Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302
Operating License No. DPR-72

October 30, 1998
3F1098-02

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: License Amendment Request #246, Revision 0
Subcooling Margin Monitoring Using Safety Parameter Display System

References:
1. FPC to NRC letter, 3F0797-21, dated July 29, 1997, "Technical Specification Change Request No. 209, Revision 1, Post-Accident Monitoring Instrumentation"
2. NRC to FPC letter, 3N1297-17, dated December 22, 1997, "Crystal River Unit 3 – Staff Evaluation and Issuance of Amendment Re: Post-Accident Monitoring Instrumentation (TAC No. M99308)"

Dear Sir:

Florida Power Corporation (FPC) hereby submits a request for an amendment to its Facility Operating License No. DPR-72 for Crystal River Unit 3 (CR-3) in accordance with 10 CFR 50.90. The attached License Amendment Request (LAR) #246, Revision 0, proposes changes to CR-3 Improved Technical Specifications (ITS) to delete the note regarding the number of required channels for the Degrees of Subcooling function, and to subdivide the Core Exit Temperature (Backup) function into two new functions in ITS Table 3.3.17-1, Post-Accident Monitoring Instrumentation.

These proposed ITS changes are the result of modifications scheduled for Refueling Outage 11, as originally described and committed to in Reference 1. These modifications significantly improve the reliability and availability of information to the control room operators for verifying adequate core cooling is maintained following a design basis accident. The display of this information is also improved from a human factors standpoint. These improvements include enhanced trending capabilities for determining the effectiveness of emergency core cooling systems during the mitigation and recovery phases following design basis accidents.

The planned modifications separate the Safety Parameter Display System (SPDS) into two redundant channels supplied from independent emergency power sources to supply the primary indication of subcooling margin to the operator. The modifications to the SPDS major components include additional physical restraints to prevent motion and minimize the probability of damage during a seismic event. The addition of a redundant "B" channel low range pressure signal to both channels of SPDS has already been implemented.

During implementation of the planned SPDS modifications, the current, obsolete digital subcooling margin monitors are to be deleted from the CR-3 design. Additional modifications separate the sixteen environmentally qualified core exit thermocouples providing input to main control board core exit temperature recorders and the SPDS into two redundant channels of eight thermocouples each supplied from independent emergency power sources.

Amendment No. to the CR-3 Facility Operating License No. DPR-72 (Reference 2) approved the addition of the Degrees of Subcooling function to ITS Table 3.3.17-1 as a Regulatory Guide (RG) 1.97 Type A, Category 1 variable. The configuration approved included use of the two, non-safety related digital subcooling margin monitors as the primary channels for indicating subcooling margin. If either one of these two primary instruments were INOPERABLE, then either channel of SPDS could be used as a backup to satisfy the ITS Limiting Condition for Operation (LCO).

The planned modifications will improve the reliability and availability of the SPDS over the current configuration. These improvements include additional redundancy for the two channels of SPDS, providing redundant emergency power supplies for each SPDS channel, and improvements in the capability of SPDS components to sustain a seismic event.

The proposed ITS change deletes the note describing the use of the SPDS as a backup since the SPDS will be the primary indication of subcooling margin after the planned modifications are implemented during Refueling Outage 11.

Reference 2 also approved the requirement that having any three of the four core exit thermocouples for each core quadrant OPERABLE was sufficient for operability of the Core Exit Temperature (Backup) function. The sixteen core exit thermocouples are environmentally qualified, but are not currently segregated into redundant channels.

The planned modifications will improve the reliability and availability of the core exit thermocouples by separating the sixteen core exit thermocouples into two separate channels of eight core exit thermocouples each. Following the modifications, there will be two core exit thermocouples per channel located in each core quadrant. Each separate channel of eight core exit thermocouples will have an associated core exit temperature recorder on the main control board, instead of the current three recorders, and will provide input into the associated channel of SPDS for calculation of subcooling margin.

The proposed ITS change will subdivide the current Core Exit Temperature (Backup) function into two new functions, Core Exit Temperature (Thermocouple) function and Core Exit Temperature (Recorder) function. For the Core Exit Temperature (Thermocouple) function, the proposed ITS will require at least two OPERABLE core exit thermocouples per core quadrant (at least one per channel) to provide a representative distribution of temperatures across the core to the operator. For the Core Exit Temperature (Recorder) function, both core exit temperature recorders will be required OPERABLE.

As discussed in Attachment A (Description of Changes, Reason for Request and Evaluation of Request), FPC has determined that the change does not involve a significant hazard. Attachment B (Proposed ITS and ITS Bases Change Pages - Strikeout/Highlight), and Attachment C (Proposed ITS and ITS Bases Change Pages - Revision Bars) provide details of the proposed changes to CR-3 ITS Table 3.3.17-1, and ITS Bases 3.3.17.

These ITS changes will result in revisions to the emergency operating procedures (EOPs) and to the associated operator requalification training program content. FPC currently plans to implement operator requalification training using the revised EOPs just prior to entering Refueling Outage 11. To avoid impact on the scheduled operator requalification training, and to allow for the planned modifications to the facility and plant simulator to be implemented in a timely manner, FPC requests that these ITS changes be approved by July 19, 1999.

This letter establishes no new regulatory commitments.

If you have any questions regarding this submittal, please contact Ms. Sherry Bernhoft, Manager, Nuclear Licensing at (352) 563-4566.

Sincerely,

J.J. Holden
Director
Site Nuclear Operations

JJH/rer/gew

xc: Regional Administrator, Region II
NRR Project Manager
Senior Resident Inspector

Attachments

A. Description of Changes, Reason for Request, and Evaluation of Request
B. Proposed ITS and ITS Bases Change Pages - Strikeout/Highlight
C. Proposed ITS and ITS Bases Change Pages - Revision Bars

STATE OF FLORIDA
COUNTY OF CITRUS

John J. Holden states that he is the Director, Site Nuclear Operations for Florida Power Corporation; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission the information attached hereto; and that all such statements made and matters set forth therein are true and correct to the best of his knowledge, information, and belief.

J.J. Holden
John J. Holden
Director
Site Nuclear Operations

Sworn to and subscribed before me this 30th day of October 1998, by John J. Holden.

Lisa Ann McBride
Signature of Notary Public
State of Florida

LISA ANN MCBRIDE
Notary Public, State of Florida
My Comm. Exp. Oct. 25, 1999
Comm. No. CC 505458

LISA ANN MCBRIDE
(Print, type, or stamp Commissioned
Name of Notary Public)

Personally Known X -OR- Produced Identification _____

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

DOCKET NUMBER 50-302/LICENSE NUMBER DPR-72

ATTACHMENT A

LICENSE AMENDMENT REQUEST #246

REVISION 0

Description of Changes,

Reason for Request, and

Evaluation of Request

ATTACHMENT A

LICENSE AMENDMENT REQUEST (LAR) #246, REVISION 0
SUBCOOLING MARGIN MONITORING
USING SAFETY PARAMETER DISPLAY SYSTEM

LICENSE DOCUMENT INVOLVED: Improved Technical Specifications (ITS)

PORTIONS: ITS Table 3.3.17-1

SUMMARY OF CHANGES:

Attachments B and C provide details of the ITS changes for which approval is being requested, and provide proposed ITS Bases changes for information to assist in the review of this license amendment request.

ITS Table 3.3.17-1, Post-Accident Monitoring Instrumentation

This license amendment request proposes to revise specific Regulatory Guide (RG) 1.97 Type A, Category 1 post-accident monitoring (PAM) instrumentation variables as follows:

1. Function 18, Core Exit Temperature (Backup), is divided into two separate functions. Function 18a, Core Exit Temperature (Thermocouple), is added with "2 thermocouples per core quadrant" as the number of required channels. Function 18b, Core Exit Temperature (Recorder), is added with "2" as the number of required channels. Both functions will reference Condition E from Required Action D.1.

2. The number of required channels for Function 21, Degrees of Subcooling, is revised to delete reference to Note (d), and the note is removed from ITS Table 3.3.17-1. Note (d) indicates 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). The note further states that at least one SPDS channel must be available to provide this backup, and that with both SPDS channels INOPERABLE, Condition C is applicable. (Condition C requires restoration of one channel to OPERABLE status within 7 days, or be in MODE 3 within 6 hours and be in MODE 4 within 12 hours).

DESCRIPTION OF REQUEST:

By letter dated July 29, 1997, FPC requested NRC review and approval of several changes to the Crystal River Unit 3 (CR-3) ITS, and proposed changes to the associated ITS Bases. These changes included revising the number of required channels for the Core Exit Temperature (Backup) function, and upgrading the classification of the Degrees of Subcooling variable from RG 1.97 Type B, Category 2, to Type A, Category 1. The NRC approved these changes by letter dated December 22, 1997, which included Amendment No. 162 to the CR-3 Facility Operating License No. DPR-72.

Core Exit Temperature (Thermocouple)

For the current Core Exit Temperature (Backup) function, the ITS change approved by Amendment No. 162 revised the number of required channels from "2 sets of 5" to "3 per core quadrant". This ITS change recognized that the sixteen core exit thermocouples were not segregated into redundant channels. The approved ITS change assured that a representative distribution of temperatures across the core was made available to the operators.

Function 18a, Core Exit Temperature (Thermocouple), will require a minimum of two of the core exit thermocouples in each core quadrant to be OPERABLE (at least one from each channel). This ITS change will make the number of required channels for this function consistent with the other post-accident monitoring instrumentation functions listed in ITS Table 3.3.17-1. Two core exit thermocouples in each core quadrant provides the capability to determine overall distribution of temperatures across the core.

Core Exit Temperature (Recorder)

Function 18b, Core Exit Temperature (Recorder), recognizes the planned physical modifications to replace the three existing, non-redundant recorders on the main control board with two, redundant recorders. These new recorders will be fed from separate and redundant emergency power supplies. Two core exit thermocouples from each core quadrant, for a total of eight core exit thermocouples, will be displayed on each recorder. The ITS change contained in this LAR makes the number of required channels for this function consistent with the other post-accident monitoring instrumentation functions listed in ITS Table 3.3.17-1.

Degrees of Subcooling

For the Degrees of Subcooling function, the configuration approved by Amendment No. 162 included use of the two, non-safety related digital subcooling margin monitors located on the main control board as the two primary channels for indicating subcooling margin. These monitors are the Bailey digital indicators, RC-4-TI4 and RC-4-TI5. If either one of these two primary instruments are INOPERABLE, then either channel of SPDS can be used as a backup to satisfy the ITS Limiting Condition for Operation (LCO).

The ITS change contained in this LAR is to delete reference to Note (d) and remove the note from ITS Table 3.3.17-1. This change is to recognize the upgrades of the SPDS to be implemented during the next refueling outage. Following these upgrades, the SPDS will serve as the primary indication of subcooling margin. Following deletion of Note (d), the number of required channels will be "2" to reflect the two channels of SPDS being available for the Degrees of Subcooling function. This ITS change makes the number of required channels for this function consistent with the other post-accident monitoring instrumentation functions listed in ITS Table 3.3.17-1.

REASON FOR REQUEST:

FPC is requesting NRC approval of these ITS changes for specified PAM instrumentation variables as a result of previous commitments made to upgrade the instrumentation used for monitoring of subcooling margin. These commitments were the result of FPC review of the emergency operating procedures (EOPs) during the extended outage from September 1996 through February 1998, and were based on ensuring the instrumentation used as RG 1.97 Type A variables reasonably meet the recommended criteria of RG 1.97 for Category 1 instruments.

Core Exit Temperature (Thermocouple)

The ITS change to add a separate Core Exit Temperature (Thermocouple) function is the result of the planned modifications to separate the sixteen environmentally qualified core exit thermocouples and associated instrument loops into two, redundant channels. This modification is scheduled for implementation during Refueling Outage 11, planned for fall of 1999. This modification will ensure that the core exit thermocouples meet the redundancy criterion recommended by RG 1.97 for Category 1 instrumentation. Also, since these core exit thermocouples serve as an input to the SPDS for calculating subcooling margin, this redundancy is necessary for the SPDS to meet this same recommended criterion. The ITS change to the number of required channels is also consistent with the other post-accident monitoring instrumentation functions listed in ITS Table 3.3.17-1. Two core exit thermocouples in each core quadrant provides the capability to determine overall distribution of temperatures across the core.

Core Exit Temperature (Recorder)

The ITS change to add a separate Core Exit Temperature (Recorder) function is also a result of the planned modifications to be implemented during Refueling Outage 11. This modification will replace the three existing recorders with two, redundant recorders. This modification will ensure the redundancy criterion recommended by RG 1.97 for Category 1 instrumentation is met by the core exit temperature recorders. The proposed number of required channels in this ITS change is consistent with the other post-accident monitoring instrumentation functions listed in ITS Table 3.3.17-1

Degrees of Subcooling

For the Degrees of Subcooling function, planned modifications will upgrade the SPDS to serve as the primary indication of subcooling margin. The existing Bailey digital indicators, RC-4-TI4 and RC-4-TI5, will be removed from the CR-3 design. These indicators have become obsolete, and as they age, the rate of component failure is anticipated to increase. Consequently, they have become increasingly difficult to maintain in an OPERABLE status. Since they are obsolete, spare parts have also become extremely difficult to obtain. For these reasons, the indicators are to be removed, and monitoring of subcooling margin is to be performed by the SPDS. Therefore, while Degrees of Subcooling remains a RG 1.97 Type A, Category 1 variable, the instrumentation used to fulfill this function will be the SPDS as modified during Refueling Outage 11.

EVALUATION OF REQUEST:

FPC has evaluated the proposed changes to the ITS Table 3.3.17-1, and has determined that the changes are consistent with the previously approved Amendment No. 162, including commitments provided by FPC to the NRC during the review and approval for Amendment No. 162. As further described below, the proposed changes are consistent with the previous statements of compliance with the recommendations of RG 1.97 for the Core Exit Temperature (Thermocouple), Core Exit Temperature (Recorder), and Degrees of Subcooling functions.

Core Exit Temperature (Thermocouple)

The sixteen environmentally qualified core exit thermocouples are to be separated into two, redundant channels during Refueling Outage 11. Following this modification, the core exit thermocouples and associated instrument loops will meet the RG 1.97 Category 1 instrumentation recommendation for redundancy. In addition, this modification will eliminate the existing three recorders on the main control board, and add two new, separate channel recorders in their place. It is also expected that the modification will result in removing several signal-conditioning modules located in the Reactor Coolant Inventory Tracking System (RCITS) cabinets.

The requirement to have a minimum number of core exit thermocouples in each core quadrant OPERABLE is being retained, but is being revised to two instead of three. Each core quadrant will still include a total of four core exit thermocouples, but these will be separated into two independent channels containing two core exit thermocouples each for additional redundancy. The minimum required number of core exit thermocouples in each core quadrant is being reduced as a result of the increased reliability created by this redundancy. The two required core exit thermocouples in each core quadrant must be from separate channels. The net effect of the ITS change to the ITS Table 3.3.17-1, and the planned physical modifications, is to preserve the original intent approved in Amendment No. 162 while increasing the reliability and availability of the core exit thermocouples for use following an accident. All other previous statements of compliance with the recommendations of RG 1.97 associated with the core exit thermocouples are unaffected, with full qualification achieved for meeting the redundancy recommendations of RG 1.97 following the planned modifications.

Core Exit Temperature (Recorder)

The three existing core exit temperature recorders will be replaced by two redundant recorders during Refueling Outage 11. Following this modification, the core exit temperature recorders will meet the RG 1.97 Category 1 instrumentation recommendation for redundancy.

Although the physical design of the core exit temperature recorders is being changed, the requirement to have a minimum number of core exit temperature recorders OPERABLE is being retained. The effect of the ITS change to the ITS Table 3.3.17-1, and the planned physical modifications, is to preserve the original intent approved in Amendment No. 162. All other previous statements of compliance with the recommendations of RG 1.97 associated with the core exit temperature recorders are unaffected, with the only exception being that full

qualification will now be achieved for meeting the redundancy recommendations of RG 1.97 following the planned modifications.

Degrees of Subcooling

For the Degrees of Subcooling function, the planned upgrades of the SPDS for use as the primary indication of subcooling margin, and removal from the CR-3 design of the existing Bailey digital indicators, RC-4-TI4 and RC-4-TI5, is to be implemented during Refueling Outage 11. The modifications to the SPDS were proposed by letter from FPC to the NRC dated July 29, 1997, which provided a description of, and evaluation of, the proposed final design of the SPDS.

Attachment A of the July 29, 1997 letter described the commitments to the design changes to be implemented for the SPDS. These commitments included the following:

1. The SPDS displays will be labeled as Regulatory Guide 1.97 instruments on the main control board.

2. The power supply to the SPDS will be separated into a train "A" and "B" redundant system, powered from safety-related inverters which are backed up by the station standby power sources, i.e., the emergency diesel generators.

3. The major components necessary for the operation of SPDS will be physically restrained to prevent motion and minimize the probability of damage during a seismic event.

4. A redundant "B" channel low range reactor coolant system (RCS) pressure signal will be provided to both trains of the SPDS for calculating subcooling margin.

Commitments 1 through 3 will be implemented during Refueling Outage 11. The last commitment has already been implemented. In addition, a commitment was provided to ensure the operators are trained in the use of the SPDS as the primary means of determining subcooling margin prior to restart from Refueling Outage 11.

Following these planned upgrades, the display provided by the SPDS will not be changed. Currently, the SPDS monitors display a digital readout of the subcooling margin (degrees of subcooling) in the upper right hand corner of each SPDS display. Additionally, the SPDS displays a graphical plot of RCS pressure on the Y-axis (ordinate) versus RCS hot leg temperature, RCS cold leg temperature, and core exit temperature on the X-axis (abscissa). Reference pressure/temperature curves showing saturation pressure versus temperature, and acceptable operating limits for pressure versus temperature, are superimposed on this graphical plot. This allows the operators to quickly determine if any trends affecting subcooling margin are being experienced. Additionally, the operators are alerted to a loss of adequate subcooling margin by the SPDS displays changing to a red background with the numerical value of subcooling margin indicated by large white numerals. A timer is also started indicating the elapsed time since subcooling margin was lost as a further aid to the operator. This is a valuable indication to the operator, necessary to ensure compliance with the EOP steps that require tripping the RCS pumps within two minutes of loss of adequate subcooling margin.

Since the current SPDS display already provides the same indications as the proposed, modified SPDS, the operators have already been able to observe expected SPDS displays and response during operator requalification training on the plant simulator.

Based on the proposed modifications to SPDS, and the removal of the existing Bailey digital indicators, loss of the SPDS indication of subcooling margin will be addressed in the EOPs. Upon this loss, backup indication will be provided by manually plotting the current reactor conditions on a graphical plot of pressure and temperature contained in the appropriate EOPs. This process of manually plotting reactor conditions was discussed by letter from FPC to the NRC dated October 29, 1997, and was provided in response to an NRC request for additional information during review of Revision 1 of Technical Specification Change Request Number 209, dated July 29, 1997. This plotting of the current reactor conditions allows the operators to quickly determine if adequate margin to saturation is available. The values of reactor pressure and temperature used for this manual plotting are obtained from instrumentation that is qualified as RG 1.97 Type A, Category 1 instrumentation.

Attachment F of the July 29, 1997, letter provided an evaluation of how the proposed design of the SPDS, subsequent to the committed modifications, would meet each of the recommended criteria from RG 1.97, and provided justification for any deviation from this criteria. Some of the previous statements of compliance with the recommendations of RG 1.97 for the Degrees of Subcooling function require revision to address the currently planned design of the SPDS. Therefore, to assist the reviewers of this requested change, and to recognize the modifications that have already been implemented to the SPDS, the following evaluation of the current and proposed SPDS design is provided.

1. Equipment Qualification

Environmental Qualification

The instrumentation should be qualified in accordance with Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants," and the methodology described in NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment."

Instrumentation whose ranges are required to extend beyond those ranges calculated in the most severe design basis accident event for a given variable should be qualified using the guidance provided in paragraph 6.3.6 of ANS-4.5.

Qualification applies to the complete instrumentation channel from sensor to display where the display is a direct-indicating meter or recording device. If the instrumentation channel signal is to be used in a computer-based display, recording, or diagnostic program, qualification applies from the sensor up to and including the channel isolation device.

Degree of Compliance - Full

All equipment used for subcooling margin monitoring, which is located in a harsh environment, has been reviewed. The sensing devices for core exit temperature, wide range

RCS pressure, RCS hot leg temperature and associated cables, connections, and building penetrations are all qualified to the requirements of 10 CFR 50.49. Originally, only the "A" side low range RCS pressure sensing device, cables, connections and penetrations were qualified to the requirements of 10 CFR 50.49. Modifications have been completed to the "B" side low range RCS pressure components to similarly qualify the same devices as the "A" side. Therefore, all required components are fully qualified.

Seismic Qualification

The instrumentation should be qualified in accordance with Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants," and the methodology described in NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment."

Instrumentation whose ranges are required to extend beyond those ranges calculated in the most severe design basis accident event for a given variable should be qualified using the guidance provided in paragraph 6.3.6 of ANS-4.5.

Qualification applies to the complete instrumentation channel from sensor to display where the display is a direct-indicating meter or recording device. If the instrumentation channel signal is to be used in a computer-based display, recording, or diagnostic program, qualification applies from the sensor up to and including the channel isolation device.

Degree of Compliance - Partial

The safety-related portions of the system are all seismically designed in accordance with the CR-3 seismic licensing basis. This includes the RCITS cabinets, which are equally qualified. The remote shutdown auxiliary cabinets and non-nuclear instrumentation (NNI) cabinets have been evaluated as part of the resolution of Unresolved Safety Issue (USI) A-46, Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors. The remote shutdown auxiliary cabinets were determined to be seismically adequate. Two of the four NNI cabinets were determined to be seismically adequate. The remaining two cabinets are not bolted together, and were therefore classified as outliers in accordance with the CR-3 USI A-46 plant specific procedure. This deficiency will be corrected in accordance with the CR-3 USI A-46 outlier resolution program. The "A" and "B" SPDS multiplexers and multiplexer servers are not seismically qualified, but are housed in seismically qualified cabinets. The SPDS computers and displays are not seismically qualified, but are either supported seismically, seismically restrained from becoming missiles, or housed in seismically qualified cabinets. As previously committed to, all major components necessary for the operation of the system will be physically restrained to prevent motion and minimize the probability of damage during a seismic event.

Justification for Deviation

The plant is located in a very low seismic risk region. The probability that a seismic event will occur and damage this equipment is very low. In the unlikely event damage does occur as a result of a seismic event, corrective actions will be initiated to restore the equipment in

accordance with the actions required by ITS 3.3.17. If both SPDS displays are damaged by a seismic event, backup indication will be provided by manually plotting the current reactor conditions on a graphical plot of pressure and temperature contained in the appropriate EOPs. The values of reactor pressure and temperature used for this manual plotting are obtained from RG 1.97 Type A, Category 1 instrumentation that is seismically qualified.

2. Redundancy

No single failure within either the accident monitoring instrumentation, its auxiliary supporting features, or its power sources concurrent with the failures that are a condition or result of a specific accident should prevent the operators from being presented the information necessary for them to determine the safety status of the plant and to bring the plant to and maintain it in a safe condition following that accident. Where failure of one accident-monitoring channel results in information ambiguity (that is, the redundant displays disagree) that could lead operators to defeat or fail to accomplish a required safety function, additional information should be provided to allow the operators to deduce the actual conditions in the plant. This may be accomplished by providing additional independent channels of information of the same variable (addition of an identical channel) or by providing an independent channel to monitor a different variable that bears a known relationship to the multiple channels (addition of a diverse channel). Redundant or diverse channels should be electrically independent and physically separated from each other and from equipment not classified important to safety in accordance with Regulatory Guide 1.75, "Physical Independence of Electric Systems," up to and including any isolation device. Within each redundant division of a safety system, redundant monitoring channels are not needed except for steam generator level instrumentation in two-loop plants.

Degree of Compliance - Partial (Subsequent to Modification)

In the final configuration, two redundant channels of subcooling margin monitoring will be provided. These two channels will be electrically independent with the following exceptions:

1. The field input signals are non-safety related and are terminated on common terminal strips in the RECALL/SPDS field input cabinet located in the "C" emergency feedwater initiation and control (EFIC) room. These signals are then provided to both channels of SPDS using hard wired ribbon cables. Redundancy is not maintained at these field terminations and cable separation is not maintained from the signal origin.

2. The keyboard commander located on the main control board serves as a switching device for both channels of SPDS and the five plant computer monitors. This switching box is a common point in the system where redundancy is not maintained.

Justification for Deviation

If a failure occurs causing both SPDS displays to present ambiguous information, backup indication will be provided by manually plotting the current reactor conditions on a graphical plot of pressure and temperature contained in the appropriate EOPs. The values

of reactor pressure and temperature used for this manual plotting are obtained from RG 1.97 Type A, Category 1 instrumentation. The pressure and temperature instruments used each include two separate and redundant channels.

3. Power Source

The instrumentation should be energized from station standby power sources as provided in Regulatory Guide 1.32, "Criteria for Safety-Related Electrical Power Systems for Nuclear Power Plants," and should be backed up by batteries where momentary interruption is not tolerable.

Degree of Compliance - Full (Subsequent to Modification)

In the final configuration, the AC power for the redundant channels will be supplied from independent, safety-related inverters, backed up by the station standby power sources (emergency diesel generators). The DC power for the inverters is from independent, safety-related station batteries. The AC power supply for the NNI cabinets is from these same sources. The NNI cabinet AC power supply is also auctioneered with redundant AC power supplies (VBDP-1 and VBDP-7) fed from non-safety related regulated instrument buses, to provide additional defense-in-depth. One of these AC power supplies, VBDP-7, is powered by an inverter supplied with AC power and DC power from non-safety related power supplies.

4. Channel Availability

The instrumentation channel should be available prior to an accident except as provided in paragraph 4.11, "Exception," as defined in IEEE Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations," or as specified in the technical specifications.

Degree of Compliance - Full

The required channels of SPDS, including the subcooling margin monitoring function, will be available prior to an accident. The required actions if one or both channels for the Degrees of Subcooling function are inoperable are contained in the proposed ITS Table 3.3.17-1.

5. Quality Assurance

The recommendations of the following regulatory guides pertaining to quality assurance should be followed:

Regulatory Guide 1.28 "Quality Assurance Program Requirements (Design and Construction)"

Regulatory Guide 1.30 "Quality Assurance Requirements for the Installation, (Safety Guide 30) Inspection, and Testing of Instrumentation and Electric Equipment"

Regulatory Guide 1.38 "Quality Assurance Requirements for Packing, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants"

Regulatory Guide 1.58 "Qualification of Nuclear Power Plant Inspection, Examination, and Testing Personnel"

Regulatory Guide 1.64 "Quality Assurance Requirements for the Design of Nuclear Power Plants"

Regulatory Guide 1.74 "Quality Assurance Terms and Definitions"

Regulatory Guide 1.88 "Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records"

Regulatory Guide 1.123 "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants"

Regulatory Guide 1.144 "Auditing of Quality Assurance Programs for Nuclear Power Plants"

Regulatory Guide 1.146 "Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants"

Reference to the above regulatory guides (except Regulatory Guides 1.30 and 1.38) is being made pending issuance of a revision to Regulatory Guide 1.28 that is under development (Task RS 002-5) and that will endorse ANSI/ASME NQA-1-1979, "Quality Assurance Program Requirements for Nuclear Power Plants."

Degree of Compliance - Partial

The safety-related portions of the system have been qualified in accordance with the FPC Quality Assurance Program that complies with the requirements of 10 CFR 50, Appendix B, and has been approved by the NRC. FPC has committed to all of the regulatory guides listed above except for RG 1.28. FPC commitment to this guidance is documented and clarified in Table 1-3 of the CR-3 FSAR. Commitments related to RG 1.28 are contained in FPC commitment to RG 1.33 and through FPC compliance with 10 CFR 50, Appendix B. The recommendation is fully met for these components.

The two RCS pressure channels (low range and wide range) are safety-related up through an isolation device in the engineered safeguards cabinets. One of the RCS hot leg temperature channels is safety-related up through an isolation device in a remote shutdown auxiliary cabinet. All sixteen core exit temperature channels (eight per SPDS train) are safety-related. The remaining components are non-safety related, but satisfy the quality assurance recommendations of RG 1.97 for Category 2 variables.

Justification for Deviation

The human factors advantages of this personal computer-based system more than outweigh the loss of quality resulting from a lack of 10 CFR 50, Appendix B qualification for all

components. The SPDS is continually in service, and monitored for proper operation by control room operators. Any malfunction will be promptly detected. There will be a high degree of confidence that the system will function when called upon to do so. Since the SPDS is continuously in service, failures will be readily evident and corrective actions can be initiated expeditiously.

The SPDS was originally installed in accordance with the requirements of Generic Letter 82-33, "Supplement 1 to NUREG-0737 - Requirements for Emergency Response Capability." One of the specific requirements that the SPDS must meet includes a high degree of reliability. The SPDS was declared operational July 24, 1985, and since original installation SPDS availability has been consistently over 99%.

6. Display and Recording

Continuous real-time display should be provided. The indication may be on a dial, digital display, CRT, or stripchart recorder. Recording of instrumentation readout information should be provided for at least one redundant channel.

If direct and immediate trend or transient information is essential for operator information or action, the recording should be continuously available on redundant dedicated recorders. Otherwise, it may be continuously updated, stored in computer memory, and displayed on demand. Intermittent displays such as data loggers and scanning recorders may be used if no significant transient response information is likely to be lost by such devices.

Degree of Compliance - Full (Subsequent to Modification)

Continuous real-time display is provided by each of the two, redundant SPDS displays. Recording of subcooling margin is performed at one-second intervals, and stored in the SPDS computer memory. In the final configuration for the SPDS subcooling margin display, this information will have the capability to be displayed in trend format.

7. Range

If two or more instruments are needed to cover a particular range, overlapping of instrument span should be provided. If the required range of monitoring instrumentation results in a loss of instrumentation sensitivity in the normal operating range separate instruments should be used.

Degree of Compliance - Full

RG 1.97, Table 3, recommends a range of 200°F subcooling to 35°F superheat. The SPDS subcooling margin range exceeds this recommendation.

8. Equipment Identification

Types A, B, and C instruments designated as Categories 1 and 2 should be specifically identified with a common designation on the control panels so that the operator can easily discern that they are intended for use under accident conditions.

Degree of Compliance - Full (Subsequent to Modifications)

The SPDS displays will be designated as RG 1.97 Category 1 instruments in accordance with CR-3 labeling requirements during Refueling Outage 11.

9. Interfaces

The transmission of signals for other use should be through isolation devices that are designed as part of the monitoring instrumentation and that meet the provisions of this document.

Degree of Compliance - None

Where signals are fed from safety-related systems for use by the SPDS for subcooling margin indication, isolation devices are provided to protect the safety-related systems from faults in the SPDS. No isolation devices are provided to protect signals to the SPDS from faults in other safety-related or non-safety related components.

Justification for Deviation

Since the SPDS is continuously in service, the control room operators will promptly detect malfunctions of the SPDS resulting from failures or other faults of components connected to the system. Prompt corrective actions can then be taken to restore the SPDS to an operable status. Failure of interconnected components during an event has a very low probability. Also, since the system is redundant, failure of a single channel will not cause a loss of the Degrees of Subcooling function.

10. Servicing, Testing, and Calibration

Servicing, testing, and calibration programs should be specified to maintain the capability of the monitoring instrumentation. If the required interval between testing is less than the normal time interval between plant shutdowns, a capability for testing during power operation should be provided.

Whenever means for removing channels from service are included in the design, the design should facilitate administrative control of the access to such removal means.

The design should facilitate administrative control of access to all setpoint adjustments, module calibration adjustments, and test points.

Periodic checking, testing, calibration, and calibration verification should be in accordance with the applicable portions of Regulatory Guide 1.118, "Periodic Testing of Electric Power and Protection Systems," pertaining to testing of instrument channels. (Note: Response time testing not usually needed.)

The location of the isolation device should be such that it would be accessible for maintenance during accident conditions.

Degree of Compliance - Full

The SPDS design, and the program for calibrating and maintaining SPDS, complies with all of the above recommendations. In addition, SPDS and the SPDS input instrumentation required for calculation and display of subcooling margin will be subject to a monthly CHANNEL CHECK as described in existing ITS Surveillance Requirement (SR) 3.3.17.1, and a biennial CHANNEL CALIBRATION as described in existing ITS SR 3.3.17.2.

11. Human Factors

The instrumentation should be designed to facilitate the recognition, location, replacement, repair, or adjustment of malfunctioning components or modules.

The monitoring instrumentation design should minimize the development of conditions that would cause meters, annunciators, recorders, alarms, etc., to give anomalous indications potentially confusing to the operator. Human factors analysis should be used in determining type and location of displays. To the extent practicable, the same instruments should be used for accident monitoring as are used for the normal operations of the plant to enable the operators to use, during accident situations, instruments with which they are most familiar.

Degree of Compliance – Full

Subcooling margin is displayed on the SPDS displays mounted above the main control board. Real-time indication of subcooling margin is the most desirable method of monitoring the variable from a human factors perspective. Operators will be trained to use the SPDS displays as the primary means of determining subcooling margin. Providing subcooling margin data on the SPDS displays provides unique flexibility in the presentation of information to the operator, including more information than the current, simple digital indication of subcooling margin could provide:

- Subcooling margin is automatically calculated from core exit temperatures when SPDS determines that no reactor coolant pumps are running, whereas the current Bailey digital indicators require the operator to manually select the inputs used to calculate subcooling margin.

- The SPDS display indicates if subcooling margin is being calculated from RCS hot leg temperature or core exit temperature, so that the operator can verify the proper inputs are being used to calculate subcooling margin based on plant conditions.

- In the event of an alarm, subcooling margin information is enlarged to cover the entire display. The display colors change to white characters on a red background, with the characters being as large as possible displaying the actual value of subcooling margin.

- In the event of an alarm, a timer starts to aid the operators in determining how long adequate subcooling margin has been lost. This is useful in determining the need to trip all reactor coolant pumps within two minutes of the loss of adequate subcooling margin.

12. Direct Measurement

To the extent practicable, monitoring instrumentation inputs should be from sensors that directly measure the desired variables. An indirect measurement should be made only when it can be shown by analysis to provide unambiguous information.

Degree of Compliance - Full

Subcooling margin is not directly measurable. However, all of the temperature and pressure inputs to SPDS used in the calculation of subcooling margin are direct measurements of actual RCS conditions.

NO SIGNIFICANT HAZARDS CONSIDERATION:

Florida Power Corporation has reviewed the requirements of 10 CFR 50.92 as they apply to the proposed License Amendment and considers the changes not to involve a significant hazards consideration. In support of this conclusion, the following analysis is provided:

1. *Involve a significant increase in the probability or consequences of an accident previously evaluated?*

   The proposed changes to the Degrees of Subcooling, Core Exit Temperature (Thermocouple), and Core Exit Temperature (Recorder) functions in the CR-3 Improved Technical Specifications (ITS) ensure appropriate post-accident monitoring instrumentation is available for use by the operators during implementation of emergency operating procedures. These emergency operating procedures provide direction to the operators for ensuring that actions required to mitigate the effects of the previously evaluated design basis accidents are performed. The instrumentation is used for monitoring by the operators after an accident occurs, perform no automatic functions, and there are no credible failures of this instrumentation which could initiate any accident previously evaluated. Therefore, the probability of occurrence of any accident previously evaluated is unaffected.

   The availability and use of this instrumentation ensures that the prescribed manual operator actions for mitigating the consequences of an accident will be implemented when necessary, and that the operator has sufficient information to verify required automatic actions have occurred when necessary. The availability and use of the instrumentation provides assurance that the consequences of accidents will not be greater than that previously evaluated. The associated modifications that are planned for these post-accident monitoring instruments will enhance the reliability of the required indications to the operators.

2. *Create the possibility of a new or different kind of accident from previously evaluated accidents?*

   The proposed changes to this post-accident monitoring instrumentation will ensure appropriate instrumentation is available for use by the operators following a design basis accident. This instrumentation is necessary for performing certain manual actions, or to

verify automatic actions have occurred, which are required to mitigate the effects of a design basis accident. The instrumentation is used for monitoring by the operators after an accident occurs, perform no automatic functions, and there are no credible failures of this instrumentation which could initiate a new or different kind of accident. Therefore, the possibility of a new or different kind of accident occurring as a result of this passive instrumentation is not created.

3. *Involve a significant reduction in a margin of safety?*

The proposed changes to this post-accident monitoring instrumentation provide additional assurance that adequate instrumentation is available for use by the operators to perform manual actions, and to verify that automatic actions that are required to mitigate the effects of a design basis accident have occurred. The instrumentation is used for monitoring by the operators after an accident occurs, and perform no automatic functions. The availability and use of this instrumentation ensures that the prescribed manual operator actions for mitigating the consequences of an accident will be implemented when necessary, and that the operators have sufficient information to verify required automatic actions have occurred when necessary. These required manual and automatic actions are necessary to preserve the margin of safety as defined in the CR-3 ITS. The availability and use of this instrumentation provides assurance that the existing margin of safety will be maintained, and assumptions related to the margin of safety during mitigation of design basis accidents will be preserved. Therefore, the existing margin of safety will not be reduced.

ENVIRONMENTAL IMPACT EVALUATION:

While 10 CFR 51 requires an environmental assessment (EA) or environmental impact statement (EIS) for any "major Federal action significantly affecting the quality of the human environment," it does allow the NRC discretion in evaluating the extent to which EAs or EISs are necessary. EAs or EISs are not required for any action included in the list of "categorical exclusions" set forth in 10 CFR 51.22(c). Specifically, 10 CFR 51.22(c)(9), provides that an EA is not required for the issuance of an amendment provided that:

(i) the amendment involves no significant hazards consideration,

(ii) there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite, and

(iii) there is no significant increase in individual or cumulative occupational radiation exposure.

FPC considers that the provisions of 10 CFR 51.22(c)(9) are applicable to this request for changes to the Degrees of Subcooling, Core Exit Temperature (Thermocouple), and Core Exit Temperature (Recorder) functions in the CR-3 ITS. For the reasons described below and elsewhere in this submittal, FPC believes that the three criteria of 10 CFR 51.22(c)(9) are satisfied. Therefore, this License Amendment should be considered under the "categorical exclusions" provisions of 10 CFR 51.22(c)(9).

The basis for this determination includes the following:

1. The proposed changes to the required post-accident monitoring instrumentation in the CR-3 ITS do not involve significant hazards as discussed above in the No Significant Hazards Consideration.

2. The proposed changes to the required post-accident monitoring instrumentation in the CR-3 ITS do not result in a significant change in the types or significant increase in the amounts of any effluents that may be release offsite. The change does not result in an increase in the consequences of previously evaluated accidents. Therefore, there will be no environmental impact from these changes in the CR-3 ITS.

3. The proposed changes to the required post-accident monitoring instrumentation in the CR-3 ITS do not result in a significant increase in individual or cumulative occupational exposure. This conclusion is based on the fact that changes do not result in any increased consequences of accidents previously evaluated. Also, failure of the affected post-accident monitoring instrumentation is not an initiator of a design basis accident or event. Therefore, for the reasons given in this submittal, there will be no change in offsite consequences due to this action and its impact is bounded by the impacts assumed in the existing Final Environmental Statement (FES) for CR-3. Even if the NRC chooses to perform an EA, information provided in the FES, together with this submittal should assist the NRC in making a "finding of no significant impact" in accordance with 10 CFR 51.32.