FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT B

LICENSE AMENDMENT REQUEST #246

REVISION 0

Proposed ITS and ITS Bases

Change Pages - Strikethrough/Highlight

~~Strikethrough Text~~ Deleted, Highlighted Text Added

Table 3.3.17-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1
1. Wide Range Neutron Flux	2	E
2. RCS Hot Leg Temperature	2	E
3. RCS Pressure (Wide Range)	2	E
4. Reactor Coolant Inventory	2	F
5. Borated Water Storage Tank Level	2	E
6. High Pressure Injection Flow	2 per injection line	E
7. Containment Sump Water Level (Flood Level)	2	E
8. Containment Pressure (Expected Post-Accident Range)	2	E
9. Containment Pressure (Wide Range)	2	E
10. Containment Isolation Valve Position	2 per penetration(a)(b)	E
11. Containment Area Radiation (High Range)	2	F
12. Containment Hydrogen Concentration	2	E
13. Pressurizer Level	2	E
14. Steam Generator Water Level (Start-up Range)	2 per OTSG	E
15. Steam Generator Water Level (Operating Range)	2 per OTSG	E
16. Steam Generator Pressure	2 per OTSG	E
17. Emergency Feedwater Tank Level	2	E
18a. Core Exit Temperature ~~(Backup)~~ (Thermocouple)	~~3~~ 2 thermocouples per core quadrant	E
18b. Core Exit Temperature (Recorder)	2	E
19. Emergency Feedwater Flow	2 per OTSG	E
20. Low Pressure Injection Flow	2	E
21. Degrees of Subcooling	2~~(d)~~	E
22. Emergency Diesel Generator kW Indication	2(c)	E

(a) Only one position indication is required for penetrations with one Control Room indicator.

(b) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(c) One indicator per EDG.

~~(d) These two channels of subcooling margin are backed up by either of two indications of subcooling margin based on similar inputs through the Safety Parameter Display System (SPDS). At least one SPDS channel must be available to provide this backup. With both SPDS channels INOPERABLE, Condition C is applicable.~~

BASES

FUNCTION	CHANNEL A	CHANNEL B
15. Steam Generator Water Level (Operating Range)	OTSG A: SP-17-LI1 or SP-17-LIR OTSG B: SP-21-LI1 or SP-21-LIR	OTSG A: SP-18-LI1 OTSG B: SP-22-LI1
16. Steam Generator Pressure	OTSG A: MS-106-PI1 or MS-106-PIR OTSG B: MS-110-PI1 or MS-110-PIR	OTSG A: MS-107-PI1 or MS-107-PIR OTSG B: MS-111-PI1 or MS-111-PIR
17. Emergency Feedwater Tank Level	EF-98-LI1	EF-99-LI1
18a. Core Exit Temperature ~~(Backup)~~ (Thermocouple)	Quadrant WX: IM-5G-TE/IM-6C-TE XY: IM-9E-TE/IM-13G-TE YZ: IM-9H-TE/IM-10O-TE ZW: IM-3L-TE/IM-6O-TE	Quadrant WX: IM-7F-TE/IM-2G-TE XY: IM-10C-TE/IM-11G-TE YZ: IM-10M-TE/IM-13L-TE ZW: IM-4N-TE/IM-6L-TE
18b. Core Exit Temperature (Recorder)	RC-171-TR	RC-172-TR
	~~Three detectors from each of the following groups:~~ ~~Quadrant WX: IM-2G-TE/IM-5G-TE/IM-6C-TE/IM-7F-TE~~ ~~Quadrant XY: IM-9E-TE/IM-10C-TE/IM-11G-TE/IM-13G-TE~~ ~~Quadrant YZ: IM-9H-TE/IM-10M-TE/IM-10O-TE/IM-13L-TE~~ ~~Quadrant ZW: IM-3L-TE/IM-4N-TE/IM-6L-TE/IM-6O-TE~~ ~~and Recorders RC-171-TR, RC-172-TR, RC-173-TR~~	
19. Emergency Feedwater Flow	OTSG A: EF-26-FI1 OTSG B: EF-24-FI1	OTSG A: EF-26-FI1 OTSG B: EF-24-FI1
20. Low Pressure Injection Flow	DHV-110 Hand/Auto station flow indication (DH-1-FK3-1)	DHV-111 Hand/Auto station flow indication (DH-1-FK4-1)
21. Degrees of Subcooling	~~RC-4-TI4 and EMCO-38~~	~~RC-4-TI5 and EMCO-39~~
	~~SPDS "A" or SPDS "B"~~	
22. Emergency Diesel Generator kW Indication	EGDG-1A Wattmeter SSF-AH Main control board indicator	EGDG-1B Wattmeter SSF-AX Main control board indicator

NOTES: For Function 18a, each quadrant requires at least 2 OPERABLE detectors, one from each channel. OPERABILITY of only ~~two~~ one detectors ~~(and associated recorder)~~ for any group quadrant constitutes entry into Condition A of LCO 3.3.17 Any group quadrant with ~~only one~~ no OPERABLE detector~~/recorder~~ combination constitutes entry into Condition C of LCO 3.3.17. Separate Condition entry is allowed for each group quadrant.

~~For Function 21, with both channels of SPDS inoperable, LCO Condition C and its associated Required Action are applicable.~~

(continued)

BASES

LCO (continued)

17. Emergency Feedwater Tank Level

The dedicated emergency feedwater (EFW) tank provides the assured, safety grade water supply for the Emergency Feedwater System. The EFW tank inventory is monitored and displayed by 0 to 38 feet control room level indications. The control room indicators and alarms are considered the primary indication used by the operator. Therefore, the LCO deals specifically with this portion of the instrument string.

The design basis accidents which require emergency feedwater are those in which the main feedwater supply and/or the electrical supply to the vital feedwater auxiliaries has been lost, e.g., a feedwater line break or a loss of offsite power. In the event of such a loss of feedwater, the EFW tank is the initial source of water for the EFW System. As the EFW tank is depleted, manual operator action is necessary to replenish the EFW tank or to realign the suction to the EFW pumps. Since tank level is required by the operator for manual actions following an event, it has been included in this LCO.

18a. Core Exit Temperature ~~(Backup)~~ (Thermocouple)

The core exit thermocouples (CETs) provide an indication of the reactor coolant temperature as it exits the active region of the core. The CETs provide input to accident monitoring instrumentation ~~provides a display of core exit temperature~~ over a range of 0 to 2500°F. ~~The displays consists of~~, and include 16 separate temperature measurements from 16 CETs, four from each quadrant. ~~Each of t~~These 16 core exit temperature measurements ~~is~~ are continuously recorded in the control room on ~~three~~ two separate recorders as described in Function 18b, and provide input to the Safety Parameter Display System (SPDS) for determining subcooling margin as described in Function 21. Since the ~~control room display is the primary indication used by the operator~~ distribution of OPERABLE CETs is important for assuring a representative indication of temperatures across the core, this LCO deals specifically with this portion of the instrument string.

The CETs are considered the primary indication of the reactor coolant temperature. ~~Core exit temperature is~~ The CETs are included in this LCO because the operator uses ~~this~~ the indication from the CETs to monitor the cooldown of the RCS following a steam generator tube rupture or small break LOCA. Operator actions to maintain a controlled cooldown, such as adjusting OTSG level or pressure, would be prompted by this indication.

(continued)

BASES

LCO (continued)

18b. Core Exit Temperature (Recorder)

The core exit temperature recorders provide an indication of the reactor coolant temperature as it exits the active region of the core over a range of 0 to 2500°F. Input to each recorder is from eight CETs, two from each core quadrant, to provide a representative distribution of temperatures across the core. Since the control room display is the primary indication used by the operator, this LCO deals specifically with this portion of the instrument string.

Core exit temperature is considered the primary indication of the reactor coolant temperature, and is included in this LCO because the operator uses this indication to monitor the cooldown of the RCS following a steam generator tube rupture or small break LOCA. Operator actions to maintain a controlled cooldown, such as adjusting OTSG level or pressure, would be prompted by this indication.

19. Emergency Feedwater Flow

EFW Flow instrumentation is provided to monitor operation of decay heat removal via the OTSGs. The EFW injection flow to each OTSG (2 channels per OTSG, one associated with each EFW injection line) is determined from a differential pressure measurement calibrated to a span of 0 gpm to 1000 gpm. Each differential pressure transmitter provides an input to a control room indicator and the plant computer.

EFW Flow is used by the operator to determine the need to throttle flow during accident or transient conditions to prevent excessive RCS cooldown rates when low decay heat levels are present. EFW Flow is also used by the operator to verify that the EFW System is delivering the correct flow to each OTSG. However, the primary indication of this function is provided by OTSG level.

These instruments are not assumed to provide information required by the operator to take a mitigation action specified in the safety analysis. As such, they are not Type A variables. However, the monitors are deemed risk significant (Category 1) and are included within the LCO based upon this consideration.

(continued)

BASES

LCO (continued)

20. Low Pressure Injection Flow

Low pressure injection flow instrumentation is provided to monitor flow to the RCS following a large break LOCA. It is also used to monitor LPI flow during piggy back operation following a small break LOCA. The low pressure injection flow to the rector (2 channels, one associated with each LPI injection line) is determined from a differential pressure measurement calibrated to a span of 0 gpm to 5000 gpm.

The LPI flow indication is used by the operator to throttle the flow to < 2000 gpm prior to switching the pump suction from the BWST to the RB sump. This assures adequate net positive suction head (NPSH) is maintained to the pump. The indication is also used to verify LPI flow to the reactor as a prerequisite to termination of HPI flow.

Since low pressure injection flow is a Type A variable on which the operator bases manual actions required for event mitigation for which no automatic controls are provided, it has been included in this LCO.

21. Degrees of Subcooling

Two channels of subcooling margin with inputs from RCS hot leg temperature (T_H), core exit temperature, and RCS pressure are provided by the Safety Parameter Display System (SPDS). Multiple core exit temperatures are auctioneered with only the highest temperature being input to the monitor. ~~A note has been added to indicate that the two channels of subcooling margin are backed up by either of two indications of subcooling margin based on similar inputs through the Safety Parameter Display System (SPDS). At least one SPDS channel must be available to provide this backup. With both SPDS channels INOPERABLE, Condition C is applicable. This is considered necessary because the core exit thermocouple inputs to the subcooling margin monitors are not environmentally qualified.~~ The T_H inputs to the SPDS subcooling margin monitors ~~and SPDS~~ operate over a range of 120 to 920°F. The core exit temperature inputs operate over a range of ~~150 to 2000°F and 150~~ 0 to 2500°F ~~for the subcooling margin monitors and SPDS, respectively~~. RCS pressure inputs operate over a wide range of 200 to 2500 psig and low range of 0 to 600 psig.

(continued)

BASES

LCO

21. Degrees of Subcooling (continued)

The subcooling margin monitors are used to verify the existence of, or to take actions to ensure the restoration of subcooling margin. Specifically, a loss of adequate subcooling margin during a LOCA requires the operator to trip the reactor coolant pumps (RCP's), to ensure high or low pressure injection, and raise the steam generator levels to the inadequate subcooling margin level. Since degrees of subcooling is a Type A variable on which the operator bases manual actions required for event mitigation for which no automatic control are provided, it has been included in this LCO.

22. Emergency Diesel Generator, kW Indication

The Emergency Diesel Generator (EDG) provides standby (emergency) electrical power in the case of Loss of Offsite Power (LOOP). EDG kW indication is provided in the control room to monitor the operational status of the EDG.

EDG Power (kW) output indication is a type A variable because EDG kW indication provides the control room operator EDG load management capabilities. EDG load management enables the operator to base manual actions of load start and stop for event mitigation.

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FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT C

LICENSE AMENDMENT REQUEST #246

REVISION 0

Proposed ITS and ITS Bases

Change Pages - Revision Bars

Table 3.3.17-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

FUNCTION	REQUIRED CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION D.1
1. Wide Range Neutron Flux	2	E
2. RCS Hot Leg Temperature	2	E
3. RCS Pressure (Wide Range)	2	E
4. Reactor Coolant Inventory	2	F
5. Borated Water Storage Tank Level	2	E
6. High Pressure Injection Flow	2 per injection line	E
7. Containment Sump Water Level (Flood Level)	2	E
8. Containment Pressure (Expected Post-Accident Range)	2	E
9. Containment Pressure (Wide Range)	2	E
10. Containment Isolation Valve Position	2 per penetration(a)(b)	E
11. Containment Area Radiation (High Range)	2	F
12. Containment Hydrogen Concentration	2	E
13. Pressurizer Level	2	E
14. Steam Generator Water Level (Start-up Range)	2 per OTSG	E
15. Steam Generator Water Level (Operating Range)	2 per OTSG	E
16. Steam Generator Pressure	2 per OTSG	E
17. Emergency Feedwater Tank Level	2	E
18a. Core Exit Temperature (Thermocouple)	2 thermocouples per core quadrant	E
18b. Core Exit Temperature (Recorder)	2	E
19. Emergency Feedwater Flow	2 per OTSG	E
20. Low Pressure Injection Flow	2	E
21. Degrees of Subcooling	2	E
22. Emergency Diesel Generator kW Indication	2(c)	E

(a) Only one position indication is required for penetrations with one Control Room indicator.

(b) Not required for isolation valves whose associated penetration is isolated by at least one closed and deactivated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.

(c) One indicator per EDG.

BASES

FUNCTION	CHANNEL A	CHANNEL B
15. Steam Generator Water Level (Operating Range)	OTSG A: SP-17-LI1 or SP-17-LIR OTSG B: SP-21-LI1 or SP-21-LIR	OTSG A: SP-18-LI1 OTSG B: SP-22-LI1
16. Steam Generator Pressure	OTSG A: MS-106-PI1 or MS-106-PIR OTSG B: MS-110-PI1 or MS-110-PIR	OTSG A: MS-107-PI1 or MS-107-PIR OTSG B: MS-111-PI1 or MS-111-PIR
17. Emergency Feedwater Tank Level	EF-98-LI1	EF-99-LI1
18a. Core Exit Temperature (Thermocouple) Quadrant		
WX	IM-5G-TE/IM-6C-TE	IM-7F-TE/IM-2G-TE
XY	IM-9E-TE/IM-13G-TE	IM-10C-TE/IM-11G-TE
YZ	IM-9H-TE/IM-10O-TE	IM-10M-TE/IM-13L-TE
ZW	IM-3L-TE/IM-6O-TE	IM-4N-TE/IM-6L-TE
18b. Core Exit Temperature (Recorder)	RC-171-TR	RC-172-TR
19. Emergency Feedwater Flow	OTSG A: EF-26-FI1 OTSG B: EF-24-FI1	OTSG A: EF-26-FI1 OTSG B: EF-24-FI1
20. Low Pressure Injection Flow	DHV-110 Hand/Auto station flow indication (DH-1-FK3-1)	DHV-111 Hand/Auto station flow indication (DH-1-FK4-1)
21. Degrees of Subcooling	EMCO-38	EMCO-39
22. Emergency Diesel Generator kW Indication	EGDG-1A Wattmeter SSF-AH Main control board indicator	EGDG-1B Wattmeter SSF-AX Main control board indicator

NOTES: For Function 18a, each quadrant requires at least 2 OPERABLE detectors, one from each channel. OPERABILITY of only one detector for any quadrant constitutes entry into Condition A of LCO 3.3.17. Any quadrant with no OPERABLE detector constitutes entry into Condition C of LCO 3.3.17. Separate Condition entry is allowed for each quadrant.

(continued)

BASES

LCO (continued)

17. Emergency Feedwater Tank Level

The dedicated emergency feedwater (EFW) tank provides the assured, safety grade water supply for the Emergency Feedwater System. The EFW tank inventory is monitored and displayed by 0 to 38 feet control room level indications. The control room indicators and alarms are considered the primary indication used by the operator. Therefore, the LCO deals specifically with this portion of the instrument string.

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18a. Core Exit Temperature (Thermocouple)

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The CETs are considered the primary indication of the reactor coolant temperature. The CETs are included in this LCO because the operator uses the indication from the CETs to monitor the cooldown of the RCS following a steam generator tube rupture or small break LOCA. Operator actions to maintain a controlled cooldown, such as adjusting OTSG level or pressure, would be prompted by this indication.

(continued)

BASES

LCO (continued)

18b. Core Exit Temperature (Recorder)

The core exit temperature recorders provide an indication of the reactor coolant temperature as it exits the active region of the core over a range of 0 to 2500°F. Input to each recorder is from eight CETs, two from each core quadrant, to provide a representative distribution of temperatures across the core. Since the control room display is the primary indication used by the operator, this LCO deals specifically with this portion of the instrument string.

Core exit temperature is considered the primary indication of the reactor coolant temperature, and is included in this LCO because the operator uses this indication to monitor the cooldown of the RCS following a steam generator tube rupture or small break LOCA. Operator actions to maintain a controlled cooldown, such as adjusting OTSG level or pressure, would be prompted by this indication.

19. Emergency Feedwater Flow

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These instruments are not assumed to provide information required by the operator to take a mitigation action specified in the safety analysis. As such, they are not Type A variables. However, the monitors are deemed risk significant (Category 1) and are included within the LCO based upon this consideration.

(continued)

BASES

LCO (continued)

20. Low Pressure Injection Flow

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Since low pressure injection flow is a Type A variable on which the operator bases manual actions required for event mitigation for which no automatic controls are provided, it has been included in this LCO.

21. Degrees of Subcooling

Two channels of subcooling margin with inputs from RCS hot leg temperature (T_H), core exit temperature, and RCS pressure are provided by the Safety Parameter Display System (SPDS). Multiple core exit temperatures are auctioneered with only the highest temperature being input to the monitor. The T_H inputs to the SPDS subcooling margin monitors operate over a range of 120 to 920°F. The core exit temperature inputs operate over a range of 0 to 2500°F. RCS pressure inputs operate over a wide range of 200 to 2500 psig and low range of 0 to 600 psig.

(continued)

BASES

LCO

21. Degrees of Subcooling (continued)

The subcooling margin monitors are used to verify the existence of, or to take actions to ensure the restoration of subcooling margin. Specifically, a loss of adequate subcooling margin during a LOCA requires the operator to trip the reactor coolant pumps (RCP's), to ensure high or low pressure injection, and raise the steam generator levels to the inadequate subcooling margin level. Since degrees of subcooling is a Type A variable on which the operator bases manual actions required for event mitigation for which no automatic control are provided, it has been included in this LCO.

22. Emergency Diesel Generator, kW Indication

The Emergency Diesel Generator (EDG) provides standby (emergency) electrical power in the case of Loss of Offsite Power (LOOP). EDG kW indication is provided in the control room to monitor the operational status of the EDG.

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(continued)