bypassed when it is on its lowest range.

4. This function is bypassed when the count rate is $\geq$ 100 cps.

5. One of the four SRM inputs may be bypassed.

6. This SRM function is bypassed when the IRM range switches are on range 8 or above.

7. The trip is bypassed when the reactor power is $\leq$ 30%.

8. This function is bypassed when the mode switch is placed in Run.

NOTES FOR TABLE 3.2.C (Cont.)

9. If the number of operable channels is less than required by the minimum operable channels per trip function requirement, place the inoperable channel in the tripped condition within twelve hours.

10. For the Startup (for IRM rod block) and the Run (for APRM rod block) positions of the Reactor Mode Selector Switch and with the number of OPERABLE channels:

    a. One less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 7 days or place the inoperable channel in the tripped condition within the next hour.

    b. Two or more less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within one hour.

11. The values of HTSP, ITSP, LTSP and DTSP are specified in the CORE OPERATING LIMITS REPORT.

12. With one or more required Rod Block Monitor channel(s) inoperable:

    a. With one rod block monitor (RBM) channel inoperable, restore RBM channel to Operable status within 24 hours.
    b. If the required action and associated completion time in Action a above are not met, place one RBM channel in trip within 1 hour.
    c. With 2 RBM channels inoperable, place one RBM channel in trip within 1 hour.

13. Section 3.3.B.5 is Applicable during operation with a limiting control rod pattern.

14. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated function maintains control rod block capability.

15. The scram discharge instrument volume has only one trip system.

TABLE 3.2.D
RADIATION MONITORING SYSTEMS THAT INITIATE AND/OR ISOLATE SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Action (1)
2	Refuel Area Exhaust Monitor	Upscale, <16 mr/hr	4 Inst. Channels	A or B
2	Reactor Building Exhaust Monitors	Upscale, <16 mr/hr	4 Inst. Channels	B
1	Main Stack Monitor	Upscale, $\leq 10^6$ cps	2 Inst. Channels	C
2 (2)	Main Control Room	Upscale, <400 cpm	4 Inst. Channels	D

Notes for Table 3.2.D

1. Action

   A. Cease operation of the refueling equipment.

   B. Isolate secondary containment and start the standby gas treatment system.

   C. Cease purging of primary containment, and close vent and purge valves greater than 2 inches in diameter.

   D. As described in LCO 3.11.A.5.

2. The trip function is required to be operable whenever secondary containment is required on either unit.

TABLE 3.2.G

INSTRUMENTATION THAT INITIATES ALTERNATE ROD INSERTION AND RECIRCULATION PUMP TRIP

Minimum No. of Operable Instrument Channels Per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design per Trip System
2	Reactor High Pressure	$\leq$ 1120 psig	2
2	Reactor Low-Low Water Level	$\geq$ -48 in. indicated level	2

TABLE 4.2.A

MINIMUM TEST AND CALIBRATION FREQUENCY FOR PCIS

Instrument Channel (5)	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Reactor High Pressure (Shutdown Cooling Permissive)	Once/ 3 months	Once/3 months	None
2) Reactor Low-Low-Low Water Level (7)	Once/3 months (3)	Once/operating cycle	Once/day
3) Main Steam High Temp.	Once/3 months (3)	Once/operating cycle	Once/day
4) Main Steam High Flow (7)	Once/3 months (3)	Once/operating cycle	Once/day
5) Main Steam Low Pressure	Once/3 months	Once/3 months	None
6) Reactor Water Cleanup High Flow	Once/3 months	Once/3 months	Once/day
7) Reactor Water Cleanup High Temp.	Once/3 months	Once/3 months	None
8) Reactor Pressure (Feedwater Flush Permissive)	Once/3 months (3)	Once/operating cycle	Once/day

Logic System Functional Test (4) (6)	Frequency
1) Main Steam Line Isolation Vvs. Main Steam Line Drain Vvs. Reactor Water Sample Vvs.	Once/operating cycle
2) RHR - Isolation Vv. Control Shutdown Cooling Vvs. Head Spray	Once/operating cycle
3) Reactor Water Cleanup Isolation	Once/operating cycle
4) Drywell Isolation Vvs. TIP Withdrawal Atmospheric Control Vvs. Sump Drain Valves	Once/operating cycle
5) Standby Gas Treatment System Reactor Building Isolation	Once/operating cycle

TABLE 4.2.B
MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

Instrument Channel		Instrument Functional Test	Calibration Frequency	Instrument Check
1)	Reactor Water Level (7)	Once/3 months (3)	Once/operating cycle	Once/day
2)	Drywell Pressure (7)	Once/3 months (3)	Once/operating cycle	Once/day
3)	Reactor Pressure (7)	Once/3 months (3)	Once/operating cycle	Once/day
4)	Reactor Pressure - PCIS/LPCI Interlock	Once/3 months	Once/3 months	None
5)	Auto Sequencing Timers	NA	Once/operating cycle	None
6)	ADS - LPCI or CS Pump Disch. Pressure Interlocks	Once/3 months	Once/3 months	None
7)	Trip System Bus Power Monitors	Once/3 months	NA	None
8)	Core Spray Sparger d/p	Once/3 months	Once/6 months	Once/day
9)	Steam Line High Flow (HPCI & RCIC)	Once/3 months	Once/3 months	None
10)	Steam Line High Flow Timers (HPCI and RCIC)	NA	Once/operating cycle	None
11)	Steam Line High Temp. (HPCI & RCIC)	Once/3 months (3)	Once/operating cycle	Once/day
12)	Safeguards Area High Temp.	Once/3 months	Once/3 months	None

TABLE 4.2.B (continued)
MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
13) HPCI and RCIC Steam Line Low Pressure	Once/3 months	Once/3 months	None
14) HPCI Suction Source Levels	Once/3 months	Once/3 months	None
15) 4KV Emergency Power System Voltage Relays (HGA,SV)	Once/operating cycle	Once/5 years	None
16) ADS Relief Valves Bellows Pressure Switches	Once/operating cycle	Once/operating cycle	None
17) LPCI/Cross Connect Valve Position	Once/refueling cycle	N/A	N/A
18) Condensate Storage Tank Level (RCIC) (7)	Once/3 months	Once/operating cycle	Once/day
19) 4KV Emergency Power Source Degraded Voltage Relays (IAV,CV-6,ITE)	Once/month	Once/eighteen months	None

TABLE 4.2.C

Unit 2

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CONTROL ROD BLOCKS ACTUATION

Instrument Channel	Instrument Functional Test	Calibration	Instrument Check
1) APRM - Downscale	Once/3 months (3)	Once/3 months	Once/day
2) APRM - Upscale	Once/3 months (3)	Once/3 months	Once/day
3) IRM - Upscale	(2) (3)	Startup or Control Shutdown	(2)
4) IRM - Downscale	(2) (3)	Startup or Control Shutdown	(2)
5) RBM - Upscale	Once/3 months (3)	Once/6 months	Once/day
6) RBM - Downscale	Once/3 months (3)	Once/6 months	Once/day
7) SRM - Upscale	(2) (3)	Startup or Control Shutdown	(2)
8) SRM - Detector Not In Startup Position	(2) (3)	N/A	(2)
9) IRM - Detector Not In Startup Position	(2) (3)	N/A	(2)
10) Scram Discharge Instrument Volume - High Level	Quarterly	Once/Operating Cycle	N/A

<u>Logic System Functional Test (4) (6)</u>	<u>Frequency</u>
1) System Logic Check	Once/Operating Cycle

TABLE 4.2.D
MINIMUM TEST & CALIBRATION FREQUENCY FOR RADIATION MONITORING SYSTEMS

Unit 2

Instrument Channels	Instrument Functional Test	Calibration	Instrument Check (2)
1) Refuel Area Exhaust Monitors - Upscale	Once/3 months	Once/3 months	Once/day
2) Reactor Building Area	Once/3 months	Once/3 months	Once/day
3) Main Stack Monitor	Once/3 months	Once/12 months as described in 4.8.C.4.a	Once/day
4) Main Control Room	Once/3 months	Once/18 months as described in 4.11.A.5	Once/day

Logic System Functional Test (4) (6)	Frequency
1) Reactor Building Isolation	Once/Operating Cycle
2) Standby Gas Treatment System Actuation	Once/Operating Cycle

TABLE 4.2.E

Unit 2

MINIMUM TEST & CALIBRATION FREQUENCY FOR DRYWELL LEAK DETECTION

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Equipment Drain Sump Flow Integrator	Once/month	Once/3 months	Once/day
2) Floor Drain Sump Flow Integrator	Once/month	Once/3 months	Once/day
3) Drywell Atmosphere Radioactivity Monitor	Once/month	Once/3 months	Once/day

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

1. Deleted.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

TABLE 4.2.G

Unit 2

MINIMUM TEST AND CALIBRATION FREQUENCY FOR ALTERNATE ROD INSERTION AND RECIRCULATION PUMP TRIP

Instrument Channel	Instrument Check (1)	Instrument Functional Test (1)	Calibration Frequency (1)
Reactor High Pressure	Once/day	Once/3 months	Once/Operating Cycle
Reactor Low-Low Water Level	Once/day	Once/3 months	Once/Operating Cycle

Logic System Functional Test (2)	Frequency
Alternate Rod Insertion/Recirculation Pump Trip	Once/3 months
Alternate Rod Insertion/Recirculation Pump Trip including air venting and breaker trip (3)	Once/Operating Cycle

Notes:

1. In accordance with Table 4.2.B. These instrument channels are the same ones used by the Core and Containment Cooling Systems.

2. The recirculation pumps need not be tripped.

3. This test, performed while shutdown, will include venting of the scram air header and tripping of the recirculation pump breakers. The test will also verify operability of the manual actuation logic.

3.2 BASES

In addition to reactor protection instrumentation which initiates a reactor scram, protective instrumentation has been provided which initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the core cooling systems, control rod block and standby gas treatment systems. The objectives of the Specifications are (i) to assure the effectiveness of the protective instrumentation when required even during periods when portions of such systems are out-of-service for maintenance, and (ii) to prescribe the trip settings required to assure adequate performance.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for Isolation Instrumentation have been determined in accordance with General Electric reports NEDC-30851P-A, Supplement 2, "Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," and NEDC-31677P-A,"Technical Specification Improvement Analyses for BWR Isolation Actuation Instrumentation." The AOT is 12 hours for Table 3.2.A Items 1, 4, and 5 because these items have instrumentation that is common to the RPS. Other Table 3.2.A Items have an AOT of 24 hours.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for ECCS Actuation Instrumentation have been determined in accordance with General Electric reports NEDC-30936P-A,"BWR Owners' Group Technical Specification Improvement Methodology with Demonstration for BWR ECCS Actuation Instrumentation," Parts 1 and 2, and RE-022,"Technical Specification Improvement Analysis for the Emergency Core Cooling System Actuation Instrumentation for Peach Bottom Atomic Power Station, Units 2 and 3."

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for miscellaneous instruments have been determined in accordance with General Electric report GENE-770-06-1,"Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," and the associated NRC Safety Evaluation Report dated July 21, 1992.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for RCIC instrumentation have been determined in accordance with

3.2 BASES (continued)

General Electric report GENE-770-06-2,"Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," and the associated NRC Safety Evaluation Report dated September 13, 1991.

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2.A which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary system isolation is connected in a dual bus arrangement.

The low water level instrumentation set to trip at zero inches indicated level (538 inches above vessel zero) closes all isolation valves except those in Groups 1, 4 and 5. Details of valve grouping and required closing times are given in Specification 3.7. For valves which isolate at this level, this trip setting is adequate to prevent the core from being uncovered in the case of a break in the largest line assuming a 60 second valve closing time. Required closing times are less than this.

The low-low reactor water level instrumentation is set to trip when reactor water level is minus 48 inches indicated level (490 inches above vessel zero). This trip initiates HPCI, RCIC, Alternate Rod Insertion and trips the recirculation pumps. The low-low-low reactor water level instrumentation is set to trip when the reactor water level is minus 160 inches indicated level (378 inches above vessel zero). This trip closes Main Steam Line Isolation Valves, Main Steam Drain Valves and Recirc Sample Valves (Group 1), activates the remainder of the CSCS subsystem, and starts

3.2 BASES (Cont'd)

Pressure instrumentation is provided to close the main steam isolation valves in RUN Mode when the main steam line pressure drops below 850 psig. The Reactor Pressure Vessel thermal transient due to an inadvertent opening of the turbine bypass valves when not in the RUN Mode is less severe than the loss of feedwater analyzed in section 14.5 of the FSAR; therefore, closure of the Main Steam isolation valves for thermal transient protection when not in RUN Mode is not required.

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI steam piping. Tripping of this instrumentation results in actuation of HPCI isolation valves. Tripping logic for the high flow is 1 out of 2 logic. Temperature is monitored at four (4) locations with four (4) temperature sensors at each location. Two (2) sensors at each location are powered by "A" DC control bus and two (2) by "B" DC control bus. Each pair of sensors, e.g., "A" or "B" at each location are physically separated and the tripping of either "A" or "B" bus sensor will actuate HPCI isolation valves. The trip settings of ≤ 300% of design flow for high flow and 200 degrees F for high temperature are such that core uncovery is prevented and fission product release is within limits.

The RCIC high flow and temperature instrumentation are arranged the same as that for the HPCI. The trip setting of ≤ 300% for high flow and 200 degrees F for temperature are based on the same criteria as the HPCI.

The Reactor Water Cleanup System high flow instrumentation is arranged similar to that for the HPCI System. The trip settings are such that core uncovery is prevented and fission product release is maintained within limits. The high temperature instrumentation downstream of the non-regenerative heat exchanger is provided to protect the ion exchange resin in the demineralizer from damage due to high temperature. Such damage could impair the resins' ability to remove impurities from the primary coolant and possibly result in the release of previously captured impurities back into the coolant in large concentrations.

The instrumentation which initiates CSCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion, the Specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed. An exception to this is when logic functional testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to the fuel cladding integrity safety limit. The trip logic for this function is 1 out of n: e.g., any trip on one of 6 APRM's, 8 IRM's, or 4 SRM's will result in a rod block.

The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met.

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.

4.2 BASES (continued)

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4.2 BASES (continued)

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4.2 BASES (continued)

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LIMITING CONDITIONS FOR OPERATION

3.1 Reactor Protection System (RPS)

A. The RPS instrumentation for each trip function in Table 3.1.1 shall be Operable; and, there shall be two Operable or tripped trip systems for each Trip Function.

The designed system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 50 milliseconds.

Applicability:

According to Table 3.1.1.

Conditions and Required Actions: (1)(2)

1. With one or more channel(s) required by Table 3.1.1 inoperable in one or more trip functions, place the inoperable channel or associated trip system in trip within 12 hours.

2. With one or more trip functions with one or more channels required by Table 3.1.1 inoperable in both trip systems, place channel in one trip system in trip or place one trip system in trip within 6 hours.

3. With one or more automatic trip functions or two or more manual trip functions (Mode Switch in Shutdown, Manual Scram and RPS Channel Test Switches) with RPS trip capability not maintained, restore RPS trip capability within one hour.

4. If the required actions and associated completion time of Action 1 or 2 or 3 are not met, take the action required by Table 3.1.1 for the Trip Function.

SURVEILLANCE REQUIREMENTS

4.1 Reactor Protection System

A. Each RPS instrument channel shall be demonstrated Operable by performance of a channel functional test and channel calibration at the Frequencies shown in Tables 4.1.1 and 4.1.2, respectively.

Response time measurements (from the opening of the sensor contact up to and including the opening of the trip actuator contacts) are not part of the normal instrument test. The RPS response time of each reactor trip function shall be demonstrated to be within its limits once per operating cycle.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated trip function maintains RPS trip capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.1.1 for that trip function shall be taken immediately.

LIMITING CONDITIONS FOR OPERATION

3.1 Reactor Protection System (continued)

B. N/A

C. N/A

D. Reactor Protection System Power Supply

D.1 Reactor Protection System Power Supply:

One trip train* per RPS MG set may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the alternate source or de-energized within 30 minutes.

D.2 One trip train* of the RPS alternate power supply may be in the bypassed or inoperative condition for a period of 72 hours. If this condition cannot be satisfied, or if both trip trains are inoperative, the RPS bus shall be transferred to the RPS MG set or de-energized within 30 minutes.

SURVEILLANCE REQUIREMENTS

4.1 Reactor Protection System (continued)

B. Deleted

C. Deleted

D. Reactor Protection System Power Supply

D.1 The following RPS power supply (MG set) protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Underfrequency Time Delay	6 sec ± 1 sec

D.2 The following RPS alternate power supply protective devices shall be functionally tested at least once every six months and calibrated once each refueling outage.

Device	Acceptable Setting
Undervoltage	113 ± 2 Volts
Overvoltage	131 ± 2 Volts
Underfrequency	57 Hz ± .2 Hz
Undervoltage Time Delay	Max. 4 secs.

* A trip train consists of one breaker, one undervoltage relay, one overvoltage relay, one underfrequency relay, one time delay relay (MG set only), and the associated logic.

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Table 3.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Item	Minimum No. of Operable Instrument Channels per Trip System	Trip Function	Trip Level Setting	Modes in which Function Must Be Operable: Refuel (7)	Startup	Run	Number of Instrument Channels Provided by Design	Action (1)
1	1	Mode Switch In Shutdown		x	x	x	1 Mode Switch (4 Sections)	A
2	1	Manual Scram		x	x	x	2 Instrument Channels	A
3	3	IRM High Flux	≤120/125 of Full Scale	x	x	(5)	8 Instrument Channels	A
4	3	IRM Inoperative		x	x	(5)	8 Instrument Channels	A
5	2	APRM High Flux	(0.66W+71%-0.66ΔW) (Clamp @ 120%) (12) (13)			x	6 Instrument Channels	A or B
6	2	APRM Inoperative	(11)	x	x	x	6 Instrument Channels	A or B
7	2	APRM Downscale	≥2.5 Indicated on Scale			(10)	6 Instrument Channels	A or B
8	2	APRM High Flux in Startup	≤15% Power	x	x		6 Instrument Channels	A
9	2	High Reactor Pressure	≤1055 psig	x (9)	x	x	4 Instrument Channels	A
10	2	High Drywell Pressure	≤2 psig	x (8)	x (8)	x	4 Instrument Channels	A
11	2	Reactor Low Water Level	≥0 in. Indicated Level	x	x	x	4 Instrument Channels	A

Table 3.1.1 (continued)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Item	Minimum No. of Operable Instrument Channels per Trip System	Trip Function	Trip Level Setting	Modes in which Function Must Be Operable: Refuel (7)	Startup	Run	Number of Instrument Channels Provided by Design	Action (1)
12	2	High Water Level in Scram Discharge Volume	≤ 50 Gallons	X (2)	X	X	4 Instrument Channels	A
13	2	Turbine Condenser Low Vacuum	≥ 23 IN. Hg. Vacuum			X	4 Instrument Channels	A or C
14	2	Main Steam Line High Radiation	≤ 15 X Normal Full Power Background	X	X	X	4 Instrument Channels	A
15	8	Main Steam Line Isolation Valve Closure	≤ 10% Valve Closure			X (6)	16 Instrument Channels	A
16	2	Turbine Control Valve Fast Closure	$500 < P < 850$ psig control Oil Pressure Between Fast Closure Solenoid and Disc Dump Valve			X (4)	4 Instrument Channels	A or D
17	4	Turbine Stop Valve Closure	≤ 10% Valve Closure			X (4)	8 Instrument Channels	A or D
18	2	RPS Channel Test Switches		X	X	X	4 Instrument Channels	A

NOTES FOR TABLE 3.1.1

1. If the required actions and associated completion time of Specification 3.1.A, Actions 1 or 2 or 3 are not met, take the action listed below for the affected trip function as required by Table 3.1.1.

   A. Initiate insertion of operable rods and complete insertion of all operable rods within 12 hours.

   B. Reduce power level to IRM range and place mode switch in the start up position within 6 hours.

   C. Reduce turbine load and close main steam line isolation valves within 6 hours.

   D. Reduce power to less than 30% rated within 4 hours.

2. Permissible to bypass, in refuel and shutdown positions of the reactor mode switch.

3. Deleted.

4. Bypassed when reactor thermal power is less than 30% of rated as indicated by turbine first stage pressure.

5. IRM's are bypassed when APRM's are onscale and the reactor mode switch is in the run position.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212 degrees F, only the following trip functions need to be operable:

   A. Mode switch in shutdown

   B. Manual scram

   C. High flux IRM

   D. Scram discharge instrument volume high level

8. Not required to be operable when primary containment integrity is not required.

9. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

TABLE 4.1.1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each refueling outage.
Manual Scram	A	Trip Channel and Alarm	Every 3 months.
RPS Channel Test Switch	A	Trip Channel and Alarm	Once/week or after channel maintenance.
IRM			
High Flux	C	Trip Channel and Alarm (4)	One per week during refueling or startup and before each startup.
Inoperative	C	Trip Channel and Alarm (4)	One per week during refueling or startup and before each startup.
APRM			
High Flux	B1	Trip Output Relays (4)	Once/3 months
Inoperative	B1	Trip Output Relays (4)	Once/3 months
Downscale	B1	Trip Output Relays (4)	Once/3 months
Flow Bias	B1	Calibrate Flow Bias Signal (4)	Once/month
High Flux in Startup or Refuel	C	Trip Output Relays (4)	One per week during refueling or startup and before each startup.
High Reactor Pressure (6)	B2	Trip Channel and Alarm (4)	Once/3 months
High Drywell Pressure (6)	B2	Trip Channel and Alarm (4)	Once/3 months
Reactor Low Water Level (5)(6)	B2	Trip Channel and Alarm (4)	Once/3 months

TABLE 4.1.1 (Continued)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TESTS
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

	Group (2)	Functional Test	Minimum Frequency (3)
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel and Alarm	Once/3 months
Turbine Condenser Low Vacuum (6)	B2	Trip Channel and Alarm (4)	Once/3 months
Main Steam Line High Radiation	B1	Trip Channel and Alarm (4)	Once/3 months
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Once/3 months
Turbine Control Valve EHC Oil Pressure	A	Trip Channel and Alarm	Once/3 months
Turbine First Stage Pressure Permissive	A	Trip Channel and Alarm	Once/3 months
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Once/3 months

NOTES FOR TABLE 4.1.1

1. Deleted.

2. A description of each of the groups is included in the Bases of this Specification.

3. Functional tests are not required on the part of the system that is not required to be operable or are tripped.

   If tests are missed on parts not required to be operable or are tripped, then they shall be performed prior to returning the system to an operable status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the measurement channels.

5. The water level in the reactor vessel will be perturbed and the corresponding level indicator changes will be monitored. This perturbation test will be performed every month after completion of the functional test program.

6. These channels consist of analog transmitters, indicators and electronic trip units. Instrument checks shall be performed once per day.

TABLE 4.1.2

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration	Minimum Frequency (2)
IRM High Flux	C	Comparison to APRM on Controlled Shutdown	Maximum frequency once per week.
APRM High Flux			
Output Signal	B1	Heat Balance	Twice per week.
Flow Bias Signal	B1	With Standard Pressure Source	Every eighteen months.
LPRM Signal	B1	TIP System Traverse	Every 6 weeks.
High Reactor Pressure	B2	Standard Pressure Source	Once per operating cycle.
High Drywell Pressure	B2	Standard Pressure Source	Once per operating cycle.
Reactor Low Water Level	B2	Pressure Standard	Once per operating cycle.
High Water Level in Scram Discharge Instrument Volume	A	Water Column	Every refueling outage.
Turbine Condenser Low Vacuum	B2	Standard Vacuum Source	Once per operating cycle.
Main Steam Line Isolation Valve Closure	A	Note (5)	Note (5)
Main Steam Line High Radiation	B1	Standard Current Source (3)	Every 3 months.
Turbine First State Pressure Permissive	A	Standard Pressure Source	Every 6 months.

TABLE 4.1.2 (Cont'd.)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS

Instrument Channel	Group (1)	Calibration	Minimum Frequency (2)
Turbine Control Valve Fast Closure Oil Pressure Trip	A	Standard Pressure Source	Once per operating cycle.
Turbine Stop Valve Closure	A	Note (5)	Note (5)

NOTES FOR TABLE 4.1.2

1. A description of these groups is included in the bases of this Specification.

2. Calibration test is not required on the part of the system that are not required to be operable or are tripped but is required prior to return to service.

3. The current source provides an instrument channel alignment. Calibration using a radiation source shall be made each refueling outage.

4. Deleted.

5. Physical inspection and actuation of these position switches will be performed during the refueling outages.

BASES

The reactor protection system automatically initiates a reactor scram to:

1. Preserve the integrity of the fuel cladding.

2. Preserve the integrity of the reactor coolant system.

3. Minimize the energy which must be absorbed following a loss of coolant accident, and prevent inadvertent criticality.

When there is not fuel in the reactor, the scram serves no function; therefore, the reactor protection system is not required to be operable.

Allowed out of service times for repair and surveillance testing for Reactor Protection System Instrumentation have been determined in accordance with General Electric report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," General Electric Company, March 1988.

The reactor protection system is of the dual channel type (Reference subsection 7.2 FSAR). The system is made up of two independent trip systems, each having two subchannels of tripping devices. Each subchannel has an input from at least one instrument channel which monitors a critical parameter.

The outputs of the subchannels are combined in a 1 out of 2 logic; i.e., an input signal on either one or both the subchannels will cause a trip system trip. The outputs of the trip systems are arranged so that a trip on both systems is required to produce a reactor scram.

This system meets the intent of IEEE - 279 for Nuclear Power Plant Protection Systems. The system has a reliability greater than that of a 2 out of 3 system and somewhat less than that of a 1 out of 2 system.

With the exception of the Average Power Range Monitor (APRM) channels, the Intermediate Range Monitor (IRM) channels, the Main Steam Isolation Valve closure and the Turbine stop valve closure, each subchannel has one instrument channel. When the minimum condition for operation on the number of operable instrument channels per untripped protection trip system is met or if it cannot be met and the affected protection trip system is placed in a tripped condition, the effectiveness of the protection system is preserved

Three APRM instrument channels are provided for each protection trip system. APRM's A and E operate contacts in one subchannel and APRM's C and E operate contacts in the other subchannel. APRM's B, D and F are arranged similarly in

4.1 Bases

A. Channel functional test frequencies for Reactor Protection System Instrumentation have been determined in accordance with General Electric report NEDC-30851P-A, "Technical Specification Improvement Analyses for BWR Reactor Protection System," General Electric Company, March 1988.

4.1 Bases (Con'td.)

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1 Bases (Con'td.)

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4.1 Bases (Con'td.)

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.

2. Vacuum tube or semi-conductor devices and detectors that drift or lose sensitivity.

4.1 Bases (Con'td.)

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LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation

A. Primary Containment Isolation Functions

The primary containment isolation instrumentation for each function in Table 3.2.A shall be Operable; and, there shall be two Operable or tripped trip systems for each trip function.

Applicability:

Whenever Primary Containment Integrity is required.

Conditions and Required Actions:
(1)(2)

1. With one or more channels required by Table 3.2.A inoperable, place channel in trip within 12 hours for Items 1, 4, and 5; and, place channel in trip within 24 hours for Items other than 1, 4, and 5.

2. With one or more automatic functions with primary containment isolation function not maintained, restore primary containment isolation capability within one hour.(3)

3. If the required action and associated completion time of Action 1 or 2 are not met, take the action required by Table 3.2.A for the function.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation

A. Primary Containment Isolation Functions

Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2.A.

System logic shall be functionally tested as indicated in Table 4.2.A.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Function maintains primary containment isolation capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the trip function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.2.A for that trip function shall be taken.

(3) This Action not applicable to Item 11, Reactor Cleanup System High Temperature.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

B. Core and Containment Cooling Systems - Initiation and Control

Core and containment cooling system initiation and control instrumentation for each Trip Function in Table 3.2.B shall be Operable; and, there shall be two Operable or tripped trip systems for each Trip Function except as noted in Table 3.2.B.

Applicability:

Each Trip Function listed in Table 3.2.B shall be Operable whenever the system(s) it initiates or controls are required to be Operable as specified in Section 3.5.

Conditions and Required Actions:

With one or more channel(s) required by Table 3.2.B inoperable in one or more Trip Functions, take the Action required by Table 3.2.B.

LIMITING CONDITIONS FOR OPERATION

4.2 Protective Instrumentation (Continued)

B. Core and Containment Cooling Systems - Initiation and Control

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.B.

System logic shall be functionally tested as indicated in Table 4.2.B.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

C. Control Rod Block (CRB) Actuation

The Control Rod Block Actuation instrumentation for each function in Table 3.2.C shall be Operable; and, there shall be two Operable or tripped trip systems for each function except as noted in Table 3.2.C.

Applicability: (1)

The Rod Block Monitor (RBM) shall be Operable with setpoints as required by Table 3.2.C and the Core Operating Limits Report (COLR).

The APRM, IRM and SRM Control Rod Block (CRB) functions shall be Operable whenever the Reactor Mode Switch is in the Startup or Run positions except as follows:

The SRM and IRM functions are not required when the Reactor Mode Switch is in Run.

The APRM and RBM functions are not required to be Operable when the Reactor Mode Switch is in Startup except for the APRM Upscale (Startup Mode) which is not required to be Operable when the Reactor Mode Switch is in Run.

The scram discharge instrument volume high level rod block is required to be Operable whenever the Reactor Mode Switch is in the Startup or Run positions or in the Refuel position whenever more than one control rod is withdrawn.

Conditions and Required Actions:

With one or more channel(s) required by Table 3.2.C inoperable in one or more trip functions, take the Action required by Table 3.2.C.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

C. Control Rod Block (CRB) Actuation

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.C.

System logic shall be functionally tested as indicated in Table 4.2.C.

(1) Section 3.3.B.5 is Applicable during operation with a limiting control rod pattern.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions

D.1. Reactor Building Isolation and Standby Gas Treatment System

The Reactor Building Isolation and Standby Gas Treatment System instrumentation for each trip function in Table 3.2.D shall be Operable; and, there shall be two Operable or tripped trip systems for each trip function.

Applicability:

Refuel Area Exhaust Monitors and Reactor Building Area Exhaust Monitors shall be Operable whenever the associated systems are required to be Operable.

Main Stack Monitor shall be Operable whenever the containment is purging and primary containment integrity is required.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.D inoperable in one or more trip functions, place channel in trip within 24 hours.

2. With one or more automatic Functions with containment isolation capability not maintained, restore containment isolation capability within one hour.

3. If the required actions and associated completion times of Action 1 or 2 are not met, take the Action required by Table 3.2.D

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions

D.1. Reactor Building Isolation and Standby Gas Treatment System

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

System logic shall be functionally tested as indicated in Table 4.2.D.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Trip Function maintains isolation capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Table 3.2.D for that trip Function shall be taken.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions (Continued)

D.2 Main Control Room

The limiting conditions for operation are given in Table 3.2.D.

E. Drywell Leak Detection

The limiting conditions of operation for the instrumentation that monitors drywell leak detection are given in Section 3.6.C, "Coolant Leakage".

F. Surveillance Information Readouts

The limiting conditions for the instrumentation that provides surveillance information readouts are given in Table 3.2.F.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

D. Radiation Monitoring Systems-Isolation and Initiation Functions (Continued)

D.2 Main Control Room

Instrumentation shall be functionally tested, calibrated and checked as indicated in Table 4.2.D.

E. Drywell Leak Detection

Instrumentation shall be calibrated and checked as indicated in Table 4.2.E.

F. Surveillance Information Readouts

Instrumentation shall be calibrated and checked as indicated in Table 4.2.F.

LIMITING CONDITIONS FOR OPERATION

3.2 Protective Instrumentation (Continued)

G. Alternate Rod Insertion (ARI) and Recirculation Pump Trip (RPT)

Two trip systems consisting of two channels per trip system for each instrumentation function that initiates an Alternate Rod Insertion (ARI) scram and trips the reactor recirculation pumps (RPT) in Table 3.2.G shall be Operable; and, the manual and automatic actuation logic and actuation devices of both trip systems shall be Operable.

Applicability:

Whenever the Reactor Mode Switch is in the Startup or Run positions.

Conditions and Required Actions: (1)(2)

1. With one or more channels required by Table 3.2.G inoperable, restore channel to Operable status or place channel in trip within 14 days.(3)

2. With one instrument function with trip capability not maintained, restore trip capability within 72 hours.

3. With both instrument functions or an actuation device with trip capability not maintained, restore trip capability for one function within 1 hour.

4. If the required actions and associated completion times of Action 1, 2 or 3 are not met, place the reactor in shutdown or refuel mode within 8 hours.

SURVEILLANCE REQUIREMENTS

4.2 Protective Instrumentation (Continued)

G. Alternate Rod Insertion and Recirculation Pump Trip

Each RPT and ARI instrumentation channel shall be demonstrated Operable by the performance of the Instrument Check, Instrument Functional Test, Channel Calibration and Logic System Functional Test at the Frequencies shown in Table 4.2.G.

---

(1) When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated Trip Function maintains ARI/RPT trip capability.

(2) An inoperable channel or trip system need not be placed in the tripped condition where this would cause the Trip Function to occur. In these cases, if the inoperable channel is not restored to Operable status within the required time, the Action required by Condition 4 for that trip Function shall be taken.

(3) The action of placing the channel in trip is not applicable if the inoperable channel is the result of an inoperable breaker.

Table 3.2.A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Item	Minimum No. of Operable Instrument Channels per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Action (2)
1	2 (6)	Reactor Low Water Level	≥ 0" Indicated Level (3)	4 Inst. Channels	A
2	1	Reactor High Pressure (Shutdown Cooling Isolation)	≤ 75 psig	2 Inst. Channels	D
3	2	Reactor Low-Low-Low Water Level	at or above -160" indicated level (4)	4 Inst. Channels	A
4	2 (6)	High Drywell Pressure	≤ 2 psig	4 Inst. Channels	A
5	2	High Radiation Main Steam Line Tunnel	≤ 15 X Normal Rated Full Power Background (8)	4 Inst. Channels	B
6	2	Low Pressure Main Steam Line	≥ 850 psig (7)	4 Inst. Channels	B
7	2 (5)	High Flow Main Steam Line	≤ 140% of Rated Steam Flow	4 Inst. Channels	B
8	2	Main Steam Line Tunnel Exhaust Duct High Temperature	≤ 200 Deg. F (9)	4 Inst. Channels	B

Table 3.2.A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Item	Minimum No. of Operable Instrument Channels per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Action (2)
9	2	Main Steam Line Leak Detection High Temperature	≤ 200 Deg. F	4 Inst. Channels	B
10	1	Reactor Cleanup System High Flow	≤ 300% of Rated Flow	2 Inst. Channels	C
11	1	Reactor Cleanup System High Temperature	≤ 200 Deg. F	1 Inst. Channels	E
12	2	Reactor Pressure (Feedwater Flush System Interlock)	≤ 600 psig	4 Inst. Channels	F

NOTES FOR TABLE 3.2.A

1. Deleted

2. If the required actions and associated completion time of Specification 3.2.A, Actions 1 or 2 are not met, take the action listed below for the affected Trip Function as required by Table 3.2.A.

   A. Initiate an orderly shutdown and have the reactor in Cold Shutdown Condition in 24 hours.

   B. Initiate an orderly load reduction and have Main Steam Lines isolated within 12 hours.

   C. Isolate Reactor Water Cleanup System within 1 hour.

   D. Isolate Shutdown Cooling within 1 hour.

   E. Isolate Reactor Water Cleanup Filter Demineralizers unless the following provision is satisfied. The RWCU Filter Demineralizer may be used (the isolation overridden) to route the reactor water to the main condenser or waste surge tank, with the high temperature trip inoperable for up to 48 hours, provided the water inlet temperature is monitored once per hour and confirmed to be below 180 degrees F.

   F. Isolate Feedwater Flush System within 1 hour.

3. Instrument setpoint corresponds to 538 inches above vessel zero.

4. Instrument setpoint corresponds to 378 inches above vessel zero.

5. Two required for each steam line.

6. These signals also start SBGTS and initiate secondary containment isolation.

7. Only required in Run Mode (interlocked with Mode Switch).

8. An alarm will be tripped in the control room to alert the control room operators to an increase in the main steam line tunnel radiation level.

TABLE 3.2.B
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (14) (15)	Reactor Low-Low Water Level	≥ -48 in. indicated level	4 HPCI & RCIC Inst. Channels	Initiates HPCI & RCIC.
2 (8) (11) (15)	Reactor Low-Low-Low Water Level	≥ -160 in. indicated level (4)	4 Core Spray & RHR Instrument Channels 4 ADS Instrument Channels	1. In conjunction with Low Reactor Pressure initiates Core Spray and LPCI. 2. In conjunction with confirmatory low level, High Drywell Pressure, 120 second time delay, and LPCI or Core Spray pump interlock initiates Auto Blowdown (ADS). 3. Initiates starting of Diesel Generators.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9) (16)	Reactor High Water Level	≤+45 in. indicated level	2 Inst. Channels	Trips HPCI & RCIC turbines.
1 (8) (15)	Reactor Low Level (inside shroud)	≥+312 in. above vessel zero (2/3 core height)	2 Inst. Channels	Prevents inadvertent operation of containment spray during accident conditions.
2 (8) (15)	Containment High Pressure	1 ⟨P ⟨2 psig	4 Inst. Channels	Prevents inadvertent operation of containment spray during accident conditions.
1 (11) (15)	Confirmatory Low Level	≥+6 in. indicated level	2 Inst. Channels	ADS Permissive.
2 (8) (11) (14) (15)	High Drywell Pressure	≤2 psig	4 Inst. Channels	1. Initiates Core Spray; LPCI; HPCI. 2. Initiates starting of Diesel Generators. 3. Initiates Auto Blowdown (ADS) in conjunction with Low-Low-Low Reactor water level, 120 second time delay, and LPCI or Core Spray pump running.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9) (15)	Reactor Low Pressure	400 - 500 psig	4 Inst. Channels	Permissive for opening Core Spray and LPCI Admission valves. Coincident with high drywell pressure, starts LPCI and Core Spray pumps.
2 (9) (15)	Reactor Low Pressure	200 - 250 psig	4 Inst. Channels	Permissive for closing Recirculation Pump Discharge Valve.
1 (13) (16)	Reactor Low Pressure	$50 \leq P \leq 75$ psig	2 Inst. Channels	In conjunction with PCI signal permits closure of RHR (LPCI) injection valves.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 (9) (15)	Core Spray Pump	6 ± 1 sec.	4 timers	All pumps - loss of offsite power only.
	Start Timer	13 sec. ± 7% of setting 23 sec. ± 7% of setting	2 timers 2 timers	A & C pumps - offsite power available. B & D pumps - offsite power available.
1 per 4kV bus (7)	480V Emergency Load Center Timer	3 ± 0.5 sec.	4 timers	All timers - loss of offsite power only.
2 (9) (15)	LPCI Pump Start Timer (Four Pumps)	2 sec. ± 7% of setting 8 sec. ± 7% of setting	4 timers 4 timers	LPCI pumps A & B. LPCI pumps C & D.
1 (12) (15)	ADS Actuation Timer	$90 \leq t \leq 120$ seconds	2 timers	In conjunction with Low Reactor Water Level, High Drywell Pressure and LPCI or Core Spray Pump running interlock, initiates ADS.
2 (12) (15)	ADS Bypass Timer	$8 \leq t \leq 10$ minutes	4 timers	In conjunction with Low Reactor Water Level, bypasses high drywell pressure initiation of ADS.
2 (12) (15)	RHR (LPCI) Pump Discharge Pressure Interlock	50 ± 10 psig	4 channels	Defers ADS actuation pending confirmation of Low Pressure Core Cooling system operation (LPCI Pump running interlock).
2 (12) (15)	Core Spray Pump Discharge Pressure Interlock	185 ± 10 psig	4 channels	Defers ADS actuation pending confirmation of Low Pressure Core Cooling system operation (Core Spray Pump running interlock).

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (8) (16)	RHR (LPCI) Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8) (16)	Core Spray Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8) (16)	ADS Trip System bus power monitor	NA	3 Inst. Channels	Monitors availability of power to logic systems.
1 (8) (16)	HPCI Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.
1 (8) (16)	RCIC Trip System bus power monitor	NA	2 Inst. Channels	Monitors availability of power to logic systems.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (8) (16)	Core Spray Sparger to Reactor Pressure Vessel d/p	1 (plus or minus 1.5) psid	2 Inst. Channels	Alarm to detect core spray sparger pipe break.
2 (10) (15)	Condensate Storage Tank Low Level	Greater than or equal to 5' above tank bottom	2 Inst. Channels	Provides interlock to HPCI pump suction valves.
2 (10) (15)	Suppression Chamber High Level	Less than or equal to 5" above torus midpoint	2 Inst. Channels	Transfers HPCI pump suction to suppression chamber.
2 (10) (15)	Condensate Storage Tank Low Level	Greater than or equal to 5' above tank bottom	2 Inst. Channels	Transfers RCIC pump suction to suppression chamber.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
1 (13) (15)	RCIC Turbine High Flow	$\leq$ 450" H_2O (2)	2 Inst. Channels	
1 (13) (15)	RCIC Turbine High Flow Time Delay	3 ± 1 seconds	2 Inst. Channels	
2 (13) (15)	RCIC Turbine Compartment Wall	$\leq$ 200 deg. F (2)	4 Inst.)) 16 Inst.	
6 (13) (15)	RCIC Steam Line Area Temp.	$\leq$ 200 deg. F (2)	) 12 Inst.)	
2 (13) (15)	RCIC Steam Line Low Pressure	$100 > p > 50$ psig (2)	4 Inst.	
1 (13) (15)	HPCI Turbine Steam Line High Flow	$\leq$ 225" H_2O (3)	2 Inst. Channels	
1 (13) (15)	HPCI Turbine High Flow Time Delay	3 ± 1 seconds	2 Inst. Channels	

TABLE 3.2.B (continued)

INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Inst. Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
4 (5) (13) (15)	HPCI Steam Line Low Pressure	100 ⟩p ⟩50 psig (3)	4 Inst.	
2 (13) (15)	HPCI Turbine Compartment Temperature	≤200 deg. F (3)	4 Inst.)	
4 (13) (15)	HPCI Steam Line Area Temperature	≤200 deg. F (3)	8 Inst.) 16 Inst.	
2 (13) (15)	HPCI/RHR Valve Station Area Temperature	≤200 deg. F (3)	4 Inst.)	
1 (1)	LPCI Cross-Connect Position	NA	1 Inst.	Initiates annunciation when valve is not closed.
1 per 4 kV bus (1)	4 kV Emergency Bus Undervoltage Relay (HGA)	25% (±5%) of Rated Voltage		1. Trips all loaded breakers. 2. Fast transfer permissive. 3. Dead bus start of diesel.
1 per 4 kV bus (1)	4 kV Emergency Bus Sequential Loading Relay (SV)	95% (+0%, -10%) of Rated Voltage		Permits sequential starting of vital loads.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 per 4 kV bus (1)	Emergency Transformer Undervoltage (IAV) (Inverse time-voltage)	60% (±5%) of rated voltage. Test at zero volts in 1.8 seconds (±10%).		1. Trips emergency transfer feed to 4kV emergency bus. 2. Fast transfer permissive.
2 per 4 kV bus (1)	Degraded voltage (27N) ("non-LOCA" relay)	98% of rated voltage ±0.3% of setting (4077 volts ± 12 volts) 0.9 - 1.1 second internal time delay 60 second ± 5% (±3 sec.) time delay		1. Trips emergency transformer feed to 4kV emergency bus. 2. Fast transfer permissive.
2 per 4 kV bus (1)	Degraded voltage (27N) ("LOCA" relay)	89% of rated voltage ±0.3% of setting (3702 volts ± 11 volts) 0.9 - 1.1 second internal time delay 9 second ± 7%(±0.6 sec.) time delay		1. Trips emergency transformer feed to 4kV emergency bus. 2. Fast transfer permissive. 3. Safety injection signal required.

TABLE 3.2.B (continued)
INSTRUMENTATION THE INITIATES OR CONTROLS
THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels per Trip System (ACTION)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2 per 4 kV bus (1)	Emergency Transformer Degraded voltage (Inverse time - voltage). (CV-6)	87% (±5%) of Rated Voltage. Tests at 2940 volts in 30 seconds (±10%)		1. Trips emergency transformer feed to 4kV emergency bus. 2. Fast transfer permissive.

NOTES FOR TABLE 3.2.B

1. With one or more required channel(s) inoperable in one or more Trip Functions, place channel in trip within one hour or the reactor shall be placed in the Cold Shutdown Condition within 24 hours.

2. Close isolation valves in RCIC subsystem.

3. Close isolation valves in HPCI subsystem.

4. Instrument setpoint corresponds to 378 inches above vessel zero.

5. HPCI has only one trip system for these sensors.

6. Deleted

7. The failure of a 480V Emergency Load Center timer could result in the failure of a 480V Emergency Load Center to re-energize following the loss of one or both offsite sources. Therefore, Technical Specification 3.9.B.7 will apply when a 480V Emergency Load Center timer is not Operable.

8. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, place inoperable channel in trip; and,
   2. Within one hour from discovery of loss of feature initiation capability in both trip systems for feature(s) supported by this trip function, declare supported feature(s) inoperable (See Footnote (1)).
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated supported features inoperable immediately.

9. With one or more required channel(s) inoperable in one or more Trip Functions:
   1. Within 24 hours, restore channel to Operable status; and,
   2. Within one hour from discovery of loss of initiation capability in both trip systems for feature(s) supported by this trip function, declare supported feature(s) inoperable(See Footnote (2)).
   3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated supported features inoperable immediately.

10. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place inoperable channel in trip or align affected (HPCI or RCIC) pump suction to suppression pool; and,
    2. Within one hour of discovery of loss of initiation capability, declare affected system (HPCI or RCIC) inoperable if associated pump suction is not aligned to suppression pool.
    3. If required actions and associated completion times of Action 1 or 2 are not met, declare associated system inoperable immediately.

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(1) Only applicable to the High Drywell Pressure and Reactor Low-Low-Low Water Level functions.

(2) Not applicable to Reactor High Water level Function.

11. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS valves inoperable; and,
    2. Within 96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable, place inoperable channel in trip; and,
    3. Within 8 days from discovery of inoperable channel if both HPCI and RCIC are Operable, place inoperable channel in trip.
    4. If required actions and associated completion times of Action 1 or 2 or 3 are not met, declare ADS inoperable immediately.

12. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within one hour from discovery of loss of ADS initiation capability in both trip systems, declare ADS valves inoperable; and,
    2. Within 96 hours from discovery of inoperable channel concurrent with HPCI or RCIC inoperable, restore channel to Operable status; and,
    3. Within 8 days from discovery of inoperable channel if both HPCI and RCIC are Operable, restore channel to Operable status.
    4. If required actions and associated completion times of Action 1 or 2 or 3 are not met, declare ADS inoperable immediately.

13. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place channel in trip; and,
    2. Within one hour from discovery of one or more automatic functions with primary containment isolation capability not maintained, restore primary isolation capability.
    3. If required actions and associated completion times of Action 1 or 2 are not met, isolate affected penetration flow path(s) within one hour.

14. With one or more required channel(s) inoperable in one or more Trip Functions:
    1. Within 24 hours, place inoperable channel in trip; and,
    2. Within one hour from discovery of loss of system (HPCI or RCIC) initiation capability, declare affected system (HPCI or RCIC) inoperable.
    3. If required actions and associated completion times of Action 1 or 2 are not met, declare affected system (HPCI or RCIC) inoperable immediately.

15. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of required Actions may be delayed for up to 6 hours provided associated Trip Function maintains trip capability.

16. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of required Actions may be delayed for up to 6 hours.

TABLE 3.2.C
INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

Minimum No. of Operable Instrument Channels Per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Action
4 (2)	APRM Upscale (Flow Biased)	(0.66W+59%-0.66ΔW) (Clamp at 108% max)	6 Inst. Channels	(10) (14)
4	APRM Upscale (Startup Mode)	≤ 12%	6 Inst. Channels	(10) (14)
4	APRM Downscale	≥ 2.5 indicated on scale	6 Inst. Channels	(10) (14)
1 (7) (11) (13)	Rod Block Monitor (Power Biased)	(RTP ≥85%), S_{RB} ≤HTSP (65% ≤RTP <85%), S_{RB} ≤ITSP (30% ≤RTP <65%), S_{RB} ≤LTSP	2 Inst. Channels	(12) (14)
1 (7, (11) (13)	Rod Block Monitor Downscale	≥ DTSP	2 Inst. Channels	(12) (14)
6	IRM Downscale (3)	≥ 2.5 indicated on scale	8 Inst. Channels	(10)
6	IRM Detector not in Startup Position	(8)	8 Inst. Channels	(10)
6	IRM Upscale	≤ 108 indicated on scale	8 Inst. Channels	(10)
2 (5)	SRM Detector not in Startup Position	(4)	4 Inst. Channels	(1)
2 (5) (6)	SRM Upscale	≤ 10^5 counts/sec.	4 Inst. Channels	(1)
1 (15)	Scram Discharge Instrument Volume High Level	≤ 25 gallons	1 Inst. Channel	(9)

NOTES FOR TABLE 3.2.C

1. If the first column cannot be met for one of the two trip systems, this condition may exist for up to seven days provided that during that time the operable system is functionally tested immediately and daily thereafter; if this condition lasts longer than seven days, the system shall be tripped. If the first column cannot be met for both trip systems, the systems shall be tripped.

2. W = Loop Recirculation flow in percent of design.

   Trip level setting is in percent of rated power (3293 MWt).

   ΔW is the difference between two loop and single loop effective recirculation drive flow rate at the same core flow. During single loop operation, the reduction in trip setting is accomplished by correcting the flow input of the flow biased rod block to preserve the original (two loop) relationship between the rod block setpoint and recirculation drive flow. ΔW = 0 for two loop operation.

3. IRM downscale is bypassed when it is on its lowest range.

4. This function is bypassed when the count rate is $\geq$ 100 cps.

5. One of the four SRM inputs may be bypassed.

6. This SRM function is bypassed when the IRM range switches are on range 8 or above.

7. The trip is bypassed when the reactor power is $\leq$ 30%.

8. This function is bypassed when the mode switch is placed in Run.

NOTES FOR TABLE 3.2.C (Cont.)

9. If the number of operable channels is less than required by the minimum operable channels per trip function requirement, place the inoperable channel in the tripped condition within twelve hours.

10. For the Startup (for IRM rod block) and the Run (for APRM rod block) positions of the Reactor Mode Selector Switch and with the number of OPERABLE channels:

    a. One less than required by the Minimum OPERABLE Channels per Trip Function requirement, restore the inoperable channel to OPERABLE status within 7 days or place the inoperable channel in the tripped condition within the next hour.

    b. Two or more less than required by the Minimum OPERABLE Channels per Trip Function requirement, place at least one inoperable channel in the tripped condition within one hour.

11. The values of HTSP, ITSP, LTSP and DTSP are specified in the CORE OPERATING LIMITS REPORT.

12. With one or more required Rod Block Monitor channel(s) inoperable:

    a. With one rod block monitor (RBM) channel inoperable, restore RBM channel to Operable status within 24 hours.
    b. If the required action and associated completion time in Action a above are not met, place one RBM channel in trip within 1 hour.
    c. With 2 RBM channels inoperable, place one RBM channel in trip within 1 hour.

13. Section 3.3.B.5 is Applicable during operation with a limiting control rod pattern.

14. When a channel is placed in an inoperable status solely for performance of required Surveillances, initiation of these Actions may be delayed for up to 6 hours provided the associated function maintains control rod block capability.

15. The scram discharge instrument volume has only one trip system.

TABLE 3.2.D

RADIATION MONITORING SYSTEMS THAT INITIATE AND/OR ISOLATE SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Action (1)
2	Refuel Area Exhaust Monitor	Upscale, <16 mr/hr	4 Inst. Channels	A or B
2	Reactor Building Exhaust Monitors	Upscale, <16 mr/hr	4 Inst. Channels	B
1	Main Stack Monitor	Upscale, $\leq 10^6$ cps	2 Inst. Channels	C
2 (2)	Main Control Room	Upscale, <400 cpm	4 Inst. Channels	D

Notes for Table 3.2.D

1. Action

   A. Cease operation of the refueling equipment.

   B. Isolate secondary containment and start the standby gas treatment system.

   C. Cease purging of primary containment, and close vent and purge valves greater than 2 inches in diameter.

   D. As described in LCO 3.11.A.5.

2. The trip function is required to be operable whenever secondary containment is required on either unit.

TABLE 3.2.G

Unit 3

INSTRUMENTATION THAT INITIATES ALTERNATE ROD INSERTION AND RECIRCULATION PUMP TRIP

Minimum No. of Operable Instrument Channels Per Trip System	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design per Trip system
2	Reactor High Pressure	≤ 1120 psig	2
2	Reactor Low-Low Water Level	≥ -48 in. indicated level	2

TABLE 4.2.A

MINIMUM TEST AND CALIBRATION FREQUENCY FOR PCIS

Instrument Channel (5)	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Reactor High Pressure (Shutdown Cooling Permissive)	Once/ 3 months	Once/3 months	None
2) Reactor Low-Low-Low Water Level (7)	Once/3 months (3)	Once/operating cycle	Once/day
3) Main Steam High Temp.	Once/3 months (3)	Once/operating cycle	Once/day
4) Main Steam High Flow (7)	Once/3 months (3)	Once/operating cycle	Once/day
5) Main Steam Low Pressure	Once/3 months	Once/3 months	None
6) Reactor Water Cleanup High Flow	Once/3 months	Once/3 months	Once/day
7) Reactor Water Cleanup High Temp.	Once/3 months	Once/3 months	None
8) Reactor Pressure (Feedwater Flush Permissive)	Once/3 months (3)	Once/operating cycle	Once/day

Logic System Functional Test (4) (6)	Frequency
1) Main Steam Line Isolation Vvs. Main Steam Line Drain Vvs. Reactor Water Sample Vvs.	Once/operating cycle
2) RHR - Isolation Vv. Control Shutdown Cooling Vvs.	Once/operating cycle
3) Reactor Water Cleanup Isolation	Once/operating cycle
4) Drywell Isolation Vvs. TIP Withdrawal Atmospheric Control Vvs. Sump Drain Valves	Once/operating cycle
5) Standby Gas Treatment System Reactor Building Isolation	Once/operating cycle

TABLE 4.2.B
MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Reactor Water Level (7)	Once/3 months (3)	Once/operating cycle	Once/day
2) Drywell Pressure (7)	Once/3 months (3)	Once/operating cycle	Once/day
3) Reactor Pressure (7)	Once/3 months (3)	Once/operating cycle	Once/day
4) Reactor Pressure - PCIS/LPCI Interlock	Once/3 months	Once/3 months	None
5) Auto Sequencing Timers	NA	Once/operating cycle	None
6) ADS - LPCI or CS Pump Disch. Pressure Interlocks	Once/3 months	Once/3 months	None
7) Trip System Bus Power Monitors	Once/3 months	NA	None
8) Core Spray Sparger d/p	Once/3 months	Once/6 months	Once/day
9) Steam Line High Flow (HPCI & RCIC)	Once/3 months	Once/3 months	None
10) Steam Line High Flow Timers (HPCI and RCIC)	NA	Once/operating cycle	None
11) Steam Line High Temp. (HPCI & RCIC)	Once/3 months (3)	Once/operating cycle	Once/day
12) Safeguards Area High Temp.	Once/3 months	Once/3 months	None

TABLE 4.2.B (continued)
MINIMUM TEST AND CALIBRATION FREQUENCY FOR CSCS

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
13) HPCI and RCIC Steam Line Low Pressure	Once/3 months	Once/3 months	None
14) HPCI Suction Source Levels	Once/3 months	Once/3 months	None
15) 4KV Emergency Power System Voltage Relays (HGA,SV)	Once/operating cycle	Once/5 years	None
16) ADS Relief Valves Bellows Pressure Switches	Once/operating cycle	Once/operating cycle	None
17) LPCI/Cross Connect Valve Position	Once/refueling cycle	N/A	N/A
18) Condensate Storage Tank Level (RCIC) (7)	Once/3 months	Once/operating cycle	Once/day
19) 4KV Emergency Power Source Degraded Voltage Relays (IAV,CV-6,ITE)	Once/month	Once/eighteen months	None

TABLE 4.2.C
MINIMUM TEST AND CALIBRATION FREQUENCY FOR CONTROL ROD BLOCKS ACTUATION

Instrument Channel	Instrument Functional Test	Calibration	Instrument Check
1) APRM - Downscale	Once/3 months (3)	Once/3 months	Once/day
2) APRM - Upscale	Once/3 months (3)	Once/3 months	Once/day
3) IRM - Upscale	(2) (3)	Startup or Control Shutdown	(2)
4) IRM - Downscale	(2) (3)	Startup or Control Shutdown	(2)
5) RBM - Upscale	Once/3 months (3)	Once/6 months	Once/day
6) RBM - Downscale	Once/3 months (3)	Once/6 months	Once/day
7) SRM - Upscale	(2) (3)	Startup or Control Shutdown	(2)
8) SRM - Detector Not In Startup Position	(2) (3)	N/A	(2)
9) IRM - Detector Not In Startup Position	(2) (3)	N/A	(2)
10) Scram Discharge Instrument Volume - High Level	Quarterly	Once/Operating Cycle	N/A

Logic System Functional Test (4) (6)	Frequency
1) System Logic Check	Once/Operating Cycle

TABLE 4.2.D
MINIMUM TEST & CALIBRATION FREQUENCY FOR RADIATION MONITORING SYSTEMS

Instrument Channels	Instrument Functional Test	Calibration	Instrument Check (2)
1) Refuel Area Exhaust Monitors - Upscale	Once/3 months	Once/3 months	Once/day
2) Reactor Building Area	Once/3 months	Once/3 months	Once/day
3) Main Stack Monitor	Once/3 months	Once/12 months as described in 4.8.C.4.a	Once/day
4) Main Control Room	Once/3 months	Once/18 months as described in 4.11.A.5	Once/day

Logic System Functional Test (4) (6)	Frequency
1) Reactor Building Isolation	Once/Operating Cycle
2) Standby Gas Treatment System Actuation	Once/Operating Cycle

Unit 3

TABLE 4.2.E
MINIMUM TEST & CALIBRATION FREQUENCY FOR DRYWELL LEAK DETECTION

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Equipment Drain Sump Flow Integrator	Once/month	Once/3 months	Once/day
2) Floor Drain Sump Flow Integrator	Once/month	Once/3 months	Once/day
3) Drywell Atmosphere Radioactivity Monitor	Once/month	Once/3 months	Once/day

NOTES FOR TABLES 4.2.A THROUGH 4.2.F

1. Deleted.

2. Functional tests, calibrations and instrument checks are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed before each startup with a required frequency not to exceed once per week. Calibrations shall be performed within 24 hours before each startup or controlled shutdown with a required frequency not to exceed once per week. Instrument checks shall be performed at least once per day during those periods when the instruments are required to be operable.

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. These instrument channels will be calibrated using simulated electrical signals.

4. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

5. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2.A since they are tested on Table 4.1.2.

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

7. These channels consist of analog transmitters, indicators and electronic Trip units.

TABLE 4.2.G

Unit 3

MINIMUM TEST AND CALIBRATION FREQUENCY FOR ALTERNATE ROD INSERTION AND RECIRCULATION PUMP TRIP

Instrument Channel	Instrument Check (1)	Instrument Functional Test (1)	Calibration Frequency (1)
Reactor High Pressure	Once/day	Once/3 months	Once/Operating Cycle
Reactor Low-Low Water Level	Once/day	Once/3 months	Once/Operating Cycle

<u>Logic System Functional Test (2)</u>	<u>Frequency</u>
Alternate Rod Insertion/Recirculation Pump Trip	Once/3 months
Alternate Rod Insertion/Recirculation Pump Trip including air venting and breaker trip (3)	Once/Operating Cycle

<u>Notes:</u>

1. In accordance with Table 4.2.B. These instrument channels are the same ones used by the Core and Containment Cooling Systems.

2. The recirculation pumps need not be tripped.

3. This test, performed while shutdown, will include venting of the scram air header and tripping of the recirculation pump breakers. The test will also verify operability of the manual actuation logic.

3.2 BASES

In addition to reactor protection instrumentation which initiates a reactor scram, protective instrumentation has been provided which initiates action to mitigate the consequences of accidents which are beyond the operator's ability to control, or terminates operator errors before they result in serious consequences. This set of specifications provides the limiting conditions of operation for the primary system isolation function, initiation of the core cooling systems, control rod block and standby gas treatment systems. The objectives of the Specifications are (i) to assure the effectiveness of the protective instrumentation when required even during periods when portions of such systems are out-of-service for maintenance, and (ii) to prescribe the trip settings required to assure adequate performance.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for Isolation Instrumentation have been determined in accordance with General Electric reports NEDC-30851P-A, Supplement 2, "Technical Specification Improvement Analysis for BWR Isolation Instrumentation Common to RPS and ECCS Instrumentation," and NEDC-31677P-A,"Technical Specification Improvement Analyses for BWR Isolation Actuation Instrumentation." The AOT is 12 hours for Table 3.2.A Items 1, 4, and 5 because these items have instrumentation that is common to the RPS. Other Table 3.2.A Items have an AOT of 24 hours.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for ECCS Actuation Instrumentation have been determined in accordance with General Electric reports NEDC-30936P-A,"BWR Owners' Group Technical Specification Improvement Methodology with Demonstration for BWR ECCS Actuation Instrumentation," Parts 1 and 2, and RE-022,"Technical Specification Improvement Analysis for the Emergency Core Cooling System Actuation Instrumentation for Peach Bottom Atomic Power Station, Units 2 and 3."

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for miscellaneous instruments have been determined in accordance with General Electric report GENE-770-06-1,"Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," and the associated NRC Safety Evaluation Report dated July 21, 1992.

Channel functional test frequencies and allowed out of service times for repair and surveillance testing for RCIC instrumentation have been determined in accordance with

3.2 BASES (continued)

General Electric report GENE-770-06-2,"Bases for Changes to Surveillance Test Intervals and Allowed Out-of-Service Times for Selected Instrumentation Technical Specifications," and the associated NRC Safety Evaluation Report dated September 13, 1991.

Some of the settings on the instrumentation that initiate or control core and containment cooling have tolerances explicitly stated where the high and low values are both critical and may have a substantial effect on safety. The set points of other instrumentation, where only the high or low end of the setting has a direct bearing on safety, are chosen at a level away from the normal operating range to prevent inadvertent actuation of the safety system involved and exposure to abnormal situations.

Actuation of primary containment valves is initiated by protective instrumentation shown in Table 3.2.A which senses the conditions for which isolation is required. Such instrumentation must be available whenever primary containment integrity is required.

The instrumentation which initiates primary system isolation is connected in a dual bus arrangement.

The low water level instrumentation set to trip at zero inches indicated level (538 inches above vessel zero) closes all isolation valves except those in Groups 1, 4 and 5. Details of valve grouping and required closing times are given in Specification 3.7. For valves which isolate at this level, this trip setting is adequate to prevent the core from being uncovered in the case of a break in the largest line assuming a 60 second valve closing time. Required closing times are less than this.

The low-low reactor water level instrumentation is set to trip when reactor water level is minus 48 inches indicated level (490 inches above vessel zero). This trip initiates HPCI, RCIC, Alternate Rod Insertion and trips the recirculation pumps. The low-low-low reactor water level instrumentation is set to trip when the reactor water level is minus 160 inches indicated level (378 inches above vessel zero). This trip closes Main Steam Line Isolation Valves, Main Steam Drain Valves and Recirc Sample Valves (Group 1), activates the remainder of the CSCS subsystem, and starts

3.2 BASES (Cont'd)

Pressure instrumentation is provided to close the main steam isolation valves in RUN Mode when the main steam line pressure drops below 850 psig. The Reactor Pressure Vessel thermal transient due to an inadvertent opening of the turbine bypass valves when not in the RUN Mode is less severe than the loss of feedwater analyzed in section 14.5 of the FSAR; therefore, closure of the Main Steam isolation valves for thermal transient protection when not in RUN Mode is not required.

The HPCI high flow and temperature instrumentation are provided to detect a break in the HPCI steam piping. Tripping of this instrumentation results in actuation of HPCI isolation valves. Tripping logic for the high flow is 1 out of 2 logic. Temperature is monitored at four (4) locations with four (4) temperature sensors at each location. Two (2) sensors at each location are powered by "A" DC control bus and two (2) by "B" DC control bus. Each pair of sensors, e.g., "A" or "B" at each location are physically separated and the tripping of either "A" or "B" bus sensor will actuate HPCI isolation valves. The trip settings of ≤ 300% of design flow for high flow and 200 degrees F for high temperature are such that core uncovery is prevented and fission product release is within limits.

The RCIC high flow and temperature instrumentation are arranged the same as that for the HPCI. The trip setting of ≤ 300% for high flow and 200 degrees F for temperature are based on the same criteria as the HPCI.

The Reactor Water Cleanup System high flow instrumentation is arranged similar to that for the HPCI System. The trip settings are such that core uncovery is prevented and fission product release is maintained within limits. The high temperature instrumentation downstream of the non-regenerative heat exchanger is provided to protect the ion exchange resin in the demineralizer from damage due to high temperature. Such damage could impair the resins' ability to remove impurities from the primary coolant and possibly result in the release of previously captured impurities back into the coolant in large concentrations.

The instrumentation which initiates CSCS action is arranged in a dual bus system. As for other vital instrumentation arranged in this fashion, the Specification preserves the effectiveness of the system even during periods when maintenance or testing is being performed. An exception to this is when logic functional testing is being performed.

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to the fuel cladding integrity safety limit. The trip logic for this function is 1 out of n: e.g., any trip on one of 6 APRM's, 8 IRM's, or 4 SRM's will result in a rod block.

The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met.

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.

4.2 BASES

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4.2 BASES (continued)

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Docket Nos. 50-277
50-278
License Nos. DPR-44
DPR-56

PEACH BOTTOM ATOMIC POWER STATION, UNITS 2 AND 3
TECHNICAL SPECIFICATIONS CHANGE REQUEST 90-03

ATTACHMENT 1

MDE-87-0485-1 (DRF A00-02119-D)

"Technical Specification Improvement Analysis for the

Reactor Protection System

for Peach Bottom Atomic Power Station, Units 2 and 3"

General Electric Company, October 1987