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Fred Dacimo
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October 22, 2004

Re: Indian Point Units 2 & 3
Docket No. 50-247 & 50-286
NL-04-134

Document Control Desk
U.S. Nuclear Regulatory Commission
Mail Stop O-P1-17
Washington, DC 20555-0001

Subject: **Proposed Change to Technical Specifications Regarding Elimination of Hydrogen Recombiner Requirements, and Relaxation of Hydrogen Monitor Requirements (TSTF-447)**

Reference:

1) Technical Specification Task Force (TSTF) Improved Technical Specification Change Traveler, TSTF-447, Revision 1.

2) Federal Register Notice 68 FR 55416, "Notice of Availability of Model Application Concerning Technical Specification Improvement to Eliminate Hydrogen Recombiner Requirement, and Relax the Hydrogen and Oxygen Monitor Requirements for Light Water Reactors Using the Consolidated Line Item Improvement Process," dated September 25, 2003.

Dear Sir:

Pursuant to 10CFR50.90, Entergy Nuclear Operations, Inc. (Entergy) is submitting a request for an amendment to the Technical Specifications for Indian Point Unit 2 (IP2) and Indian Point Unit 3 (IP3).

The proposed amendment will delete the requirements in the Technical Specifications (TS) associated with hydrogen recombiners, and hydrogen monitors. The proposed TS changes support implementation of the revisions to 10 CFR 50.44, "Standards for Combustible Gas Control System in Light-Water-Cooled Power Reactors," that became effective October 16, 2003. The changes are consistent with Revision 1 of NRC-approved Industry/Technical Specification Task Force (TSTF) Standard Technical Specification Change

A001

Traveler, TSTF-447, "Elimination of Hydrogen Recombiners and Change to Hydrogen and Oxygen Monitors" (Reference 1). The availability of this TS improvement was announced in the Federal Register on September 25, 2003 as part of the consolidated line item improvement process (Reference 2).

Attachment 1 provides a description of the proposed change, the requested confirmation of applicability, and plant-specific verifications and commitments. Attachment 2 provides the existing TS pages marked-up to show the proposed change. Implementation of TSTF-447 also involves various changes to the TS Bases. Attachment 3 provides marked-up and revised TS Bases for information only.

Entergy has determined that this License Amendment Request (LAR) does not involve a significant hazard consideration as determined per 10 CFR 50.92. In accordance with 10 CFR 50.91, a copy of this application and the associated attachments are being submitted to the designated New York State official.

The new regulatory commitment required for implementation of the requested license amendment is summarized in Attachment 4. Entergy requests approval of the proposed amendment by April 2005 with the amendment being implemented within 60 days. If you have any questions or require additional information, please contact Mr. Kevin Kingsley at (914) 734-6695.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 10/22/04

Sincerely,

Fred R. Dacimo
Site Vice President
Indian Point Energy Center

cc: next page

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ATTACHMENT 1 TO NL-04-134

DESCRIPTION AND ASSESSMENT OF

PROPOSED CHANGES TO THE TECHNICAL SPECIFICATIONS

REGARDING HYDROGEN RECOMBINERS AND HYDROGEN MONITORS

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 & 3
DOCKET NO. 50-247 AND 50-286

1.0 INTRODUCTION

The proposed License amendment changes Technical Specification (TS) sections 3.3.3 and 3.6.8 for both Indian Point Unit 2 (IP2) and Indian Point Unit 3 (IP3) regarding hydrogen recombiners and hydrogen monitors.

The changes are consistent with Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler, TSTF-447, Revision 1, "Elimination of Hydrogen Recombiners and Change to Hydrogen and Oxygen Monitors." The availability of this technical improvement was announced in the *Federal Register* on September 25, 2003 as part of the consolidated line item improvement process (CLIIP).

2.0 DESCRIPTION OF PROPOSED AMENDMENT

Consistent with Revision 1 of TSTF-447, the proposed TS changes include:

Indian Point 2

• SR 3.3.3.2	Channel Calibration for Hydrogen Monitors	Deleted
• Table 3.3.3-1	Item 10, Hydrogen Monitors	Deleted
• TS 3.6.8	Hydrogen Recombiners	Deleted

Indian Point 3

• Table 3.3.3-1	Item 11, Hydrogen Monitors	Deleted
• Table 3.3.3-1 Note	Item C, Hydrogen Monitors	Deleted
• TS 3.6.8	Hydrogen Recombiners	Deleted

As described in TSTF-447, the changes to TS requirements also result in changes to various TS Bases. Proposed changes to the TS Bases are provided for information only in Attachment 3. The TS Bases changes will be submitted with a future update in accordance with the Technical Specification Bases Control Program.

3.0 BACKGROUND

The background for this application is addressed by the *NRC Notice of Availability* published on September 25, 2003 (68 FR 55416), TSTF-447 Revision 1, "Elimination of Hydrogen Recombiners and Change to Hydrogen and Oxygen Monitors," the documentation associated with the 10 CFR 50.44 rulemaking, and other related documents.

4.0 REGULATORY REQUIREMENTS AND GUIDANCE

The applicable regulatory requirements and guidance associated with this application are adequately addressed by the *NRC Notice of Availability* published on September 25, 2003 (68 FR 55416), TSTF-447 Revision 1, "Elimination of Hydrogen Recombiners and Change to Hydrogen and Oxygen Monitors," the documentation associated with the 10 CFR 50.44 rulemaking, and other related documents.

5.0 TECHNICAL ANALYSIS

Entergy has reviewed the model safety evaluation (SE) published on September 25, 2003 (68 FR 55416), and verified its applicability as part of the CLIIP. This verification included a review of the NRC staff's model SE, as well as the information provided to support TSTF-447, Revision 1. Entergy has concluded that the justifications presented in the TSTF proposal and the model SE prepared by the NRC staff are applicable to IP2 and IP3 and justify this amendment for the incorporation of the changes to the respective plant Technical Specifications as described in Section 2.0 above. Entergy currently has hydrogen monitors installed at IP2 and IP3 that are capable of diagnosing beyond design basis accident scenarios and a commitment is being made (see Section 6.1) to maintain this capability.

6.0 REGULATORY ANALYSIS

A description of this proposed change and its relationship to applicable regulatory requirements and guidance was provided in the *NRC Notice of Availability* published on September 25, 2003 (68 FR 55416), TSTF-447, Revision 1, the documentation associated with the 10 CFR 50.44 rulemaking, and other related documentation.

6.1 Verification of Commitments

As discussed in the model SE published in the Federal Register on September 25, 2003 (68 FR 55416), for this TS improvement, Entergy is making the following verifications and regulatory commitment:

1. Entergy has verified that a hydrogen monitoring system capable of diagnosing beyond design-basis accidents is installed at IP2 and IP3 and is making a regulatory commitment to maintain that capability for both units. The hydrogen monitors will be included in a preventive maintenance program to assure that the monitors are maintained reliable and functional. This regulatory commitment will be implemented within 60 days of issuance of the license amendment.

2. IP2 and IP3 do not have an inerted containment.

7.0 NO SIGNIFICANT HAZARDS CONSIDERATION

Entergy has reviewed the proposed no significant hazards consideration determination published on September 25, 2003 (68 FR 55416) as part of the CLIIP. Entergy has concluded that the proposed determination presented in the notice is applicable to IP2 and IP3, and the determination is hereby incorporated by reference to satisfy the requirements of 10 CFR 50.91(a).

8.0 ENVIRONMENTAL EVALUATION

Entergy has reviewed the environmental evaluation included in the model SE published on September 25, 2003 (68 FR 55416) as part of the CLIIP. Entergy has concluded that the staff's findings presented in that evaluation are applicable to IP2 and IP3, and the evaluation is hereby incorporated by reference for this application.

9.0 PRECEDENT

This application is being made in accordance with the CLIIP. Entergy is not proposing variations or deviations from the TS changes described in TSTF-447, Revision 1 or the NRC staff's model SE published on September 25, 2003 (68 FR 55416).

ATTACHMENT 2 TO NL-04-134

MARK-UP OF TECHNICAL SPECIFICATION PAGES FOR

PROPOSED CHANGES TO THE TECHNICAL SPECIFICATIONS

REGARDING HYDROGEN RECOMBINERS AND HYDROGEN MONITORS

Indian Point 2:

Page 3.3.3-2
Page 3.3.3-4
Page 3.6.8-1
Page 3.6.8-2

Indian Point 3:

Page 3.3.3-4
Page 3.3.3-5
Page 3.6.8-1
Page 3.6.8-2

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INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 & 3
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ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
RCS Cold Leg Temperature (Wide Range) channel inoperable and no OPERABLE SG Pressure channel for the associated SG.			
D. Required Action and associated Completion Time of Condition C not met.	D.1	Enter the Condition referenced in Table 3.3.3-1 for the channel or train.	Immediately
E. As required by Required Action D.1 and referenced in Table 3.3.3-1.	E.1 AND E.2	Be in MODE 3. Be in MODE 4.	6 hours 12 hours
F. As required by Required Action D.1 and referenced in Table 3.3.3-1.	F.1	Initiate action in accordance with Specification 5.6.6.	Immediately

SURVEILLANCE REQUIREMENTS

- NOTE -

SR 3.3.3.1 and SR 3.3.3.3 apply to each PAM instrumentation Function in Table 3.3.3-1.

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.	31 days
SR 3.3.3.2	Perform CHANNEL CALIBRATION of the following: ~~a. Function 10, Containment Hydrogen Monitors; and~~ ~~b.~~ a. Function 22, RWST Level Instruments.	92 days

Table 3.3.3-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION D.1
1.	Reactor Coolant System (RCS) Hot Leg Temperature (Wide Range)	1 per loop [(a)]	E
2.	RCS Cold Leg Temperature (Wide Range)	1 per loop [(b)]	E
3.	RCS Pressure (Wide Range)	2	E
4.	Reactor Vessel Level Indication System (RVLIS)	2	F
5.	Containment Sump Water Level (Recirculation Sump)	2	E
6.	Containment Water Level (Containment Sump)	3	E
7.	Containment Pressure	2	E
8.	Containment Pressure (High Range)	2	E
9.	Containment Area Radiation (High Range)	2	F
10.	~~Containment Hydrogen Monitors~~ **NOT USED**	~~2~~	~~F~~
11.	Pressurizer Level	2	E
12.	Steam Generator (SG) Water Level (Narrow Range)	2 per steam generator	E
13.	Steam Generator Water Level (Wide Range)	4	E
14.	Condensate Storage Tank level	2	F
15.	Core Exit Temperature - Quadrant 1	2 trains[(c)]	E
16.	Core Exit Temperature - Quadrant 2	2 trains[(c)]	E
17.	Core Exit Temperature - Quadrant 3	2 trains[(c)]	E
18.	Core Exit Temperature - Quadrant 4	2 trains[(c)]	E
19.	Auxiliary Feedwater Flow	4	E
20.	Steam Generator Pressure	2 per steam line	E
21.	RCS Subcooling Margin Monitor	2	E
22.	RWST Level	2	E

(a) The required redundant channel for each of the four loops of RCS hot leg temperature is a qualified Core Exit Temperature train in the quadrant associated with that loop.

(b) The required redundant channel for each of the four loops of RCS cold leg temperature is any channel of steam generator pressure for that loop.

(c) A CET train consists of two core exit thermocouples (CETs).

3.6 CONTAINMENT SYSTEMS

3.6.8 ~~Hydrogen Recombiners~~ **Not Used**

~~LCO 3.6.8 Two hydrogen recombiners shall be OPERABLE.~~

~~APPLICABILITY: MODES 1 and 2.~~

~~ACTIONS~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~A. One hydrogen recombiner inoperable.~~	~~A.1 Restore hydrogen recombiner to OPERABLE status.~~	~~30 days~~
~~B. Two hydrogen recombiners inoperable.~~	~~B.1 Verify by administrative means that the Post Accident Containment Venting System function is maintained.~~ ~~AND~~ ~~B.2 Restore one hydrogen recombiner to OPERABLE status.~~	~~1 hour~~ ~~AND~~ ~~Once per 12 hours thereafter~~ ~~7 days~~
~~C. Required Action and associated Completion Time not met.~~	~~C.1 Be in MODE 3.~~	~~6 hours~~

~~SURVEILLANCE REQUIREMENTS~~

~~SURVEILLANCE~~		~~FREQUENCY~~
~~SR 3.6.8.1~~	~~Verify by visual inspection that each hydrogen recombiner has no significant fouling by foreign materials.~~	~~24 months~~
~~SR 3.6.8.2~~	~~Verify the required response of a sample plate from each hydrogen recombiner to a test mixture of hydrogen gas.~~	~~18 months~~

Table 3.3.3-1 (page 1 of 2)
Post Accident Monitoring Instrumentation

	FUNCTION	REQUIRED CHANNELS	CONDITION REFERENCED FROM REQUIRED ACTION D.1	SR 3.3.3.2 FREQUENCY
1.	Neutron Flux	2	F	24 months
2.	RCS Hot Leg Temperature (Wide Range) (T_{hot})	1 per loop	E	24 months
3.	RCS Cold Leg Temperature (Wide Range) (T_{cold})	1 per loop	E	24 months
4.	RCS Pressure (Wide Range)	2	E	24 months
5.	Reactor Vessel Water Level	2	E	24 months
6.	Containment Water Level (Wide Range)	2	E	24 months
7.	Containment Water Level (Recirculation Sump)	2	E	24 months
8.	Containment Pressure	2	E	18 months
9.	Automatic Containment Isolation Valve Position	2 per penetration flow path[a][b]	F	24 months
10.	Containment Area Radiation (High Range)	2	F	24 months
11.	~~Containment Hydrogen Monitors~~ NOT USED	~~2[c]~~	~~E~~	~~92 days~~
12.	Pressurizer Level	2	E	24 months
13.	SG Water Level (Narrow Range)	2 per SG	E	24 months
14.	SG Water Level (Wide Range) and Auxiliary Feedwater Flow	1 each per SG	E	24 months, SGL 18 months, AFF
15.	NOT USED			
16.	Steam Generator Pressure	2 per SG	E	24 months
17.	Condensate Storage Tank Level	2	F	24 months
18.	Core Exit Thermocouples-Quadrant 1	2 (d c)	E	24 months
19.	Core Exit Thermocouples-Quadrant 2	2 (d c)	E	24 months
20.	Core Exit Thermocouples-Quadrant 3	2 (d c)	E	24 months
21.	Core Exit Thermocouples-Quadrant 4	2 (d c)	E	24 months
22.	Main Steam Line Radiation	1 per steam line	F	24 months
23.	Gross Failed Fuel Detector	2	F	24 months
24.	RCS Subcooling Margin	2	E	24 months

See NOTES, next page.

TABLE 3.3.3-1 (page 2 of 2)
Post Accident Monitoring Instrumentation

NOTES:

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

(b) Only one position indication channel is required for penetration flow paths with only one installed control room indication channel.

~~(c) Hydrogen monitor OPERABILITY requires that at least one of the associated containment fan cooler unit is OPERABLE.~~

(dc)A channel consists of two core exit thermocouples (CETs).

3.6 CONTAINMENT SYSTEMS

~~3.6.8 Hydrogen Recombiners~~ **Not Used**

~~LCO 3.6.8 Two hydrogen recombiners shall be OPERABLE.~~

~~APPLICABILITY: MODES 1 and 2.~~

~~ACTIONS~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~A. One hydrogen recombiner inoperable.~~	~~A.1 NOTE LCO 3.0.4 is not applicable.~~	
	~~Restore hydrogen recombiner to OPERABLE status.~~	~~30 days~~
~~B. Required Action and associated Completion Time not met.~~	~~B.1 Be in MODE 3.~~	~~6 hours~~

~~SURVEILLANCE REQUIREMENTS~~

~~SURVEILLANCE~~		~~FREQUENCY~~
~~SR 3.6.8.1~~	~~Perform a system functional test for each hydrogen recombiner.~~	~~6 months~~
~~SR 3.6.8.2~~	~~Visually examine each hydrogen recombiner enclosure and verify there is no evidence of abnormal conditions.~~	~~24 months~~
~~SR 3.6.8.3~~	~~Perform a resistance to ground test for each heater phase.~~	~~24 months~~

ATTACHMENT 3 TO NL-04-134

MARK-UP OF TECHNICAL SPECIFICATION BASES PAGES FOR

PROPOSED CHANGES TO THE TECHNICAL SPECIFICATION BASES

REGARDING HYDROGEN RECOMBINERS AND HYDROGEN MONITORS

Indian Point 2:

Page B 3.3.3-8
Page B 3.3.3-17
Page B 3.6.1-1

Indian Point 3:

Page B 3.3.3-10
Page B 3.6.8-1

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INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 & 3
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This LCO is satisfied by the OPERABILITY of any 2 of the 6 channels supported by PT-948A, PT-948B, PT-948C, PT-949A, PT-949B or PT-949C. Each channel provides indication in the control room over a range of –5 psig to 75 psig.

8. Containment Pressure (High Range)

Containment Pressure (High Range) is a Type C, Category I Function that is provided for verification of RCS and containment OPERABILITY. This Function would be used for the assessment of the potential for a containment boundary breach.

This LCO is satisfied by the OPERABILITY of PT-3300 and PT-3301. Each channel provides indication in the control room over a range of -10 psig to 150 psig.

9. Containment Area Radiation (High Range)

Containment Area Radiation is a Type A, Category I Function that is provided to monitor for the potential of significant radiation releases and to provide release assessment for use by operators in determining the need to invoke site emergency plans. Containment radiation level is used to determine if a high energy line break (HELB) has occurred, and whether the event is inside or outside of containment.

This LCO is satisfied by the OPERABILITY of High Range Containment Radiation Monitors R-25 and R-26. Each channel has a range of 1 R/hour to 10^7 R/hour. Acceptable criteria for calibration are provided in Table II.F-13 of NUREG-0737.

10. ~~Containment Hydrogen Monitors~~ **Not Used**

~~Hydrogen Monitors are a Type C, Category I Function that is provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. This variable is also important in verifying the adequacy of mitigating actions.~~

~~This LCO is satisfied by the OPERABILITY of two hydrogen analyzers: AIT-5109-1 (channel 1) and AIT-5110-1 (channel 2). Each channel has a range of 0% to 10%. Calibration is performed using a calibration span gas.~~

SR 3.3.3.1

Performance of the CHANNEL CHECK once every 31 days ensures that a gross instrumentation failure has not occurred. A CHANNEL CHECK is normally a comparison of the parameter indicated on one channel to a similar parameter on other channels. It is based on the assumption that instrument channels monitoring the same parameter should read approximately the same value. Significant deviations between the two instrument channels could be an indication of excessive instrument drift in one of the channels or of something even more serious. A CHANNEL CHECK will detect gross channel failure; thus, it is key to verifying the instrumentation continues to operate properly between each CHANNEL CALIBRATION. The high radiation instrumentation should be compared to similar unit instruments located throughout the unit.

Agreement criteria are determined by the unit staff, based on a combination of the channel instrument uncertainties, including isolation, indication, and readability. If a channel is outside the criteria, it may be an indication that the sensor or the signal processing equipment has drifted outside its limit. If the channels are within the criteria, it is an indication that the channels are OPERABLE.

As specified in the SR, a CHANNEL CHECK is only required for those channels that are normally energized. Instruments that are normally isolated or normally not in service are considered de-energized.

The Frequency of 31 days is based on operating experience that demonstrates that channel failure is rare. The CHANNEL CHECK supplements less formal, but more frequent, checks of channels during normal operational use of the displays associated with the LCO required channels.

SR 3.3.3.2 and SR 3.3.3.3

A CHANNEL CALIBRATION is performed every 92 days for the ~~hydrogen monitor and~~ RWST level and every 24 months, or approximately at every refueling for all other Table 3.3.3-1 Functions. CHANNEL CALIBRATION is a complete check of the instrument loop, including the sensor. The test verifies that the channel responds to measured parameter with the necessary range and accuracy. Whenever a sensing element is replaced, the next required CHANNEL CALIBRATION of the Core Exit thermocouple

B 3.6 CONTAINMENT SYSTEMS

B 3.6.8 ~~Hydrogen Recombiners~~ **Not Used (all pages of B 3.6.8 are deleted)**

~~BASES~~

~~BACKGROUND The function of the hydrogen recombiners is to eliminate the potential breach of containment due to a hydrogen-oxygen reaction.~~

~~Per 10 CFR 50.44, "Standards for Combustible Gas Control Systems in Light-Water-Cooled Reactors" (Ref. 1), and GDC 41, "Containment Atmosphere Cleanup" (Ref. 2), hydrogen recombiners are required to reduce the hydrogen concentration in the containment following a loss of coolant accident (LOCA) or steam line break (SLB). The recombiners accomplish this by recombining hydrogen and oxygen to form water vapor. The vapor remains in containment, thus eliminating any discharge to the environment.~~

~~Two 100% capacity independent hydrogen recombiner units are provided. The IP2 hydrogen recombiners are passive autocatalytic recombiners which contain no moving parts and do not need electrical power or any other support system. Recombination is accomplished by the attraction of oxygen and hydrogen molecules to the surface of the catalyst. The hydrogen recombiners are designed for self-starting and self-sustaining operation.~~

~~Each hydrogen recombiner consists of a stainless steel sheet metal box open at the bottom and at both sides on the top. There are 88 catalytic cartridges inserted into each box. Each cartridge fabricated from perforated steel plates holds catalyst pellets. The spaces between the cartridges serve as flow channels for the gases. The exothermic reaction of the combination produces heat, which results in a convective flow that draws more gases from the containment atmosphere into the unit from below. Airflow enters at the bottom and the catalyst combines hydrogen and oxygen in the flow channels to form gaseous water.~~

~~A single recombiner is capable of limiting the peak hydrogen concentration in containment to less than 4.0 v/o. The second recombiner is redundant and is installed to provide margin and increased containment coverage.~~

~~Both hydrogen recombiners are located outside the missile shield wall inside containment at the 95 foot level. They are seismically qualified and have undergone environmental qualification testing in accordance with IEEE 627 and IEEE 344.~~

BASES

LCO

The LCO requirement for Containment Area Radiation (high range) monitoring is satisfied by radiation monitors designated R-25 and R-26.

~~11. Containment Hydrogen Monitors~~ - Not Used

~~Hydrogen Monitors are provided to detect high hydrogen concentration conditions that represent a potential for containment breach from a hydrogen explosion. This variable is also important in verifying the adequacy of mitigating actions.~~

~~The LCO requirement for Containment Hydrogen monitoring is satisfied by containment hydrogen sampling monitors designated HCMC-A and HCMC-B. Hydrogen monitor OPERABILITY requires that at least one of the associated containment fan cooler units (FCU) is OPERABLE. HCMC-A is associated with FCU 32 or 35 and HCMC-B is associated with FCU 31 or 33 or 34.~~

12. Pressurizer Level

Pressurizer Level is used to determine whether to terminate SI, if still in progress, or to reinitiate SI if it has been stopped. Knowledge of pressurizer water level is also used to verify that the unit is maintained in a safe shutdown condition.

The LCO requirement for 2 channels of pressurizer level indication is satisfied by any two of the level instruments designated LT-459, LT-460 and LT-461.

13. Steam Generator Water Level (Narrow Range)

SG Water Level is required to monitor operation of decay heat removal via the SGs.

Each Steam Generator (SG) has three narrow range transmitters which span a range from the top of the tube bundles up to the moisture separator.

(continued)

B 3.6 CONTAINMENT SYSTEMS

~~B 3.6.8 Hydrogen Recombiners~~ Not Used (all pages of B 3.6.8 are deleted)

~~BASES~~

~~BACKGROUND~~ ~~The function of the hydrogen recombiners is to eliminate the potential breach of containment due to a hydrogen oxygen reaction.~~

~~Per 10 CFR 50.44, "Standards for Combustible Gas Control Systems in Light Water Cooled Reactors" (Ref. 1), and GDC 41, "Containment Atmosphere Cleanup" (Ref. 2), hydrogen recombiners are required to reduce the hydrogen concentration in the containment following a loss of coolant accident (LOCA) or steam line break (SLB). The recombiners accomplish this by recombining hydrogen and oxygen to form water vapor. The vapor remains in containment, thus eliminating any discharge to the environment. The hydrogen recombiners are manually initiated since flammable limits would not be reached until several days after a Design Basis Accident (DBA).~~

~~Two 100% capacity independent hydrogen recombiner systems are provided. Each consists of controls located in the control room, a power supply and a recombiner. Recombination is accomplished by heating a hydrogen air mixture above 1150 °F. A single recombiner is capable of maintaining the hydrogen concentration in containment below the 4.1 volume percent (v/o) flammability limit. Two recombiners are provided to meet the requirement for redundancy and independence. Each recombiner is powered from a separate Engineered Safety Features bus, and is provided with a separate power panel and control panel.~~

~~APPLICABLE SAFETY ANALYSES~~

~~The hydrogen recombiners provide for the capability of controlling the bulk hydrogen concentration in containment to less than the lower flammable concentration of 4.1 v/o following a DBA. This control would prevent a containment wide hydrogen burn, thus ensuring the pressure and temperature assumed~~

~~(continued)~~

ATTACHMENT 4 TO NL-04-134

COMMITMENTS FOR IMPLEMENTATION OF LICENSE

AMENDMENT REQUEST TO ADOPT TSTF-447, REVISION 1

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT NUCLEAR GENERATING UNIT NOS. 2 & 3
DOCKET NO. 50-247 AND 50-286

Commitment for Implementation of Licensing Amendment Request

ID	DESCRIPTION	DATE
NL-04-134-A (for IP2) NL-04-134-1 (for IP3)	Entergy has verified that a hydrogen monitoring system capable of diagnosing beyond design-basis accidents is installed at IP2 and IP3 and is making a regulatory commitment to maintain that capability for both units. The hydrogen monitors will be included in a preventive maintenance program to assure that the monitors are maintained reliable and functional.	60 days following NRC approval of the License Amendment Request