FPL

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
License Amendment Request for
Steam Generator Alternate Repair Criteria
for Tube Portion within the Tubesheet

Pursuant to 10 CFR 50.90, Florida Power and Light Company (FPL) requests to amend Technical Specifications (TS) of Facility Operating Licenses DPR-31 and DPR-41 for Turkey Point Units 3 and 4.

The proposed amendments would revise the TS 3/4.4.5 Steam Generator (SG) Surveillance Requirements and TS 3/4.4.6 Reactor Coolant System Leakage. The purpose of these modifications is to clearly delineate the scope of the inservice inspections required in the tube sheet regions of the Turkey Point Units 3 and 4 SGs.

The attached License Amendment Request (LAR) is subdivided as follows:

Enclosure 1 provides a description and assessment of the proposed changes.

Enclosure 2 provides the existing TS pages marked-up to show the proposed changes.

Enclosure 3 provides the proposed revised TS pages.

Enclosure 4 provides the existing TS Bases pages marked-up to show the proposed changes. The marked-up TS Bases pages are provided for information only.

Enclosure 5 is a copy of the non-proprietary WCAP-16506-NP dated December 2005, "Steam Generator Alternate Repair Criteria for Tube Portion Within the Tubesheet at Turkey Point Units 3 and 4."

Enclosure 6 is a copy of the proprietary WCAP-16506-P dated December 2005, "Steam Generator Alternate Repair Criteria for Tube Portion Within the Tubesheet at Turkey Point Units 3 and 4."

Enclosure 7 is a copy of the Westinghouse authorization letter CAW-06-2092 with accompanying affidavit, Proprietary Information Notice and Copyright Notice.

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Enclosure 6 contains information proprietary to Westinghouse Electric Company LLC; it is supported by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.390 of the Commissions' regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10CFR 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse affidavit should reference CAW-06-2092 and should be addressed to B.F. Maurer, Acting manager, Regulatory Compliance and Plant Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

FPL requests approval of the proposed amendment by September 1, 2006, with the amendment implementation period of 60 days from date of issuance. The requested approval date will support implementation prior to the Fall 2006 Unit 4 refueling outage currently scheduled to commence October 29, 2006.

The license amendments proposed by FPL have been reviewed by the Turkey Point Plant Nuclear Safety Committee and the FPL Company Nuclear Review Board. In accordance with 10 CFR 50.91(b)(1), a copy of the proposed license amendment is being forwarded to the State Designee for the State of Florida.

Please contact Mr. Walter J. Parker, Licensing Manager at 305-246-6632 if there are any questions about this submittal.

Very truly yours,

Terry Jones

Terry O. Jones
Vice President
Turkey Point Nuclear Plant

ENCLOSURES

1 Description and Assessment
2 Proposed Technical Specification Changes (Mark up)
3 Proposed Technical Specification Pages
4 Proposed Technical Specification Bases Pages (Mark up for information only)
5 WCAP-16506-NP
6 WCAP-16506-P
7 Westinghouse Letter CAW-06-092, Affidavit, Propriety Info. & Copyright Notices

cc: Regional Administrator, Region II, USNRC
USNRC Project Manager, Turkey Point
Senior Resident Inspector, USNRC, Turkey Point
W. A. Passetti, Florida Department of Health

STATE OF FLORIDA)
)
COUNTY OF MIAMI-DADE)

Terry O. Jones, being first duly sworn, deposes and says:

That he is Vice President, Turkey Point Plant, of Florida Power & Light Company, the Licensee herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensee.

Terry O. Jones
TERRY O. JONES

Sworn to and subscribed before me

This 21 day of April, 2006

By Terry O. Jones, who is personally known to me.

Tracy S. Davis

Tracy S Davis
My Commission DD364248
Expires September 12, 2008

ENCLOSURE 1

Description and Assessment

ENCLOSURE 1

DESCRIPTION OF THE PROPOSED AMENDMENT AND ASSESSMENT

1.0 Introduction

Pursuant to 10 CFR 50.90, Florida Power and Light Company (FPL) requests to amend Facility Operating Licenses DPR-31 and DPR-41 for Turkey Point Units 3 and 4. This proposed license amendment request (LAR) revises the requirements in the Turkey Point Units 3 and 4 Technical Specifications (TS) related to Steam Generator (SG) Tube Sample Selection and Inspection, and Reactor Coolant System Leakage.

2.0 Description of Proposed Amendment

The Turkey Point TS would be revised as follows:

TS 4.4.5.4.a.6 currently states:

"Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness;"

TS 4.4.5.4.a.6 would be revised as follows (text in bold is new):

"Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness. **This criterion does not apply to degradation identified in the portion of the tube below 17 inches from the top of the hot leg tubesheet. Degradation found in the portion of the tube below 17 inches from the top of the hot leg tubesheet does not require plugging. *All* tubes with degradation identified in the portion of the tube within the region from the top of the tubesheet to 17 inches below the top of the tubesheet shall be removed from service;"**

TS 4.4.5.4.a.8 currently states:

"Tube inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg, or from the point of entry (cold leg side) completely around the U-bend and to the bottom of the hot leg; and"

TS 4.4.5.4.a.8 would be revised as follows (text in bold is new):

"Tube inspection means an inspection of the steam generator tube from **17 inches below the top of the tubesheet** ~~the point of entry~~ (hot leg side) completely around the U-bend to the top support of the cold leg side, or from the point of entry (cold leg side)

completely around the U-bend and to **a point 17 inches below the top of the tubesheet on** ~~the bottom of~~ the hot leg; and"

TS 3.4.6.2.c currently states:

"1 GPM total primary-to-secondary leakage through all steam generators and 500 gallons per day through any one steam generator,"

TS 3.4.6.2.c will be revised as follows (text in bold is new):

"~~1 GPM total~~ **150 GPD** primary-to-secondary leakage through ~~all steam generators and 500 gallons per day through~~ any one steam generator,"

This LAR also includes proposed revisions to the TS Bases as described below:

TS B 3/4.4.5 currently states:

"....The extent of cracking during plant operation will be limited by the limitation of steam generator tube leakage between the Reactor Coolant System and the Secondary Coolant System (reactor-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a reactor-to-secondary coolant leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that reactor-to-secondary leakage of 500 gallons per day per steam generator can readily be detected by radiation monitors of steam generator blow down. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged."

TS B 3/4.4.5 will be revised as follows (text in bold is new):

"....The extent of cracking during plant operation will be limited by the limitation of steam generator tube leakage between the Reactor Coolant System and the Secondary Coolant System (reactor-to-secondary leakage = **150** ~~500~~ gallons per day per steam generator **at room temperature**). **The 150 gallons per day leakage limit is acceptable as it ensures that leakage under hot normal operating conditions will be less than that assumed in the Turkey Point Units 3 and 4 safety analyses. Satisfying the 150 gallons per day limit, coupled with periodic condition monitoring, is sufficient to ensure that leakage under accident conditions will remain within the licensing basis accident analyses.** ~~Cracks having a reactor-to-secondary coolant leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents.~~ Operating plants have demonstrated that reactor-to-secondary leakage of **150** ~~500~~ gallons per day per steam generator can readily be detected by radiation monitors of steam generator blow down. Leakage in excess of this limit will

require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged."

TS B 3/4.4.6.2 currently states:

"The total steam generator tube leakage limit of 1 gpm for all steam generators ensures that the dosage contribution from the tube leakage will be limited to a small fraction of 10 CFR 100 dose guideline values in the event of either a steam generator tube rupture or steam line break. The 500 gpd leakage limit per steam generator ensures that steam generator tube integrity is maintained in the event of a main steam line rupture or under LOCA conditions."

TS B 3/4.4.6.2 will be revised as follows (text in bold is new):

"The ~~total steam generator tube~~ **150 gpd primary-to-secondary** leakage limit ~~of 1 gpm for all~~ **per** steam generators **could result in a total primary-to-secondary leakage of 450 gpd for all steam generators. This leakage limit** ensures that the dosage contribution **for all steam generators** from the tube leakage will be limited to a small fraction of 10 CFR 100 dose guideline values in the event of either a steam generator tube rupture or steam line break. The ~~500~~ **150** gpd leakage limit per steam generator **also** ensures that steam generator tube integrity is maintained in the event of a ~~main~~ steam line ~~rupture~~ **break** or under LOCA conditions. **The Turkey Point Units 3 and 4 safety analyses for steam line break assume 500 gpd per steam generator (accident conditions). Thus, the assumed total primary-to-secondary leakage from all steam generators is acceptable since it ensures leakage under hot operating conditions will be less than that considered in the Turkey Point Units 3 and 4 safety analyses**"

3.0 Background

In August 2004, the NRC issued Generic Letter (GL) 2004-01[1] to determine if PWR licensees were implementing SG tube inspections in accordance with applicable requirements. The Turkey Point Units 3 and 4 responses to GL 2004-01[2] (L-2004-227) described the most recent tube inspections and concluded that the NDE methods utilized were fully capable of detecting all flaws that may be present based upon Turkey Point and industry experience.

In April 2005, the NRC issued Information Notice (IN) 2005-09[3], "Indications in Thermally Treated Alloy 600 Steam Generator Tubes and Tube-to-Tubesheet Welds" describing inspection findings from the Catawba Unit 2 SGs during the Fall 2004 RFO. Tube indications were

[1] NRC Generic Letter 2004-01: "Requirements for Steam Generator Tube Inspections," August 30, 2004, ML042370766.
[2] FPL letter L-2004-227, Response to NRC GL 2004-01, October 29, 2004.
[3] NRC Information Notice 2005-09: "Indications in Thermally Treated Alloy 600 Steam Generator Tubes and Tube-to-Tubesheet Welds," April 7, 2005.

reported approximately seven inches from the top of the hot leg tubesheet in one tube, and just above the tube-to-tubesheet welds in the tack expansion region of several other tubes. Finally, indications were also reported in a number of the tube-end welds. The affected Catawba Unit 2 SGs are the Westinghouse Model D5 design, with thermally treated Alloy 600 tubes hydraulically expanded into the tube sheet.

In March 2005, Vogtle Unit 1 discovered circumferential crack indications in two tubes at over-expanded areas in the hot leg tubesheet of SG 4[4]. The four Unit 1 SGs are Westinghouse Model F design, with thermally treated Alloy 600 tubes hydraulically expanded into the tubesheets.

The findings at Catawba and Vogtle were significant because they indicated that degradation of thermally treated Alloy 600 tubes could potentially occur in the tubesheet region. They were also noteworthy because potential crack-like indications were first found in manufacturing anomalies (e.g., bulges or tubesheet anomalies) rather than at other tube locations such as the expansion transition or U-bend region that were previously thought to be the most susceptible to cracking. Finally, the findings presented three distinct issues with regard to future inspections of thermally treated Alloy 600 tubes that have been hydraulically expanded into the tubesheet:

1) indications in internal bulges within the tubesheet
2) indications at the elevation of the tack expansion transition, and
3) indications in the tube-to-tubesheet welds, including some extending into the tube.

4.0 Technical Basis/Justification for Proposed Change

4.1 Design

Turkey Point Units 3 and 4 are both three loop Westinghouse designed NSSSs, with one Model 44F SG installed in each primary loop. Each SG incorporates 3214 tubes fabricated from thermally treated Alloy 600. The tubes are installed in the tubesheet via full depth hydraulic expansion and are seal-welded to the primary face of the tubesheet.

4.2 Inspection Practices/Results

The Turkey Point Units 3 and 4 SG Inspection Program requires that a degradation assessment (DA) be performed prior to each refueling outage. Its purpose is to determine the susceptible areas of the tubing to be inspected, and the appropriate eddy current techniques for the inspection of each area. Data gathered is utilized as input to the subsequent condition monitoring (CM) and operational assessments (OA). The Turkey Point SG Inspection Program satisfies the intent of Nuclear Energy Institute (NEI) 97-06[5], "Steam Generator Program Guidelines."

The most recent Turkey Point Unit 3 SG inspections[6] were performed during the Fall 2004 (EOC 20) refueling outage. They included full length bobbin probe examinations of all active tubes,

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[4] OE20339: "Vogtle Unit 1 Steam Generator Tube Crack Indications," Institute of Nuclear Power Operations (INPO), Atlanta, GA, April 4, 2005.
[5] NEI 97-06 Rev. 1, Steam Generator Program Guidelines, January 2001.
[6] FPL Engineering Evaluation PTN-ENG-SESJ-05-006, Rev. 0, "Condition Monitoring and Operational Assessment for the Turkey Point Unit 3 Steam Generators Based on Eddy Current Examination End of Cycle 20, October 2004"

and sample inspections with a rotating probe for low row U-bends and dings/dents. Additionally, all active tube hot legs were inspected with rotating probes from +3 to -2 inches, referenced to the secondary face of the tubesheets. There were no indications of degradation in the low row U-bends, tube dings/dents or expansion transitions, and there was no evidence of corrosion degradation.

The most recent Turkey Point Unit 4 SG inspections[7] were performed during the Fall 2003 (EOC 20) refueling outage. They included full length bobbin probe examinations of all active tubes, and sample inspections with rotating probe for low row U-bends and dings/dents. Additionally, all active tube hot legs were inspected with rotating probes from +3 to -2 inches, referenced to the secondary face of the tubesheets. There were no indications of degradation in the low row U-bends, tube dings/dents or expansion transitions, and there was no evidence of corrosion degradation.

4.3 Analysis

In an effort to limit the inspection depth within the tubesheet region of the Turkey Point Units 3 and 4 SGs, a technical evaluation[8] (WCAP-16506-P) was performed to identify the portion of the tube within the hot leg tubesheet necessary to maintain structural and leakage integrity for both normal operating and accident conditions. The determination of the required engagement depth was based upon finite element model structural analyses and a bounding leak rate evaluation. Furthermore, this evaluation considered the requirements of the ASME Code, Regulatory Guides, NRC Generic Communications, Code of Federal Regulations, NEI 97-06 and additional industry requirements.

The findings of WCAP-16506-P are:

1) The structural integrity of the primary-to-secondary pressure boundary is unaffected by tube degradation of any magnitude below a tube location-specific depth ranging from 4.78 to 8.04 inches, designated as H*. The pullout resistance of the tubes was demonstrated for axial forces associated with 3 times the normal operating differential pressure and 1.4 times the differential pressure associated with the most severe postulated accident.
2) The accident condition leak rate integrity can be bounded by twice the normal operation leak rate (150 gpd as modified by this LAR) from degradation below 17 inches from the top of the 21.81 inch thick tubesheet, including degradation of the tube end welds. This is apparent from comparison of the contact pressures from the finite element analyses over the full range of radii from the center of the tubesheet, and ignores any increase in the leak rate resistance due to the contact pressure changes and associated tightening of the crack flanks.

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[7] FPL Engineering Evaluation PTN-ENG-SEMS-03-076, Rev. 0, "Condition Monitoring and Operational Assessment for the Turkey Point Unit 4 Steam Generators Based on Eddy Current Examination End of Cycle 20, October 2003"

[8] WCAP-16506-P: "Steam Generator Alternate Repair Criteria for Tube Portion Within the tubesheet at Turkey Point Units 3 and 4," December 2005.

The findings of WCAP-16506-P indicate that no inspection of the tube-to-tubesheet welds, tack roll region or anomalies below 17 inches from the top of the tubesheet is necessary to assure compliance with the structural and primary-to-secondary leak rate requirements for the SGs (i.e., tube pullout is precluded and steam line break (SLB) leakage will remain within accident analysis assumptions through primary-to-secondary side leakage monitoring). Based upon these findings, FPL proposes to limit the inspection of SG tubes to a depth of 17 inches from the top of the tube sheet. Tube inspection and plugging will be completed as defined in the modified plant Technical Specifications.

In support of the leak rate analysis contained in WCAP-16506-P, this LAR also includes a conservative modification of the primary-to-secondary leakage LCO (TS 3.4.6.2.c) from 1 gpm total and 500 gpd per SG (at accident conditions) to 150 gpd per SG (at room temperature). This modification reduces the potential for tube rupture and provides margin to account for a potential increase in leakage due to higher differential pressure under accident conditions. This modification is also consistent with the NRC-approved Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, Rev. 4 "Steam Generator Tube Integrity."[9]

4.4 Conclusion

The evaluation results support a license amendment to eliminate inspection of the region of the tube below the 17 inch elevation from the top of the tubesheet. Such an amendment is interpreted to constitute a redefinition of the primary-to-secondary pressure boundary relative to the original design of the SG and requires the approval of the NRC staff through a license amendment. Potential degradation regions excluded from examination would be limited to below 17 inches from the top of the tubesheet in the nominally 21.81 inch thick tubesheet, which is well below the mid-plane of the tubesheet.

5.0 Regulatory Analysis

Steam generator tube inspection and repair limits are specified in Section 3/4.4.5 of the Turkey Point Units 3 and 4 Technical Specifications. The current TS require that flawed tubes be repaired if the depths of the flaws are greater than or equal to 40 percent through wall. The TS repair limits ensure that tubes accepted for continued service will retain adequate structural and leakage integrity during normal operating, transient, and postulated accident conditions, consistent with General Design Criteria (GDC) 14, 15, 30, 31, and 32 of 10 CFR 50, Appendix A. Structural integrity refers to maintaining adequate margins against gross failure, rupture, and collapse of the SG tubing. Leakage integrity refers to limiting primary-to-secondary leakage to within acceptable limits.

At normal operating pressures, leakage from primary water stress corrosion cracking (PWSCC) below the 17 inch inspection depth is limited by both the tube-to-tubesheet crevice and the limited crack opening permitted by the tubesheet constraint. Consequently, negligible

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[9] Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-449, Revision 4, "Steam Generator Tube Integrity."

normal operating leakage is expected from cracks within the tubesheet region. Primary-to-secondary leakage flow due to a postulated SG tube rupture (SGTR) is not affected since the tubesheet enhances the tube integrity in the region of the hydraulic expansion by precluding tube deformation beyond its initial expanded outside diameter. The resistance to both tube rupture and collapse is strengthened by the tubesheet in that region. Primary-to-secondary leakage due to a postulate SLB is limited to a value less than twice the leakage occurring during normal operating conditions. The limited inspection depth of 17 inches maintains the NEI 07-06, Rev. 2 and Regulatory Guide 1.121 margins against leakage for both normal and postulated accident conditions.

For design basis events, the required structural margins of the SG tubes will be maintained by the presence of the tubesheet. Tube rupture is precluded for cracks in the hydraulic region due to the constraint provided by the tubesheet. The limited inspection depth of 17 inches from the top of the tubesheet provides the necessary resistive force to preclude loads which could result in tube pullout under normal operating and accident conditions. Additionally, SLB leakage will remain within accident analyses assumptions (and the applicable NEI 97-06, Rev. 2 performance criteria) through primary-to-secondary leakage monitoring.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 No Significant Hazards Consideration

Florida Power and Light Company has evaluated the no significant hazards considerations involved with the proposed amendment, focusing on the three standards set forth in 10 CFR 50.92(c):

"The commission may make a final determination, pursuant to the procedures in paragraph 50.91, that a proposed amendment to an operating license for a facility licensed under paragraph 50.21(b) or paragraph 50.22 or for a testing facility involves no significant hazards considerations, if operation of the facility in accordance with the proposed amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or

(2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or

(3) Involve a significant reduction in a margin of safety."

The following evaluation is provided for the no significant hazards considerations.

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

Of the various accidents previously evaluated, the proposed changes only affect the SG tube rupture (SGTR) event evaluation and the postulated steam line break accident evaluation. Loss-of-coolant accident (LOCA) conditions cause a compressive axial load to act on the tube. Therefore, since the LOCA tends to force the tube into the tubesheet rather than pull it out, it is not a factor in this amendment request. Another faulted load consideration is a safe shutdown earthquake (SSE); however, the seismic analysis of Series 44F SGs has shown that axial loading of the tubes is negligible during a SSE.

For the SGTR event, the required structural margins of the SG tubes will be maintained by the presence of the tubesheet. Tube rupture is precluded for cracks in the hydraulic expansion region due to the constraint provided by the tubesheet. Therefore, Regulatory Guide (RG) 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes," margins against burst are maintained for both normal and postulated accident conditions.

The limited inspection length of 17 inches supplies the necessary resistive force to preclude pullout loads under both normal operating and accident conditions. The contact pressure results from the hydraulic expansion process, thermal expansion mismatch between the tube and tubesheet and from the differential pressure between the primary and secondary side. The proposed changes do not affect other systems, structures, components or operational features. Therefore, the proposed change results in no significant increase in the probability of the occurrence of a SGTR event.

The consequences of an SGTR event are affected by the primary-to-secondary leakage flow during the event. Primary-to-secondary leakage flow through a postulated broken tube is not affected by the proposed change since the tubesheet enhances the tube integrity in the region of the hydraulic expansion by precluding tube deformation beyond its initial expanded outside diameter. The resistance to both tube rupture and collapse is strengthened by the tubesheet in that region. At normal operating pressures, leakage from primary water stress corrosion cracking (PWSCC) below 17 inches from the top of the tubesheet is limited by both the tube-to-tubesheet crevice and the limited crack opening permitted by the tubesheet constraint. Consequently, negligible normal operating leakage is expected from cracks within the tubesheet region.

The probability of a SLB is unaffected by the potential failure of a SG tube as the failure of a tube is not an initiator for a SLB event. SLB leakage is limited by leakage flow restrictions resulting from the crack and tube-to-tubesheet contact pressures that provide a restricted leakage path above the indications and also limit the degree of crack face opening compared to free span indications. The leak rate during postulated accident conditions would be expected to be less than twice that during normal operation for indications near the bottom of the tubesheet (including indications in the tube end welds) based on the observation that while the driving pressure increases by about a factor of two, the flow resistance increases with an increase in the tube-to-tubesheet contact. While such a decrease is rationally expected, the postulated accident

leak rate is bounded by twice the normal operating leak rate if the increase in contact pressure is ignored. Since normal operating leakage is limited to less than 150 gpd, the attendant accident condition leak rate, assuming all leakage to be from lower tubesheet indications, would be bounded by 300 gpd. This value is less than the 500 gpd leak rate assumed during a postulated SLB in the Turkey Point Units 3 and 4 Updated Final Safety Analysis Report (UFSAR).

Therefore, based on the above evaluation, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. *Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?*

The proposed changes do not introduce any changes or mechanisms that create the possibility of a new or different kind of accident. Tube bundle integrity is expected to be maintained for all plant conditions upon implementation of the limited tubesheet inspection depth methodology. The proposed changes do not introduce any new equipment or any change to existing equipment. No new effects on existing equipment are created nor are any new malfunctions introduced.

Therefore, based on the above evaluation, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. *Does the change involve a significant reduction in a margin of safety?*

The proposed changes maintain the required structural margins of the SG tubes for both normal and accident conditions. NEI 97-06, Rev. 2 and RG 1.121 are used as the basis in the development of the limited tubesheet inspection depth methodology for determining that SG tube integrity considerations are maintained within acceptable limits. RG 1.121 describes a method acceptable to the NRC staff for meeting General Design Criteria 14, 15, 31, and 32 by reducing the probability and consequences of an SGTR. RG 1.121 concludes that by determining the limiting safe conditions of tube wall degradation beyond which tubes with unacceptable cracking, as established by inservice inspection, should be removed from service or repaired, the probability and consequences of a SGTR are reduced. This RG uses safety factors on loads for tube burst that are consistent with the requirements of Section III of the ASME Code.

For axially oriented cracking located within the tubesheet, tube burst is precluded due to the presence of the tubesheet. For circumferentially oriented cracking, WCAP-16506-P defines a length of degradation free expanded tubing that provides the necessary resistance to tube pullout due to the pressure induced forces (with applicable safety factors applied). Application of the limited tubesheet inspection depth criteria will preclude unacceptable primary-to-secondary leakage during all plant conditions. The methodology for determining leakage provides for large margins between calculated and actual leakage values in the proposed limited tubesheet inspection depth criteria.

Plugging of the SG tubes reduces the reactor coolant flow margin for core cooling. Implementation of the 17 inch inspection length at Turkey Point Units 3 and 4 will result in maintaining the margin of flow that may have otherwise been reduced by tube plugging.

Based on the above, it is concluded that the proposed changes do not result in any reduction of margin with respect to plant safety as defined in the UFSAR or Bases of the plant Technical Specifications.

7.0 Environmental Evaluation

FPL has evaluated the proposed amendment and determined it does no involve: (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed license amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental assessment or impact statement need be prepared in connection with the proposed amendment.

ENCLOSURE 2

Technical Specifications Mark-up and Inserts

REACTOR COOLANT SYSTEM

STEAM GENERATORS

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.4 Acceptance Criteria

a. As used in this specification:

1) Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections;

2) Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube;

3) Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation;

4) % Degradation means the percentage of the tube wall thickness affected or removed by degradation;

5) Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.

6) Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness; Insert A

7) Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.5.3c, above;

17 inches below the top of the tubesheet

8) Tube Inspection means an inspection of the steam generator tube from the point of entry (hot leg side) completely around the U-bend to the top support of the cold leg, or from the point of entry (cold leg side) completely around the U-bend and to the bottom of the hot leg; and

a point 17 inches below the top of the tubesheet on

Insert A
. This criterion does not apply to degradation identified in the portion of the tube below 17 inches from the top of the hot leg tubesheet. Degradation found in the portion of the tube below 17 inches from the top of the hot leg tubesheet does not require plugging. All tubes with degradation identified in the portion of the tube within the region from the top of the tubesheet to 17 inches below the top of the tubesheet shall be removed from service;

REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATING

3.4.6.2 Reactor Coolant System leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 GPM UNIDENTIFIED LEAKAGE,

150 GPD

c. 1 GPM total primary-to-secondary leakage through all steam generators and 500 gallons per day through any one steam generator,

d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, and

e. Leakage as specified in Table 3.4-1 up to a maximum of 5 GPM at a Reactor Coolant System pressure of 2235 ± 20 psig from any Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1.*

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With any Reactor Coolant System Pressure Isolation Valve leakage greater than allowed by 3.4.6.2.e above operation may continue provided:

1. Within 4 hours verify that at least two valves in each high pressure line having a non-functional valve are in, and remain in that mode corresponding to the isolated condition, i.e., manual valves shall be locked in the closed position; motor operated valves shall be placed in the closed position and power supplies deenergized. Follow applicable ACTION statement for the affected system, and

* Test pressure less than 2235 psig are allowed. Minimum differential test pressure shall not be less than 150 psid. Observed leakage shall be adjusted for the actual test pressure up to 2235 psig assuming the leakage to be directly proportional to pressure differential to the one-half power.

ENCLOSURE 3

Proposed Revised Technical Specification Pages

REACTOR COOLANT SYSTEM

STEAM GENERATORS

SURVEILLANCE REQUIREMENTS (Continued)

4.4.5.4 Acceptance Criteria

a. As used in this specification:

1) Imperfection means an exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as imperfections;

2) Degradation means a service-induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube;

3) Degraded Tube means a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation;

4) % Degradation means the percentage of the tube wall thickness affected or removed by degradation;

5) Defect means an imperfection of such severity that it exceeds the plugging limit. A tube containing a defect is defective.

6) Plugging Limit means the imperfection depth at or beyond which the tube shall be removed from service because it may become unserviceable prior to the next inspection and is equal to 40% of the nominal tube wall thickness. This criterion does not apply to degradation identified in the portion of the tube below 17 inches from the top of the hot leg tubesheet. Degradation found in the portion of the tube below 17 inches from the top of the hot leg tubesheet does not require plugging. All tubes with degradation identified in the portion of the tube within the region from the top of the tubesheet to 17 inches below the top of the tubesheet shall be removed from service.

7) Unserviceable describes the condition of a tube if it leaks or contains a defect large enough to affect its structural integrity in the event of an Operating Basis Earthquake, a loss-of-coolant accident, or a steam line or feedwater line break as specified in 4.4.5.3c, above;

8) Tube Inspection means an inspection of the steam generator tube from 17 inches below the top of the tubesheet (hot leg side) completely around the U-bend to the top support of the cold leg, or from the point of entry (cold leg side) completely around the U-bend and to a point 17 inches below the top of the tubesheet on the hot leg; and

REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATING

3.4.6.2 Reactor Coolant System leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE,

b. 1 GPM UNIDENTIFIED LEAKAGE,

c. 150 GPD total primary-to-secondary leakage through any one steam generator,

d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, and

e. Leakage as specified in Table 3.4-1 up to a maximum of 5 GPM at a Reactor Coolant System pressure of 2235 ± 20 psig from any Reactor Coolant System Pressure Isolation Valve specified in Table 3.4-1.*

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With any Reactor Coolant System Pressure Isolation Valve leakage greater than allowed by 3.4.6.2.e above operation may continue provided:

1. Within 4 hours verify that at least two valves in each high pressure line having a non-functional valve are in, and remain in that mode corresponding to the isolated condition, i.e., manual valves shall be locked in the closed position; motor operated valves shall be placed in the closed position and power supplies deenergized. Follow applicable ACTION statement for the affected system, and

* Test pressure less than 2235 psig are allowed. Minimum differential test pressure shall not be less than 150 psid. Observed leakage shall be adjusted for the actual test pressure up to 2235 psig assuming the leakage to be directly proportional to pressure differential to the one-half power.

ENCLOSURE 4

Marked-up Pages and Inserts for Technical Specifications Bases Control Program, ADM-536

ATTACHMENT 1
(Page 45 of 103)

TECHNICAL SPECIFICATION BASES

3/4.4 REACTOR COOLANT SYSTEM (Continued)

3/4.4.5 STEAM GENERATORS

The Surveillance Requirements for inspection of the steam generator tubes ensure that the structural integrity of this portion of the RCS will be maintained. The program for inservice inspection of steam generator tubes is based on a modification of Regulatory Guide 1.83, Revision 1. Inservice inspection of steam generator tubing is essential in order to maintain surveillance of the conditions of the tubes in the event that there is evidence of mechanical damage or progressive degradation due to design, manufacturing errors, or inservice conditions that lead to corrosion. Inservice inspection of steam generator tubing also provides a means of characterizing the nature and cause of any tube degradation so that corrective measures can be taken.

150

at room temperature

The plant is expected to be operated in a manner such that the secondary coolant will be maintained within those chemistry limits found to result in negligible corrosion of the steam generator tubes. If the secondary coolant chemistry is not maintained within these limits, localized corrosion may likely result in stress corrosion cracking. The extent of cracking during plant operation would be limited by the limitation of steam generator tube leakage between the Reactor Coolant System and the Secondary Coolant System (reactor-to-secondary leakage = 500 gallons per day per steam generator). Cracks having a reactor-to-secondary leakage less than this limit during operation will have an adequate margin of safety to withstand the loads imposed during normal operation and by postulated accidents. Operating plants have demonstrated that reactor-to-secondary leakage of 500 gallons per day per steam generator can readily be detected by radiation monitors of steam generator blowdown. Leakage in excess of this limit will require plant shutdown and an unscheduled inspection, during which the leaking tubes will be located and plugged.

150

Wastage-type defects are unlikely with the all volatile treatment (AVT) of the secondary coolant. However, even if a defect should develop in service, it will be found during scheduled inservice steam generator tube examinations. Plugging will be required for all tubes with imperfections exceeding the plugging limit of 40% of the tube nominal wall thickness. Steam generator tube inspections of operating plants have demonstrated the capability to reliably detect degradation that has penetrated 20% of the original tube wall thickness.

The 150 gallons per day leakage limit is acceptable as it ensures that leakage under hot normal operating conditions will be less than that assumed in the Turkey Point Units 3 and 4 safety analyses. Satisfying the 150 gallon per day, coupled with periodic condition monitoring, is sufficient to ensure that leakage under accident conditions will remain within the licensing basis accident analyses.

TECHNICAL SPECIFICATION BASES

3/4.4 REACTOR COOLANT SYSTEM (Continued)

3/4.4.5 STEAM GENERATORS (Continued)

Whenever the results of any steam generator tubing inservice inspection fall into Category C-3, these results will be promptly reported to the Commission in a Special Report pursuant to Specification 6.9.2 within 30 days and prior to resumption of plant operation. Such cases will be considered by the Commission on a case-by-case basis and may result in a requirement for analysis, laboratory examinations, tests, additional eddy-current inspection, and revision of the Technical Specifications, if necessary.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

The RCS Leakage Detection Systems required by this specification are provided to monitor and detect leakage from the reactor coolant pressure boundary to the containment. The containment sump level system is the normal sump level instrumentation. The Post Accident Containment Water Level Monitor - Narrow range instrumentation also functions as a sump level monitoring system. In addition, gross leakage will be detected by changes in makeup water requirements, visual inspection, and audible detection. Leakage to other systems will be detected by activity changes (e.g., within the component cooling system) or water inventory changes (e.g., tank levels).

3/4.4.6.2 OPERATIONAL LEAKAGE

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Therefore, the presence of any PRESSURE BOUNDARY LEAKAGE requires the unit to be promptly placed in COLD SHUTDOWN.

Industry experience has shown that while a limited amount of leakage is expected from the RCS, the unidentified portion of this leakage can be reduced to a threshold value of less than 1 gpm. This threshold value is sufficiently low to ensure early detection of additional leakage.

The total steam generator tube leakage limit of 1 gpm for all steam generators ensures that the dosage contribution from the tube leakage will be limited to a small fraction of 10 CFR Part 100 dose guideline values in the event of either a steam generator tube rupture or steam line break. The 500 gpd leakage limit per steam generator ensures that steam generator tube integrity is maintained in the event of a main steam line rupture or under LOCA conditions.

Insert A

The 10 gpm IDENTIFIED LEAKAGE limitation provides allowance for a limited amount of leakage from known sources whose presence will not interfere with the detection of UNIDENTIFIED LEAKAGE by the Leakage Detection Systems.

INSERT A

The 150 gpd primary-to-secondary leakage limit per steam generator could result in a total primary-to-secondary leakage of 450 gpd for all steam generators. This leakage limit ensures that the dosage contribution for all steam generators from the tube leakage will be limited to a small fraction of 10 CFR 100 dose guideline values in the event of either a steam generator tube rupture or steam line break. The 150 gpd leakage limit per steam generator also ensures that steam generator tube integrity is maintained in the event of a steam line break or under LOCA conditions. The Turkey Point Units 3 and 4 safety analyses for steam line break assume 500 gpd per steam generator (accident conditions). Thus, the assumed total primary-to-secondary leakage from all steam generators is acceptable since it ensures leakage under hot operating conditions will be less than that considered in the Turkey Point Units 3 and 4 safety analyses.