UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 26, 2015

Vice President, Operations
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3 - ISSUANCE OF AMENDMENTS REGARDING IMPLEMENTATION OF TECHNICAL SPECIFICATION TASK FORCE 510, "REVISION TO STEAM GENERATOR PROGRAM INSPECTION FREQUENCIES AND TUBE SAMPLE SELECTION" (TAC NOS. MF3752 AND MF3753)

Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 281 to Facility Operating License No. DPR-26 for the Indian Point Nuclear Generating Unit No. 2 and Amendment No. 257 to Facility Operating License No. DPR-64 for the Indian Point Nuclear Generating Unit No. 3. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated April 1, 2014.

The amendments revise the TSs by implementing Technical Specification Task Force Traveler (TSTF) 510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection."

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly *Federal Register* notice.

Sincerely,

Douglas V. Pickett

Douglas V. Pickett, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-247 and 50-286

Enclosures:
1. Amendment No. 281 to DPR-26
2. Amendment No. 257 to DPR-64
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

ENTERGY NUCLEAR INDIAN POINT 2, LLC

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-247

INDIAN POINT NUCLEAR GENERATING UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

AND TECHNICAL SPECIFICATIONS

Amendment No. 281
License No. DPR-26

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Nuclear Operations, Inc. (the licensee), dated April 1, 2014, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. DPR-26 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A, B and C, as revised through Amendment No. 281, are hereby incorporated in the license. ENO shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Michael I. Dudek, Acting Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the License and
Technical Specifications

Date of Issuance: May 26, 2015

ATTACHMENT TO LICENSE AMENDMENT NO. 281

FACILITY OPERATING LICENSE NO. DPR-26

DOCKET NO. 50-247

Replace the following page of the License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page	Insert Page
3	3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages
3.4.17-1	3.4.17-1
3.4.17-2	3.4.17-2
5.5-6	5.5-6
5.5-7	5.5-7
5.5-8	5.5-8
-----	5.5-8a
5.6-4	5.6-4
5.6-5	5.6-5

instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) ENO pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; Amdt. 42 10-17-78

(5) ENO pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility. Amdt. 220 09-06-01

C. This amended license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

ENO is authorized to operate the facility at steady state reactor core power levels not in excess of 3216 megawatts thermal. Amdt. 241 10-27-04

(2) Technical Specifications

The Technical Specifications contained in Appendices A, B, and C, as revised through Amendment No. 281, are hereby incorporated in the license. ENO shall operate the facility in accordance with the Technical Specifications.

(3) The following conditions relate to the amendment approving the conversion to Improved Standard Technical Specifications:

1. This amendment authorizes the relocation of certain Technical Specification requirements and detailed information to licensee controlled documents as described in Table R, "Relocated Technical Specifications from the CTS," and Table LA, "Removed Details and Less Restrictive Administrative Changes to the CTS" attached to the NRC staff's Safety Evaluation enclosed with this amendment. The relocation of requirements and detailed information shall be completed on or before the implementation of this amendment.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Steam Generator (SG) Tube Integrity

LCO 3.4.17 SG tube integrity shall be maintained.

AND

All SG tubes satisfying the tube plugging criteria shall be plugged in accordance with the Steam Generator Program.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each SG tube.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more SG tubes satisfying the tube plugging criteria and not plugged in accordance with the Steam Generator Program.	A.1	Verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection.	7 days
	AND		
	A.2	Plug the affected tube(s) in accordance with the Steam Generator Program.	Prior to entering MODE 4 following the next refueling outage or SG tube inspection
B. Required Action and associated Completion Time of Condition A not met. OR SG tube integrity not maintained.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.17.1	Verify SG tube integrity in accordance with the Steam Generator Program.	In accordance with the Steam Generator Program
SR 3.4.17.2	Verify that each inspected SG tube that satisfies the tube plugging criteria is plugged in accordance with the Steam Generator Program.	Prior to entering MODE 4 following a SG tube inspection

5.5 Programs and Manuals

5.5.6 Inservice Testing Program (continued)

b. The provisions of SR 3.0.2 are applicable to the above required Frequencies and to other normal and accelerated Frequencies specified as 2 years or less in the Inservice Testing Program for performing inservice testing activities,

c. The provisions of SR 3.0.3 are applicable to inservice testing activities, and

d. Nothing in the ASME OM Code shall be construed to supersede the requirements of any TS.

5.5.7 Steam Generator (SG) Program

A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following:

a. Provisions for condition monitoring assessments. Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during an SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected or plugged, to confirm that the performance criteria are being met.

b. Performance criteria for SG tube integrity. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational LEAKAGE.

   1. Structural integrity performance criterion: All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cool down), all anticipated transients included in the design specification and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary-to-secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary-to-secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads

5.5 Programs and Manuals

5.5.7 Steam Generator (SG) Program (continued)

contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.

2. Accident induced leakage performance criterion: The primary to secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 150 gpd per SG.

3. The operational LEAKAGE performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."

c. Provisions for SG tube plugging criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

The following SG tube alternate plugging criteria shall be applied as an alternative to the preceding criteria.

Tubes with service-induced flaws located greater than 18.9 inches below the top of the tubesheet do not require plugging. Tubes with service-induced flaws located in the portion of the tube from the top of the tubesheet to 18.9 inches below the top of the tubesheet shall be plugged upon detection.

d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from 18.9 inches below the top of the tubesheet on the hot leg side to 18.9 inches below the top of the tubesheet on the cold leg side, and that may satisfy the applicable tube plugging criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and

5.5 Programs and Manuals

5.5.7 Steam Generator (SG) Program (continued)

location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.

2. After the first refueling outage following SG installation, inspect each SG at least every 48 effective full power months or at least every other refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, and c below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

   a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 120 effective full power months. This constitutes the first inspection period;

   b) During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period; and

   c) During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the third and subsequent inspection periods.

5.5.7 Steam Generator (SG) Program (continued)

3. If crack indications are found in any SG tube, then the next inspection for each affected and potentially affected SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever results in more frequent inspections). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-line indication is not associated with a crack(s), then the indication need not be treated as a crack.

e. Provisions for monitoring operational primary to secondary LEAKAGE.

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

8. WCAP-12610-P-A, "VANTAGE+ Fuel Assembly Reference Core Report", April 1995;

9. WCAP-10079-P-A, "NOTRUMP, A Nodal Transient Small Break and General Network Code", August 1985;

10. WCAP-10054-P-A, "Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code", August 1985; and

11. WCAP-10054-P-A, Addendum 2, Revision 1, "Addendum to the Westinghouse Small Break ECCS Evaluation Model Using the NOTRUMP Code: Safety Injection Into the Broken Loop and Cosi Condensation Model", July 1997.

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided to the NRC upon issuance for each reload cycle.

5.6.6 Post Accident Monitoring Report

When a report is required by Condition B or F of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.7 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.7, Steam Generator (SG) Program. The report shall include:

a. The scope of inspections performed on each SG,

b. Degradation mechanisms found,

c. Nondestructive examination techniques utilized for each degradation mechanism, 5.6 Reporting Requirements

5.6.7 Steam Generator Tube Inspection Report (continued)

d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,

e. Number of tubes plugged during the inspection outage for each degradation mechanism,

f. The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG,

g. The results of condition monitoring, including the results of tube pulls and in-situ testing,

h. The primary to secondary leakage rate observed in each SG (if it is not practical to assign the leakage to an individual SG, the entire primary to secondary leakage should be conservatively assumed to be from one SG) during the cycle preceding the inspection which is the subject of the report,

i. The calculated accident leakage rate from the portion of the tubes below 18.9 inches from the top of the tubesheet for the most limiting accident in the most limiting SG. In addition, if the calculated accident leakage rate from the most limiting accident is less than 1.75 times the maximum primary to secondary leakage rate, the report should describe how it was determined, and

j. The results of monitoring for tube displacement (slippage). If slippage is discovered, the implications of the discovery and corrective action shall be provided.

UNITED STATES
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ENTERGY NUCLEAR INDIAN POINT 3, LLC

ENTERGY NUCLEAR OPERATIONS, INC.

DOCKET NO. 50-286

INDIAN POINT NUCLEAR GENERATING UNIT NO. 3

AMENDMENT TO FACILITY OPERATING LICENSE

AND TECHNICAL SPECIFICATIONS

Amendment No. 257
License No. DPR-64

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Entergy Nuclear Operations, Inc. (the licensee), dated April 1, 2014, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and Paragraph 2.C.(2) of Facility Operating License No. DPR-64 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 257, are hereby incorporated in the license. ENO shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

Michael I. Dudek

Michael I. Dudek, Acting Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the License and
Technical Specifications

Date of Issuance: May 26, 2015

ATTACHMENT TO LICENSE AMENDMENT NO. 257

FACILITY OPERATING LICENSE NO. DPR-64

DOCKET NO. 50-286

Replace the following page of the License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page	Insert Page
3	3

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages
3.4.17-1	3.4.17-1
3.4.17-2	3.4.17-2
5.0-13	5.0-13
5.0-14	5.0-14
5.0-15	5.0-15
5.0-36	5.0-36

(4) ENO pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; Amdt. 203 11/27/00

(5) ENO pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility. Amdt. 203 11/27/00

C. This amended license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

ENO is authorized to operate the facility at steady state reactor core power levels not in excess of 3216 megawatts thermal (100% of rated power).

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 257 are hereby incorporated in the License. ENO shall operate the facility in accordance with the Technical Specifications.

(3) (DELETED) Amdt. 205 2-27-01

(4) (DELETED) Amdt. 205 2-27-01

D. (DELETED) Amdt.46 2-16-83

E. (DELETED) Amdt.37 5-14-81

F. This amended license is also subject to appropriate conditions by the New York State Department of Environmental Conservation in its letter of May 2, 1975, to Consolidated Edison Company of New York, Inc., granting a Section 401 certification under the Federal Water Pollution Control Act Amendments of 1972.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.17 Steam Generator (SG) Tube Integrity

LCO 3.4.17 SG tube integrity shall be maintained.

AND

All SG tubes satisfying the tube plugging criteria shall be plugged in accordance with the Steam Generator Program.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

---------------------------------------NOTE--------------------------------------
Separate Condition entry is allowed for each SG tube.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more SG tubes satisfying the tube plugging criteria and not plugged in accordance with the Steam Generator Program.	A.1	Verify tube integrity of the affected tube(s) is maintained until the next refueling outage or SG tube inspection.	7 days
	AND		
	A.2	Plug the affected tube(s) in accordance with the Steam Generator Program.	Prior to entering MODE 4 following the next refueling outage or SG tube inspection
B. Required Action and associated Completion Time of Condition A not met. OR SG tube integrity not maintained.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.17.1	Verify SG tube integrity in accordance with the Steam Generator Program.	In accordance with the Steam Generator Program
SR 3.4.17.2	Verify that each inspected SG tube that satisfies the tube plugging criteria is plugged in accordance with the Steam Generator Program.	Prior to entering MODE 4 following a SG tube inspection

5.5.8 Steam Generator (SG) Program

A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following:

a. Provisions for condition monitoring assessments. Condition monitoring assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural integrity and accident induced leakage. The "as found" condition refers to the condition of the tubing during an SG inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging of tubes. Condition monitoring assessments shall be conducted during each outage during which the SG tubes are inspected or plugged, to confirm that the performance criteria are being met.

b. Performance criteria for SG tube integrity. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage, and operational LEAKAGE.

   1. Structural integrity performance criterion: All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cool down), all anticipated transients included in the design specification and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary-to-secondary pressure differential and a safety factor of 1.4 against burst applied to the design basis accident primary-to-secondary pressure differentials. Apart from the above requirements, additional loading conditions associated with the design basis accidents, or combination of accidents in accordance with the design and licensing basis, shall also be evaluated to determine if the associated loads contribute significantly to burst or collapse. In the assessment of tube integrity, those loads that do significantly affect burst or collapse shall be determined and assessed in combination with the loads due to pressure with a safety factor of 1.2 on the combined primary loads and 1.0 on axial secondary loads.

   2. Accident induced leakage performance criterion: The primary to secondary accident induced leakage rate for any design basis accident, other than a SG tube rupture, shall not exceed the

(continued)

5.5.8 Steam Generator (SG) Program (continued)

leakage rate assumed in the accident analysis in terms of total leakage rate for all SGs and leakage rate for an individual SG. Leakage is not to exceed 0.3 gpm per SG and 1 gpm through all SGs.

3. The operational LEAKAGE performance criterion is specified in LCO 3.4.13, "RCS Operational LEAKAGE."

c. Provisions for SG tube plugging criteria. Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube plugging criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.

2. After the first refueling outage following SG installation, inspect each SG at least every 72 effective full power months or at least every third refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, c and d below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new

(continued)

5.5.8 Steam Generator (SG) Program (continued)

form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 144 effective full power months. This constitutes the first inspection period;

b) During the next 120 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period;

c) During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the third inspection period; and

d) During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the fourth and subsequent inspection periods.

3. If crack indications are found in any SG tube, then the next inspection for each affected and potentially affected SG for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (whichever results in more frequent inspections). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-line indication is not associated with a crack(s), then the indication need not be treated as a crack.

e. Provisions for monitoring operational primary to secondary LEAKAGE.

---------------------NOTE--------------------
Pages 5.0-16 through 5.0-19 are deleted.
Next page is 5.0-20.

(continued)

5.6.7 Post Accident Monitoring Instrumentation (PAM) Report

When a report is required by LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the next 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.8 Steam Generator Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.8 Steam Generator (SG) Program. The report shall include:

a. The scope of inspections performed on each SG,

b. Degradation mechanisms found,

c. Nondestructive examination techniques utilized for each degradation mechanism,

d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,

e. Number of tubes plugged during the inspection outage for each degradation mechanism,

f. The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG, and

g. The results of condition monitoring, including the results of tube pulls and in-situ testing.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 281

TO FACILITY OPERATING LICENSE NO. DPR-26

AND AMENDMENT NO. 257

TO FACILITY OPERATING LICENSE NO. DPR-64

ENTERGY NUCLEAR INDIAN POINT 2, LLC,

ENTERGY NUCLEAR INDIAN POINT 3, LLC, AND

ENTERGY NUCLEAR OPERATIONS, INC.

INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3

DOCKET NOS. 50-247 AND 50-286

1.0 INTRODUCTION

By application dated April 1, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14099A227), Entergy Nuclear Operations, Inc. (Entergy, the licensee), requested changes to the Technical Specifications (TSs) for Indian Point Nuclear Generating Unit No. 2 (IP2) and Indian Point Nuclear Generating Unit No. 3 (IP3). The proposed license amendments would implement Nuclear Regulatory Commission (NRC) approved Technical Specification Task Force (TSTF) Improved Standard Technical Specifications Change Traveler 510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection" (ADAMS Accession No. ML110610350). The proposed changes represent an improvement to the existing steam generator (SG) inspection requirements and will continue to provide assurance that the plant licensing basis will be maintained between SG inspections. The availability of this TS improvement was announced in the *Federal Register* on October 27, 2011 (76 FR 66763), as part of the Consolidated Line Item Improvement Process.

2.0 REGULATORY EVALUATION

The following explains the applicability of General Design Criteria (GDC) for IP2 and IP3. The construction permits for IP2 and IP3 were issued by the Atomic Energy Commission (AEC) on October 14, 1966, and August 13, 1969, respectively, and the facility operating licenses were issued on September 28, 1973, and December 12, 1975, respectively.

The plant GDC are discussed in the Updated Final Safety Analysis Report (UFSAR) Chapter 1.3, "General Design Criteria," with more details given in the applicable UFSAR sections. The AEC published the final rule that added Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," in the *Federal Register* (36 FR 3255) on February 20, 1971, with the rule effective on May 21, 1971. In accordance with a U.S. Nuclear Regulatory Commission (NRC) staff requirements memorandum from S. J. Chilk to J. M. Taylor, "SECY-92-223 - Resolution of Deviations Identified During the Systematic Evaluation Program," dated September 18, 1992 (ADAMS Accession No. ML003763736), the Commission decided not to apply the Appendix A GDC to plants with construction permits issued prior to May 21, 1971. Therefore, the GDC that constitute the licensing bases for IP2 and IP3 are those in the UFSARs.

As discussed in the UFSARs, the licensees for IP2 and IP3 made some changes to the facilities over the life of the units that committed to some of the GDC from 10 CFR Part 50, Appendix A. The extent to which the Appendix A GDC have been invoked can be found in specific sections of the UFSARs and in other IP2 and IP3 licensing basis documentation, such as license amendments.

The regulations in 10 CFR establish the requirements with respect to the integrity of SG tubing. Specifically, the GDC in Appendix A to 10 CFR Part 50 state that the reactor coolant pressure boundary (RCPB) shall have "an extremely low probability of abnormal leakage ... and of gross rupture" (GDC 14), "shall be designed with sufficient margin to assure that the design conditions ... are not exceeded ..." (GDC 15), "shall be designed with sufficient margin that when stressed ... (1) the boundary behaves in a nonbrittle manner, and (2) the probability of rapidly propagating fracture is minimized" (GDC 31), shall be of "the highest quality standards practical" (GDC 30), and "shall be designed to permit periodic inspection and testing ... to assess ... structural and leaktight integrity" (GDC 32). These GDC are referred to in TSTF-510.

The licensee's application provides the following specifics regarding the applicable regulatory requirements, and specifically, how the intent of GDC 14, 15, 30, 31, and 32 of 10 CFR Part 50, Appendix A, are met for IP2 and IP3:

> The General Design Criteria which formed the bases for Indian Point 2 and 3 designs were published by the Atomic Energy Commission (AEC) in the *Federal Register* of July 11, 1967, and subsequently made part of 10 CFR 50. The application of the AEC proposed GDC to IP2 and IP3 is contained in the UFSARs. Appendix A of 10 CFR Part 50 GDC differ both in numbering and content from the AEC GDC for IP2/IP3.
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> *1967 GDC-9 Reactor Coolant Pressure Boundary* [RCPB] - The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of gross rupture or significant uncontrolled leakage throughout its design lifetime.
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> *1967 GDC-16 Monitoring Reactor Coolant Leakage* - Means shall be provided to detect significant uncontrolled leakage from the reactor coolant pressure boundary.

1967 GDC-33 Reactor Coolant Pressure Boundary Capability - The RCPB shall be capable of accommodating without rupture the static and dynamic load imposed on any boundary component as a result of an inadvertent and sudden release of energy to the coolant. As a design reference, this sudden release shall be taken as that which would result from a sudden reactivity insertion such as rod ejection (unless prevented by positive mechanical means), rod dropout, or cold water addition.

1967 GDC-34 Reactor Coolant Pressure Boundary Rapid Propagation Failure Prevention - The reactor coolant pressure boundary shall be designed and operated to reduce to an acceptable level the probability of rapidly propagating type failure. Consideration is given (a) to the provisions for control over service temperature and irradiation effects, which may require operational restrictions, (b) to the design and construction of the reactor pressure vessel in accordance with applicable codes, including those, which establish requirements for absorption of energy within the elastic strain energy range and for absorption of energy by plastic deformation and (c) to the design and construction of reactor coolant pressure boundary piping and equipment in accordance with applicable codes."

1967 GDC-36 RCPB Surveillance - RCPB components shall have provisions for inspection, testing, and surveillance of criteria areas by appropriate means to assess the structural and testing, and surveillance of criteria areas by appropriate means to assess the structural and leak tight integrity of the boundary components during their service lifetime.

The TS plugging limits ensure that tubes accepted for continued service will retain adequate structural and leakage integrity during normal operating, transient, and postulated accident conditions. The reactor coolant pressure boundary is designed, fabricated and constructed so as to have an exceedingly low probability of gross rupture or significant uncontrolled leakage throughout its design lifetime. Reactor coolant pressure boundary components have provisions for the inspection, testing, and surveillance of critical areas by appropriate means to assess the structural and leaktight integrity of the boundary components during their service lifetime. Structural integrity refers to maintaining adequate margins against burst and collapse of the SG tubing. Leakage integrity refers to limiting primary-to-secondary leakage to within acceptable limits during all plant conditions.

10 CFR 50, Appendix B, establishes quality assurance requirements for the design, construction, and operation of safety related components. The pertinent requirements of this appendix apply to all activities affecting the safety related functions of these components. These requirements are described in Criteria IX, XI, and XVI of Appendix B, and include control of special processes, inspection, testing, and corrective action.

> Under 10 CFR 50.65, the Maintenance Rule, licensees classify SGs as risk significant components because they are relied upon to remain functional during and after design basis events. SGs are to be monitored under 10 CFR 50.65(a)(2) against industry established performance criteria. Meeting the performance criteria of NEI [Nuclear Energy Institute] 97-06, Revision 3, provides reasonable assurance that the SG tubing remains capable of fulfilling its specific safety function of maintaining the reactor coolant pressure boundary."

The NRC's model safety evaluation for TSTF-510 (ADAMS Accession No. ML112101513) states that paragraph 50.55a(c)(1) of 10 CFR specifies that components that are part of the RCPB must meet the requirements for Class 1 components in Section III of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). Paragraph 50.55a(g)(4) of 10 CFR further requires, in part, that throughout the service life of a pressurized-water reactor (PWR) facility, ASME Code Class 1 components meet the requirements, except design and access provisions and preservice examination requirements in Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," of the ASME Code, to the extent practical. This requirement includes the inspection and repair criteria of Section XI of the ASME Code.

Section 50.36 of 10 CFR, "Technical specifications," establishes the requirements related to the content of the TSs. Pursuant to 10 CFR 50.36, TSs are required to include items in the following five categories related to station operation: (1) Safety limits, limiting safety system settings, and limiting control settings; (2) Limiting conditions for operation (LCOs); (3) Surveillance requirements (SRs); (4) Design features; and (5) Administrative controls. As described in TSTF-510, LCOs and accompanying action statements and SRs in the Standard TSs (STSs) relevant to SG tube integrity are in Specification 3.4.13, "Reactor Coolant System Operational Leakage," and Specification 3.4.20 (SR 3.4.20.2), "Steam Generator (SG) Tube Integrity." The SRs in the "Steam Generator (SG) Tube Integrity" specification reference the SG program, which is defined in the STS administrative controls.

Paragraph 50.36(c)(5) of 10 CFR defines administrative controls as, "The provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure the operation of the facility in a safe manner." Programs established by the licensee to operate the facility in a safe manner, including the SG program, are listed in the administrative controls section of the TSs. For IP2 and IP3, the SG program is defined in TSs 5.5.7 and 5.5.8, respectively, while the reporting requirements relating to implementation of the SG program are in TSs 5.6.7 and 5.6.8, respectively.

3.0 TECHNICAL EVALUATION

The SG tubes in PWRs have a number of important safety functions. These tubes are an integral part of the RCPB and, as such, are relied upon to maintain primary system pressure and inventory. As part of the RCPB, the SG tubes are unique in that they are also relied upon as a heat transfer surface between the primary and secondary systems such that residual heat can be removed from the primary system and are relied upon to isolate the radioactive fission products in the primary coolant from the secondary system. In addition, the SG tubes are relied upon to maintain their integrity to be consistent with the containment objectives of preventing uncontrolled fission product release under conditions resulting from core damage during severe accidents.

TSTF Travelers, such as TSTF-510, evaluate changes to the STSs. The STSs applicable to the IP2 and IP3 Nuclear Steam Supply System is NUREG-1431, "Standard Technical Specifications - Westinghouse Plants." The current STS provisions related to SG programs were established in May 2005 with the NRC staff's approval of TSTF-449, Revision 4, "Steam Generator Tube Integrity" (NRC *Federal Register* Notice of Availability 70 FR 24126). The TSTF-449 changes to the STSs incorporated a new, largely performance-based approach for ensuring that the integrity of the SG tubes is maintained. The performance-based provisions were supplemented by prescriptive provisions relating to tube inspections and tube repair limits to ensure that conditions adverse to quality are detected and corrected on in a timely manner. Per the licensee, TSTF-449 was implemented as Amendment 251 at IP2 and Amendment 233 at IP3.

After the issuance of TSTF-449, TSTF-510 was developed to reflect the industry's early implementation experience with respect to TSTF-449. TSTF-510 characterizes the changes as editorial corrections, changes, and clarifications intended to improve internal consistency, consistency with implementing industry documents, and usability, without changing the intent of the requirements. Further, according to the licensee's application, the proposed changes are an improvement to the existing SG inspection requirements and continue to provide assurance that the plant licensing basis will be maintained between SG inspections.

Each proposed change to the TSs is described below, followed by the NRC staff's assessment of the change. It should be noted that there are differences in numbering between the STSs in TSTF-510 and the IP2 and IP3 TSs. Specifically:

-TSTF-510 TS 5.5.9 corresponds to IP2 TS 5.5.7 and IP3 TS 5.5.8
-TSTF-510 TS 5.6.7 corresponds to IP3 TS 5.6.8

The IP2 and IP3 SG program and tube inspection requirements are located at the following:

<u>IP2 TSs</u>:

-TS 3.4.17, "Steam Generator (SG) Tube Integrity"
-TS 5.5.7, "Steam Generator (SG) Program"
-TS 5.6.7, "Steam Generator Tube Inspection Report"

<u>IP3 TSs</u>:

-TS 3.4.17, "Steam Generator (SG) Tube Integrity"
-TS 5.5.8, "Steam Generator (SG) Program"
-TS 5.6.8, "Steam Generator Tube Inspection Report"

3.1 LCO 3.4.17, "Steam Generator (SG) Tube Integrity"

The licensee states that the current references to "tube repair criteria" in IP2/IP3 LCO 3.4.17, Condition A and SR 3.4.17.2 are being revised to "tube plugging criteria" consistent with the TSTF-510, Revision 2, change.

Current TS Requirement:

LCO 3.4.17: SG tube integrity shall be maintained.

AND

All SG tubes satisfying the tube repair criteria shall be plugged in accordance with the Steam Generator Program.

CONDITION A

One or more SG tubes satisfying the tube repair criteria and not plugged in accordance with the Steam Generator Program.

SURVEILLANCE

SR 3.4.17.2: Verify that each inspected SG tube that satisfies the tube repair criteria is plugged in accordance with the Steam Generator Program.

Proposed TS Change:

LCO 3.4.17: SG tube integrity shall be maintained.

AND

All SG tubes satisfying the tube plugging criteria shall be plugged in accordance with the Steam Generator Program.

CONDITION A

A. One or more SG tubes satisfying the tube plugging criteria and not plugged in accordance with the Steam Generator Program.

SURVEILLANCE

SR 3.4.17.2: Verify that each inspected SG tube that satisfies the tube plugging criteria is plugged in accordance with the Steam Generator Program.

Evaluation:

The NRC staff finds that the proposed changes more accurately label the criteria, and therefore, add clarity to the specification. Generally, one of two actions must be taken when the criteria are exceeded. One action is to remove the tube from service by plugging the tube at both tube ends. The alternative action is to repair the tube, but only if such a repair is permitted in the TSs by the Steam Generator Program as specified in IP2 TS 5.5.7 and IP3 TS 5.5.8. The Indian Point units do not have any approved alternate repair criteria, and thus, plugging is the only available option if the criteria are exceeded. Therefore, the staff finds that these corrective changes are acceptable.

3.2 Introductory Paragraph to IP2 TS 5.5.7 and IP3 TS 5.5.8, "Steam Generator (SG) Program"

The introductory paragraph in IP2 TS 5.5.7 and IP3 TS 5.5.8, "Steam Generator (SG) Program," has a duplicative word "provisions" at the end of the first paragraph as noted in TSTF-510, Revision 2.

Current TS Requirement:

> A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following provisions.

Proposed Change:

> A Steam Generator Program shall be established and implemented to ensure that SG tube integrity is maintained. In addition, the Steam Generator Program shall include the following:

Evaluation:

The NRC staff reviewed the licensee's proposed change to IP2 TS 5.5.7 and IP3 TS 5.5.8 and determined that the word "provisions" in the introductory paragraph is duplicative. The NRC staff has determined that the editorial change is corrective or minor in nature, changes no technical requirements and, therefore, is acceptable.

3.3 IP2 TS 5.5.7 and IP3 TS 5.5.8, Paragraph b.1

Paragraph b.1 of IP2 TS 5.5.7 and IP3 TS 5.5.8 has misplaced closing parenthesis as noted in TSTF-510, Revision 2.

Current TS Requirement:

> Structural integrity performance criterion: All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cool down and all anticipated transients included in the design specification) and design basis accidents.

Proposed Change:

> Structural integrity performance criterion: All in-service steam generator tubes shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot

standby, and cool down), all anticipated transients included in the design specification and design basis accidents.

Evaluation:

The basis for the change is that the sentence inappropriately includes anticipated transients in the description of normal operating conditions. The NRC staff determined that the change is corrective in nature in that the current wording is incorrect, because anticipated transients should be differentiated from normal operating conditions since each refers to separate and distinct parameters. Therefore, the staff finds that the change is acceptable.

3.4 IP2 TS 5.5.7 and IP3 TS 5.5.8, Paragraph c

Paragraph c of IP2 TS 5.5.7 and IP3 TS 5.5.8 will be revised, consistent with TSTF-510, Revision 2, to change "tube repair criteria" to "tube plugging criteria."

Current TS Requirement:

c. Provisions for SG tube repair criteria: Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

Proposed Change:

c. Provisions for SG tube plugging criteria: Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% of the nominal tube wall thickness shall be plugged.

Evaluation:

As evaluated in Section 3.1 above, the NRC staff determined that the licensee's change from its current references to "tube repair criteria" to "tube plugging criteria" is consistent with the approved TSTF-510, Revision 2, and, therefore, is acceptable.

3.5 IP2 TS 5.5.7 and IP3 TS 5.5.8, Paragraph d

Paragraph d of IP2 TS 5.5.7 and IP3 TS 5.5.8 will be revised, consistent with TSTF-510, Revision 2, to replace "tube repair criteria" with "tube plugging criteria" and "An assessment of degradation" with "A degradation assessment."

Current IP2 TS 5.5.7 Requirement:

d. Provisions for SG tube inspections: Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from 18.9 inches below the top of the tubesheet on the hot leg side to 18.9 inches below the top of the tubesheet on the cold leg side, and that may satisfy the applicable tube repair criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. An assessment of degradation shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

Proposed Change to IP2 TS 5.5.7:

d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from 18.9 inches below the top of the tubesheet on the hot leg side to 18.9 inches below the top of the tubesheet on the cold leg side, and that may satisfy the applicable tube plugging criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

Current IP3 TS 5.5.8 Requirement:

d. Provisions for SG tube inspections. Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube repair criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. An assessment of degradation shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

Proposed Change to IP3 TS 5.5.8:

d. Provisions for SG tube inspections: Periodic SG tube inspections shall be performed. The number and portions of the tubes inspected and methods of inspection shall be performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube plugging criteria. The tube-to-tubesheet weld is not part of the tube. In addition to meeting the requirements of d.1, d.2, and d.3 below, the inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection. A degradation assessment shall be performed to determine the type and location of flaws to which the tubes may be susceptible and, based on this assessment, to determine which inspection methods need to be employed and at what locations.

Evaluation:

As evaluated in Section 3.1 above, the licensee's change from its current references to "tube repair criteria" to "tube plugging criteria" is consistent with the approved TSTF-510, Revision 2, and therefore, is acceptable. The proposed change from "An assessment of degradation" to "A degradation assessment," is editorial, does not alter the technical requirements, and, therefore, is acceptable.

3.6 IP2 TS 5.5.7 and IP3 TS 5.5.8, Paragraph d.1

Paragraph d.1 of IP2 TS 5.5.7 and IP3 TS 5.5.8 will be revised, consistent with TSTF-510, Revision 2, to replace "replacement" with "installation," as follows:

Current TS Requirement:

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG replacement.

Proposed Change:

1. Inspect 100% of the tubes in each SG during the first refueling outage following SG installation.

Evaluation:

The NRC staff finds that the SG Program can apply to both existing and new plants, and the wording change allows for consistency between IP2, IP3, and other plants. Since this wording modification does not alter any technical or functional requirements for the Indian Point units, the staff finds it acceptable.

3.7 IP2 TS 5.5.7 and IP3 TS 5.5.8, Paragraph d.2

The licensee proposes the following changes to IP2 TS 5.5.7.d.2 and IP3 TS 5.5.8.d.2:

> Consistent with TSTF-510, Revision 2, IP2 TS 5.5.7.d.2 is replaced with content applicable to SGs with Alloy 600 thermally treated tubing and IP3 TS 5.5.8.d.2 is replaced with content applicable to SGs with Alloy 690 thermally treated tubing. The TSTF-510 content is modified slightly, consistent with the administrative error noted in Technical Specifications Task Force letter dated March 28, 2012 (Reference 3). The correction in this letter notes that the phrase "tube repair criteria" should have read "tube plugging criteria" consistent with other changes to specification 5.5.7.d of TSTF-510. The corrected phrase is modified to "tube plugging criteria" to reflect that IP2/IP3 do not have an approved SG tube repair method.

Current IP2 TS 5.5.7.d.2 Requirement for SGs with Alloy 600 TT:

> Inspect 100% of the tubes at sequential periods of 120, 90, and, thereafter, 60 effective full power months. The first sequential period shall be considered to begin after the first inservice inspection of the SGs. In addition, inspect 50% of the tubes by the refueling outage nearest the midpoint of the period and the remaining 50% by the refueling outage nearest the end of the period. No SG shall operate for more than 48 effective full power months or two refueling outages (whichever is less) without being inspected.

Proposed Change to Replace IP2 TS 5.5.7.d.2 in its Entirety:

> After the first refueling outage following SG installation, inspect each SG at least every 48 effective full power months or at least every other refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, and c below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full power months to include a SG inspection

outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 120 effective full power months. This constitutes the first inspection period;

b) During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period; and

c) During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the third and subsequent inspection periods.

Evaluation:

Paragraph 5.5.7.d.2 in its current form, and with the proposed changes, is similar for each of the tube alloy types, but with differences that reflect the improved resistance of Alloy 600 thermally treated (TT) to stress corrosion cracking relative to Alloy 600 mill annealed (MA), and the improved resistance of Alloy 690 TT relative to both Alloy 600 MA and Alloy 600 TT. These differences include progressively larger maximum inspection interval requirements and sequential inspection periods (during which 100 percent of the tubes must be inspected) for Alloy 600 MA, 600 TT, and Alloy 690 TT tubes, respectively. In addition, because of the longer maximum inspection intervals allowed for Alloy 600 TT and 690 TT tubes, Paragraph 5.5.7.d.2 includes a restriction on the distribution of sampling over each sequential inspection period for Alloy 600 TT and 690 TT tubes that is not included for Alloy 600 MA tubes.

The licensee proposes to move the first two sentences of Paragraph 5.5.7.d.2 to the end of the paragraph and make editorial changes to improve clarity. The NRC staff finds these changes to be of a clarifying nature that do not change the current intent of these two sentences.

However, the proposed amendment also includes the following two changes when inspections are performed:

- The second inspection period would be revised from 90 to 96 effective full power months (EFPMs).
- The third and subsequent inspection periods would be revised from 60 to 72 EFPMs.

The licensee characterizes these changes as marginal increases for consistency with typical fuel cycle lengths, which better accommodate the scheduling of inspections. The NRC staff notes that plants with Alloy 600 TT SG tubes typically inspect at 18- or 36-month intervals (one or two fuel cycles, respectively) depending on whether stress corrosion crack activity was observed during the most recent inspection. With these intervals, the last scheduled inspection during the first inspection period would occur at 108 months after the first refueling outage following SG installation. This is 12 months before the end of the first 120 EFPM inspection period. However, with the proposed changes to the length of the second and subsequent inspection periods, the staff finds that the last scheduled inspections in the second and subsequent inspection periods will coincide exactly with the end of these periods.

The proposed changes would generally increase the number of inspections in each of the second and subsequent inspection periods by up to one additional inspection. This could reduce the required average minimum sample size during these periods. However, inspection sample sizes will continue to be subject to Paragraph 5.5.7.d, which states that in addition to meeting the requirements of Paragraphs 5.5.7.d.1, d.2, and d.3, the inspection scope, inspection methods, and inspection intervals shall ensure that SG tube integrity is maintained until the next scheduled inspection. Therefore, the NRC staff concludes that with the proposed changes to the length of the second and subsequent inspection periods, compliance with the SG program requirements in TS 5.5.7 will continue to ensure both adequate inspection scopes and tube integrity.

For each inspection period, Paragraph 5.5.7.d.2 currently requires that at least 50 percent of the tubes be inspected by the refueling outage nearest to the midpoint of the inspection period and the remaining 50 percent by the refueling outage nearest the end of the inspection period. The NRC staff notes that if there is not an equal number of inspections in the first half and second half of the inspection period, the average minimum sampling requirement may be markedly different for inspections in the first half of the inspection period compared to those in the second half, even when there are uniform intervals between each inspection. For example, a plant in the first (120 EFPM) inspection period with a scheduled 36-month interval (two fuel cycles) between each inspection would currently be required to inspect 50 percent of the tubes by the refueling outage nearest the midpoint of the inspection, which would be the third refueling outage in the period, 6 months before the midpoint. However, since no inspection is scheduled for that outage, then the full 50-percent sample must be performed during the inspection scheduled for the second refueling outage in the period. Two inspections would be scheduled to occur in the second half of the inspection period, at 72 and 108 months into the inspection period. Thus, the current sampling requirement could be satisfied by performing a 25-percent sample during each of these inspections or other combinations of sampling (e.g., 10 percent during one and 40 percent in the other) totaling 50 percent. The NRC staff finds there is no basis to require the minimum initial sample size to vary so much from inspection to inspection. The licensee proposes to revise this requirement such that the minimum sample size for a given inspection in a given inspection period is 100 percent divided by the number of scheduled inspections during that inspection period. For the above example, the proposed change would result in a uniform initial minimum sample size of 33.3 percent for each of the three scheduled inspections during the inspection period. The NRC staff concludes this proposed revision to be an improvement to the existing requirement, since it provides a more consistent minimum initial sampling requirement.

The proposed changes to Paragraph 5.5.7.d.2 include two new sentences addressing the prorating of required tube sample sizes if a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria. For example, new information from another similar plant becomes available indicating the potential for circumferential cracking at a specific location on the tube. Previous degradation assessments had not identified the potential for this type of degradation at this location. Thus, previous inspections of this location had not been performed with a technique capable of detecting circumferential cracks. However, now that the potential for circumferential cracking has been identified at this location, Paragraph 5.5.7.d requires a method of inspection to be performed with the objective of detecting circumferential cracks that may be present at this location and that may satisfy the applicable tube plugging criteria. Suppose this inspection is performed for the first time during the third of four SG inspections scheduled for one of the inspection periods. Paragraph 5.5.7.d.2 currently does not specify whether this location needs to be 100 percent inspected by the end of the inspection period, or whether a prorated approach may be taken. The NRC staff addressed this question in Issue 1 of NRC Regulatory Information Summary (RIS) 2009-04, "Steam Generator Tube Inspection Requirements," dated April 3, 2009 (ADAMS Accession No. ML083470557), as follows:

> Issue 1:
>
> A licensee may identify a new potential degradation mechanism after the first inspection in a sequential period. If this occurs, what are the expectations concerning the scope of examinations for this new potential degradation mechanism for the remainder of the period (e.g., do 100 percent of the tubes have to be inspected by the end of the period or can the sample be prorated for the remaining part of the period)?

The TSs contain requirements that are a mixture of prescriptive and performance-based elements. Paragraph "d" of these requirements indicates that the inspection scope, inspection methods, and inspection intervals shall be sufficient to ensure that SG tube integrity is maintained until the next SG inspection. Paragraph "d" is a performance-based element because it describes the goal of the inspections but does not specify how to achieve the goal. However, Paragraph "d.2" is a prescriptive element because it specifies that the licensee must inspect 100 percent of the tubes at specified periods.

If an assessment of degradation performed after the first inspection in a sequential period results in a licensee concluding that a new degradation mechanism (not anticipated during the prior inspections in that period) may potentially occur, the scope of inspections in the remaining portion of the period should be sufficient to ensure SG tube integrity for the period between inspections.

In addition, to satisfy the prescriptive requirements of Paragraph "d.2" that the licensee must inspect 100 percent of the tubes within a specified period, a prorated sample for the remaining portion of the period is appropriate for this potentially new degradation mechanism. This prorated sample should be such that if the licensee implemented it at the beginning of the period, the TS requirement for the 100 percent inspection in the entire period (for this degradation mechanism) would have been met. A prorated sample is appropriate because (1) the licensee would have performed the prior inspections in this sequential period consistently with the requirements, and (2) the scope of inspections must be sufficient to ensure that the licensee maintains SG tube integrity for the period between inspections.

The NRC staff finds that proposed sentences 3 and 4 clarify the existing requirement consistent with the staff's position from RIS 2009-04 quoted above and are, therefore, acceptable.

The proposed fifth sentence in Paragraph 5.5.7.d.2 states, "Each inspection period defined below may be extended up to 3 EFPMs to include an SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage." Allowing extension of the inspection periods by up to an additional 3 EFPMs potentially impacts the average tube inspection sample size to be implemented during a given inspection in that period. For example, if three SG inspections are scheduled to occur within the nominal 60 EFPM period, the minimum sample size for each of the three inspections could average as little as 33.3 percent of the tube population. If a fourth inspection can be included within the period by extending the period by 3 EFPMs, then the minimum sample size for each of the four inspections could average as little as 25 percent of the tube population. Since the subsequent period begins at the end of the included SG inspection outage, the proposed change does not impact the required frequency of SG inspection.

Required tube inspection sample sizes are also subject to the performance-based requirement in Paragraph 5.5.7.d.2, which states, in part, that in addition to meeting the requirements of Paragraph 5.5.7.d.1, d.2, and d.3, "The inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next SG inspection." This requirement remains unchanged under the proposal. The NRC staff concludes that the proposed fifth sentence, by allowing the potential for smaller sample sizes, involves only a relatively minor relaxation to the existing sampling requirements in paragraph 5.5.7.d.2. However, the performance-based requirements in 5.5.7.d ensure that adequate inspection sampling will be performed to ensure tube integrity is maintained. Thus, the staff concludes that the proposed change is acceptable.

Finally, the first sentence of the proposed revision to Paragraph 5.5.7.d.2 replaces the last sentence of the current paragraph 5.5.7.d.2. This sentence establishes the minimum allowable SG inspection frequency as at least every 48 EFPMs, or at least every other refueling outage (whichever results in more frequent inspections). This minimum inspection frequency is unchanged from the current sentence. The NRC staff finds that the wording changes in the sentence are of an editorial and clarifying nature and are not material, such that the current intent of the requirement is unchanged. Thus, the NRC staff concludes that the first sentence of proposed paragraph 5.5.7.d.2 is acceptable.

<u>Current IP3 TS 5.5.8.d.2 Requirement for SGs with Alloy 690 TT</u>:

> Inspect 100% of the tubes at sequential periods of 144, 108, 72, and, thereafter, 60 effective full power months. The first sequential period shall be considered to begin after the first inservice inspection of the SGs. In addition, inspect 50% of the tubes by the refueling outage nearest the midpoint of the period and the remaining 50% by the refueling outage nearest the end of the period. No SG shall operate for more than 72

effective full power months or three refueling outages (whichever is less) without being inspected.

Proposed Change to Replace IP3 TS 5.5.8.d.2 in its Entirety:

After the first refueling outage following SG installation, inspect each SG at least every 72 effective full power months, or at least every third refueling outage (whichever results in more frequent inspections). In addition, the minimum number of tubes inspected at each scheduled inspection shall be the number of tubes in all SGs divided by the number of SG inspection outages scheduled in each inspection period as defined in a, b, c, and d below. If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period. Each inspection period defined below may be extended up to 3 effective full power months to include a SG inspection outage in an inspection period, and the subsequent inspection period begins at the conclusion of the included SG inspection outage.

a) After the first refueling outage following SG installation, inspect 100% of the tubes during the next 144 effective full power months. This constitutes the first inspection period;

b) During the next 120 effective full power months, inspect 100% of the tubes. This constitutes the second inspection period;

c) During the next 96 effective full power months, inspect 100% of the tubes. This constitutes the third inspection period; and

d) During the remaining life of the SGs, inspect 100% of the tubes every 72 effective full power months. This constitutes the fourth and subsequent inspection periods.

Evaluation:

The proposed change relocates the requirements of the first two sentences of Paragraph 5.5.8.d.2 to the inspection periods specified in a) through d) of the revised paragraph, and clarifies existing inspection requirements for the sequential periods. The NRC staff finds the relocation of these two sentences and editorial changes to be administrative in nature, does not change the current intent of these two sentences, and is acceptable.

In addition to the relocation and editorial changes, the licensee proposed three changes to the inspection periods. The duration of the inspection periods would be changed as stated below:

> The second inspection period would be revised from 108 to 120 EFPM.
>
> The third inspection period would be revised from 72 to 96 EFPM.
>
> The fourth and subsequent inspection periods would be revised from 60 to 72 EFPM.

The licensee characterizes these changes as marginal increases for consistency with typical fuel cycle lengths that better accommodate the scheduling of refueling outage inspections. The NRC staff finds that depending on the actual plant inspection schedule, these changes could impact the number of inspections in a given period, as well as the sample size. However, inspection sample sizes will continue to be subject to Paragraph 5.5.8.d.2, which states that in addition to meeting the requirements of Paragraph 5.5.8.d.2, the inspection scope, inspection methods, and inspection intervals shall ensure that SG tube integrity is maintained until the next scheduled inspection. Therefore, the NRC staff concludes that with the proposed extensions to the length of the second and subsequent inspection periods, compliance with the SG program requirements in Specification 5.5.8.d.2 will continue to ensure both adequate inspection scopes and tube integrity for the reasons addressed below.

For each inspection period, Paragraph 5.5.8.d.2 currently requires that at least 50 percent of the tubes be inspected by the refueling outage nearest to the midpoint of the inspection period and the remaining 50 percent by the refueling outage nearest the end of the inspection period. The NRC staff notes that if there is not an equal number of inspections in the first half and second half of the inspection period, the average minimum sampling requirement may be markedly different for inspections in the first half of the inspection period, as compared to those in the second half, even when there are uniform intervals between each inspection. For example, a plant in the second (120 EFPM) inspection period with a scheduled 36-month interval (two 18-month fuel cycles) between each inspection would currently be required to inspect 50 percent of the tubes by the refueling outage nearest the midpoint of the inspection period, which would be the third refueling outage in the period (after 54 EFPM), 6 months before the midpoint (assuming an inspection was performed at the very end of the 144 EFPM inspection period). However, since no inspection is scheduled for that outage (because inspections take place every other outage – once every 36 months), then the full 50-percent sample must be performed during the inspection scheduled for the second refueling outage in the period. Two inspections would be scheduled to occur in the second half of the inspection period, at 72 and 108 months into the inspection period. Thus, the current sampling requirement could be satisfied by performing a 25-percent sample during each of these inspections or other combinations of sampling (e.g., 10 percent during one and 40 percent in the other) totaling 50 percent. Also, the current TS allows variation in sample sizes from inspection to inspection within a given period. The licensee proposes to revise this requirement such that the minimum sample size for a given inspection in a given inspection period is 100 percent divided by the number of scheduled inspections during that inspection period. For the above example, the proposed change would result in a uniform initial minimum sample size of 33.3 percent for each of the three scheduled inspections during the inspection period. The NRC staff concludes this proposed revision provides more consistency in the refueling outage inspection minimum initial sampling requirement and is acceptable.

The proposed third and fourth sentences of Paragraph 5.5.8.d.2 state:

> If a degradation assessment indicates the potential for a type of degradation to occur at a location not previously inspected with a technique capable of detecting this type of degradation at this location and that may satisfy the applicable tube plugging criteria, the minimum number of locations inspected with such a capable inspection technique during the remainder of the inspection period may be prorated. The fraction of locations to be inspected for this potential type of degradation at this location at the end of the inspection period shall be no less than the ratio of the number of times the SG is scheduled to be inspected in the inspection period after the determination that a new form of degradation could potentially be occurring at this location divided by the total number of times the SG is scheduled to be inspected in the inspection period.

These sentences address the possibility that a degradation assessment in accordance with Paragraph 5.5.8.d.2 will indicate that the tubing may be susceptible to a type of degradation at a location not previously inspected with a technique capable of detecting that type of degradation at that location (for example, new information from another similar plant becomes available), indicating the potential for circumferential cracking at a specific location on the tube. Thus, previous degradation assessments would not have identified the potential for this type of degradation at this location, and previous inspections of this location would not have been performed with a technique capable of detecting circumferential cracks. However, once the potential for circumferential cracking is identified at this location, revised paragraph 5.5.8.d.2 would require an inspection with a method capable of detection of a crack that may satisfy the applicable tube plugging criteria.

Furthermore, if this inspection is performed for the first time during the third of four SG inspections scheduled for the 144 EFPM inspection period, the current Paragraph 5.5.8.d.2 does not specifically identify whether 100 percent of the tubes at this location need to be inspected by the end of the 144 EFPM inspection period using a method capable of detection, or whether a prorated approach may be taken. The NRC staff addressed this question in Issue 1 of RIS 2009-04, as follows:

> Issue 1: A licensee may identify a new potential degradation mechanism after the first inspection in a sequential period. If this occurs, what are the expectations concerning the scope of examinations for this new potential degradation mechanism for the remainder of the period (e.g., do 100 percent of the tubes have to be inspected by the end of the period or can the sample be prorated for the remaining part of the period)?

The TSs contain requirements that are a mixture of prescriptive and performance-based elements. Paragraph 5.5.9 "d" in NUREG-1431 regarding these requirements indicates that the inspection scope, inspection methods, and inspection intervals shall be sufficient to ensure that SG tube integrity is maintained until the next SG inspection. Paragraph 5.5.9.d is a performance-based element because it describes the goal of the inspections but does not specify how to achieve the goal. However, this paragraph "d.2" is a prescriptive element because it specifies that the licensee must inspect 100 percent of the tubes at specified periods. IP3 TS 5.5.8.d.2 contains information similar to STS Paragraph 5.5.9.d.

If an assessment of degradation performed after the first inspection in a sequential period results in a licensee concluding that a new degradation mechanism (not anticipated during the prior inspections in that period) may potentially occur, the scope of inspections in the remaining portion of the period should be sufficient to ensure SG tube integrity for the period between inspections.

In addition, to satisfy the prescriptive requirements of Paragraph 5.5.9. "d.2" in NUREG-1431 that the licensee must inspect 100 percent of the tubes within a specified period, a prorated sample for the remaining portion of the period is appropriate for this potentially new degradation mechanism. This prorated sample should be such that if the licensee had implemented it at the beginning of the period, the TS requirement for the 100-percent inspection in the entire period (for this degradation mechanism) would have been met. A prorated sample is appropriate because (1) the licensee would have performed the prior inspections in this sequential period consistently with the requirements, and (2) the scope of inspections must be sufficient to ensure that the licensee maintains SG tube integrity for the period between inspections.

The NRC staff finds that relocation of information in proposed sentences 3 and 4, as described above, clarifies the existing requirement, such that it is consistent with the staff's position from RIS 2009-04, and is, therefore, acceptable.

The proposed fifth sentence in Paragraph 5.5.8.d.2 states, "Each inspection period defined below may be extended up to 3 effective full power months (EFPM) to include a SG inspection outage in an inspection period and the subsequent inspection period begins at the conclusion of the included SG inspection outage." Allowing extension of the inspection periods by up to an additional 3 EFPM potentially impacts the average tube inspection sample size to be implemented during a given inspection in that period. For example, if four SG inspections are scheduled to occur within the nominal 144 EFPM period, the minimum sample size for each of the four inspections could average as little as 25 percent of the tube population. If a licensee chooses to include a fifth inspection within the period by extending the period by 3 EFPM, then the minimum sample size for each of the five inspections could average as little as 20 percent of the tube population. Since the subsequent period begins at the end of the included SG inspection outage, the proposed change does not impact the required frequency of SG inspection.

Required tube inspection sample sizes are also subject to the performance-based requirement in Paragraph 5.5.8.d.2, which states, in part, that in addition to meeting the requirements of Paragraph 5.5.8.d.2, "The inspection scope, inspection methods, and inspection intervals shall be such as to ensure that SG tube integrity is maintained until the next scheduled SG inspection." This requirement remains unchanged under the proposal. The NRC staff concludes that the proposed fifth sentence, which allows for smaller sample sizes, involves only a minor relaxation to the existing sampling requirements in Paragraph 5.5.8.d.2. In addition, these requirements are enhanced by the performance-based requirements in 5.5.8.d.2, which ensure that adequate inspection sampling will be performed and ensure tube integrity is maintained. Thus, the staff concludes that the proposed change is acceptable.

Finally, the first sentence of the proposed revision to Paragraph 5.5.8.d.2, "After the first refueling outage following SG installation, inspect each SG at least every 72 effective full power months or at least every third refueling outage (whichever results in more frequent inspections)," replaces the last sentence of the current Paragraph 5.5.8.d.2, "No SG shall operate for more than 72 effective full power months or three refueling outages (whichever is less) without being inspected." Because the minimum allowable SG inspection frequency of at least every 72 EFPM, or at least every third refueling outage (whichever results in more frequent inspections), remains unchanged from the current requirement in the IP3 TSs, the NRC staff finds that the changes in the sentence are editorial in nature and do not substantially change the existing requirements. Thus, the staff concludes the proposed change is acceptable.

3.8 <u>IP2 TS 5.5.7 and IP3 TS 5.5.8, Paragraph d.3</u>

Consistent with TSTF-510, Revision 2, paragraph d.3 of IP2 TS 5.5.7 and IP3 TS 5.5.8 will be revised to clarify the term "each SG" and to make an editorial change to the parenthetical statement.

<u>Current IP2 TS 5.5.7.d.3 and IP3 TS 5.5.8.d.3 Requirement</u>:

> If crack indications are found in any SG tube, then the next inspection for <u>each</u> <u>SG</u> for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (<u>whichever is less</u>). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-line indication is not associated with a crack(s), then the indication need not be treated as a crack.

<u>Proposed Change</u>:

> If crack indications are found in any SG tube, then the next inspection for <u>each</u> <u>affected and potentially affected SG</u> for the degradation mechanism that caused the crack indication shall not exceed 24 effective full power months or one refueling outage (<u>whichever results in more frequent inspections</u>). If definitive information, such as from examination of a pulled tube, diagnostic non-destructive testing, or engineering evaluation indicates that a crack-line indication is not associated with a crack(s), then the indication need not be treated as a crack.

Evaluation:

The proposed changes in IP2 TS 5.5.7.d.3 and IP3 TS 5.5.8.d.3 permit SG inspection intervals to extend over multiple fuel cycles for SGs with Alloy 600 TT and 690 TT tubing, assuming that such intervals can be implemented while ensuring tube integrity is maintained in accordance with paragraph IP2 TS 5.5.7 or IP3 TS 5.5.8. However, stress-corrosion cracks may not become detectable by inspection until the crack depth approaches the tube plugging criteria. In addition, stress-corrosion cracks may exhibit high growth rates. Once cracks have been found in any SG tube, current paragraph IP2 TS 5.5.7 or IP3 TS 5.5.8 restrict the allowable interval to the next scheduled inspection to 24 EFPM or one refueling outage (whichever is less). The licensee states this requirement is intended to apply to the affected SG and to any other SG at that unit, which may be potentially affected by the degradation mechanism that caused the known crack(s).

For example, if a root cause analysis in response to the initial finding of one or more cracks reveals that the crack(s) are associated with a manufacturing anomaly that causes locally high residual stress, which in turn, caused the early initiation of cracks at the affected locations and it can be established that the extent of condition of the manufacturing anomaly applies only to one SG and not the others, then the NRC staff finds it reasonable for the licensee to inspect only the affected SG within 24 EFPM, or one refueling cycle, in accordance with revised paragraph IP2 TS 5.5.7 or IP3 TS 5.5.8. Conversely, if it cannot be established that the manufacturing anomaly applies to just one SG, then all potentially affected SGs would have to be inspected. The next scheduled inspections of the other SGs would continue to be subject to all other provisions of paragraph IP2 TS 5.5.7.d.3 or IP3 TS 5.5.8.d.3. The staff finds the proposed change to paragraph IP2 TS 5.5.7 or IP3 TS 5.5.8 acceptable, because it requires inspections be performed to ensure tube integrity consistent with the scope of the suspected degradation mechanism.

3.9 IP2 TS 5.6.7 and IP3 TS 5.6.8

Consistent with TSTF-510, Revision 2, the word "active" is removed from IP2 TS 5.6.7.b and e and IP3 TS 5.6.8.b and e. Also, IP2 TS 5.6.7.f and IP3 TS 5.6.8.f are being combined with IP2 TS 5.6.7.h and IP3 TS 5.6.8.h, respectively, to require reporting the effective plugging percentage. Finally, IP2 TS 5.6.7.i, j, and k are renumbered to become IP2 TS 5.6.7.h, i, and j, as follows:

Current IP2 TS 5.6.7.b and e, and IP3 TS 5.6.8.b and e:

b. Active degradation mechanisms found,

e. Number of tubes plugged during the inspection outage for each active degradation mechanism,

Proposed Change:

b. Degradation mechanisms found,

e. Number of tubes plugged during the inspection outage for each degradation mechanism,

Current IP2 TS 5.6.7.f, h, i, j, and k:

f. Total number and percentage of tubes plugged to date,

h. The effective plugging percentage for all plugging in each SG.

i. The primary to secondary leakage rate observed in each SG (if it is not practical to assign the leakage to an individual SG, the entire primary to secondary leakage should be conservatively assumed to be from one SG) during the cycle preceding the inspection which is the subject of the report,

j. The calculated accident leakage rate from the portion of the tubes below 18.9 inches from the top of the tubesheet for the most limiting accident in the most limiting SG. In addition, if the calculated accident leakage rate from the most limiting accident is less than 1.75 times the maximum primary to secondary leakage rate, the report should describe how it was determined, and

k. The results of monitoring for tube displacement (slippage). If slippage is discovered, the implications of the discovery and corrective action shall be provided.

Proposed IP2 TS 5.6.7.f, h, i, and j:

f. The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG,

h. The primary to secondary leakage rate observed in each SG (if it is not practical to assign the leakage to an individual SG, the entire primary to secondary leakage should be conservatively assumed to be from one SG) during the cycle preceding the inspection which is the subject of the report,

i. The calculated accident leakage rate from the portion of the tubes below 18.9 inches from the top of the tubesheet for the most limiting accident in the most limiting SG. In addition, if the calculated accident leakage rate from the most limiting accident is less than 1.75 times the maximum primary to secondary leakage rate, the report should describe how it was determined, and

j. The results of monitoring for tube displacement (slippage). If slippage is discovered, the implications of the discovery and corrective action shall be provided.

Current IP3 TS 5.6.8.f and h:

f. Total number and percentage of tubes plugged to date,

h. The effective plugging percentage for all plugging in each SG.

Proposed IP3 TS 5.6.8.f:

f. The number and percentage of tubes plugged to date, and the effective plugging percentage in each SG, and

Evaluation:

The proposed revisions to Items b and e would require that any degradation mechanisms found, whether deemed to be active or not, be reportable. The NRC staff finds these changes acceptable because the revised TSs are more restrictive. In addition, the staff finds the added reporting requirement to items f and h regarding the effective percentage of tube plugging is more restrictive and acceptable. Finally, renumbering IP2 TS 5.6.7.i, j, and k to IP2 TS 5.6.7.h, i, and j reflects the previously discussed changes, is administrative, and is acceptable to the staff.

3.10 Technical Conclusion

The NRC staff has reviewed the licensee's proposed changes and concludes that they are acceptable for the reasons described above.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and change surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (79 FR 38588; July 8, 2014). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

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

Principal Contributor: Ravinder P. Grover

Date: May 26, 2015

May 26, 2015

Vice President, Operations
Entergy Nuclear Operations, Inc.
Indian Point Energy Center
450 Broadway, GSB
P.O. Box 249
Buchanan, NY 10511-0249

SUBJECT: INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 AND 3 - ISSUANCE OF AMENDMENTS REGARDING IMPLEMENTATION OF TECHNICAL SPECIFICATION TASK FORCE 510, "REVISION TO STEAM GENERATOR PROGRAM INSPECTION FREQUENCIES AND TUBE SAMPLE SELECTION" (TAC NOS. MF3752 AND MF3753)

Dear Sir or Madam:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 281 to Facility Operating License No. DPR-26 for the Indian Point Nuclear Generating Unit No. 2 and Amendment No. 257 to Facility Operating License No. DPR-64 for the Indian Point Nuclear Generating Unit No. 3. The amendments consist of changes to the Technical Specifications (TSs) in response to your application dated April 1, 2014.

The amendments revise the TSs by implementing Technical Specification Task Force Traveler (TSTF) 510, Revision 2, "Revision to Steam Generator Program Inspection Frequencies and Tube Sample Selection."

A copy of the related Safety Evaluation is enclosed. A Notice of Issuance will be included in the Commission's next regular biweekly *Federal Register* notice.

Sincerely,
/RA/
Douglas V. Pickett, Senior Project Manager
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-247 and 50-286

Enclosures:
1. Amendment No. 281 to DPR-26
2. Amendment No. 257 to DPR-64
3. Safety Evaluation

cc w/enclosures: Distribution via Listserv

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AGilbertson, NRR (rotation)

ADAMS Accession No.: ML15110A009 *by memo

OFFICE	LPL1-1/PM	LPL1-1/PM	LPL2-2/LAiT	LPL1-1/LA	STSB/BC*	OGC	LPL1-1/BC(A)
NAME	AGilbertson	DPickett	LRonewicz	KGoldstein (BClayton for)	RElliott	DRoth	MDudek
DATE	4/22/2015	5/09/2015	4/22/2015	4/21/2015	3/18/2015	5/07/2015	5/26/2015

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