Entergy

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May 30, 2002

Re: Indian Point Unit No. 2
Docket No. 50-247
NL-02-075

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

SUBJECT: Indian Point Nuclear Generating Unit No. 2 – Response to Request for Additional Information Regarding One-time Extension of Containment Integrated Leak Rate Test Frequency (TAC No. MB2414)

References:
1. Consolidated Edison letter (NL-01-093) to NRC, "Indian Point 2 License Amendment Request: Containment Integrated Leakage Rate Testing Frequency," dated July 13, 2001
2. NRC letter to Entergy Nuclear Operations, Inc., "Indian Point Nuclear Generating Unit No. 2 – Request for Additional Information Regarding One-Time Extension of Containment Integrated Leakage Rate Test Frequency (TAC No. MB2414)," dated October 4, 2001
3. Entergy Nuclear Operations, Inc. letter (NL-01-140) to the NRC, "Indian Point Nuclear Generating Unit No. 2 – Response to Request for Additional Information Regarding One-time Extension of Containment Integrated Leak Rate Test Frequency (TAC MB2414)" dated November 30, 2001
4. NRC letter to Entergy Nuclear Operations, Inc., "Request for Additional Information Regarding One-Time Extension of Containment Integrated Leak Rate Test Frequency, Indian Point Nuclear Generating Unit No. 2 (TAC No. MB2414)," dated February 5, 2002
5. Entergy Nuclear Operations, Inc. letter (NL-02-030) to the NRC, "Indian Point Nuclear Generating Unit No. 2 – Response to Request for Additional Information Regarding One-time Extension of Containment Integrated Leak Rate Test Frequency (TAC No. MB2414)" dated March 13, 2002
6. Entergy Nuclear Operations, Inc. letter (NL-02-047) to the NRC, "Indian Point Nuclear Generating Unit No. 2 – Response to Request for Additional Information Regarding One-time Extension of Containment Integrated Leak Rate Test Frequency (TAC No. MB2414)" dated April 3, 2002

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7. NRC letter to Entergy Nuclear Operations, Inc., "Indian Point Nuclear Generating Unit No. 2 - Request for Additional Information Regarding One-Time Extension of Containment Integrated Leak Rate Test Frequency (TAC No. MB2414)," dated May 17, 2002

By letter dated July 13, 2001 (Reference 1), Consolidated Edison Company of New York, Inc., (the previous licensee) submitted an application for an amendment to the Technical Specifications (TS) for Indian Point Unit No. 2 (IP2). The proposed amendment would allow a one-time extension of the frequency for the containment integrated leakage rate test from the current interval of one test in 10-years to one test in 15-years.

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the submittal, determined that additional information was required to complete its review, and requested the additional information in References 2 and 4 above. Entergy Nuclear Operations, Inc. (ENO – the current licensee) submitted responses to the NRC's requests for additional information in References 3, 5 and 6.

The NRC staff reviewed the additional information provided, determined that further additional information was required to complete the review and requested that additional information in its letter of May 17, 2002 (Reference 7). Attachment 1 to this letter provides the requested additional information.

The assessment submitted with the original application (Reference 1) concluded that the proposed TS did not involve a significant hazards consideration. The assessment is not affected by the additional information submitted herein or in the letters previously submitted in support of the application.

A new commitment made by ENO is contained in Attachment 2 of this submittal.

Should you or your staff have any questions regarding this submittal, please contact Mr. John F. McCann, Manager, Nuclear Safety and Licensing at (914) 734-5074.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

Executed on May 20, 2002

Fred Dacimo
Vice President – Operations
Indian Point Energy Center
Unit 2

cc: See page 3
Attachments

cc:

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ATTACHMENT 1

NL-02-075

**Response to Request for Additional Information
Regarding Proposed One-Time Extension
of the
Containment Integrated Leakage Rate Test Frequency**

ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GENERATING UNIT NO. 2
DOCKET NO. 50-247

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

The NRC staff is reviewing information provided in the July 13, 2001 application along with the November 30, 2001, March 13, 2002 and April 3, 2002 supplements and has determined that additional information is needed for the staff to complete its evaluation. On May 15, 2002, NRC staff held telephone conferences with representatives of ENO to discuss the NRC staff's concerns. These were transmitted to ENO by NRC letter dated May 17, 2002 in which the NRC staff requested clarification or additional information to address specific questions or concerns. The following are the specific requests from the NRC staff and ENO's response to those requests.

Request No. 1

In its March 13, 2002, response to an NRC request for additional information (RAI), Entergy provided a discussion of corrosion on the containment liner, from approximately 2" above to 3" below the liner/containment floor slab intersection, that resulted from a 1980 event in which a leak in the IP2 service water system had caused flooding above the 46' elevation of the containment. The RAI response addressed the corrective actions taken and the evaluation of the liner corrosion identified near the liner/containment floor slab intersection. However, there is no discussion of the effects on portions of the Weld Channel and Penetration Pressurization System (WC&PPS) that might have experienced water intrusion as a result of the flooding incident.

Section 6.6.2 of the IP2 updated final safety analysis report (UFSAR) identifies portions of the WC&PPS that have been disconnected in a manner that the liner welds will still be open to containment atmosphere and pressurized during an ILRT.

A. Discuss the effects of the flooding incident on all portions of the WC&PPS that may have experienced water intrusion as a result of the flooding with specific discussion of the effects on the portions on the WC&PPS that have been disconnected. Additionally, provide results of any inspections or tests performed to ensure that these liner welds have not experienced corrosion and are sound.

B. For the portions of the WC&PPS identified as disconnected in Section 6.6.2 of the IP2 UFSAR, provide the following information:

   (i) explanation of why each zone was disconnected;
   (ii) when modifications to disconnect each zone were performed;
   (iii) location where each physical modification was performed (i.e. describe the location of the disconnection and the manner of ensuring that the disconnected zone is exposed to ILRT pressure);
   (iv) a description, and results, of any testing or evaluations performed to ensure that the containment liner and associated welds in the disconnected zones are sound.

Response to Request No. 1

A. The flooding incident of 1980 occurred as a result of a service water leak within the containment. Only portions of the Weld Channel and Containment Penetration Pressurization System (WCCPPS) located inside the containment were affected. Specifically, the exterior surface of the carbon steel piping that was submerged during the event was exposed to service water. This included piping headers located near the containment floor at elevation 46' and those portions of the system that penetrate the concrete floor supplying air to the containment liner floor channels and lower wall channels. At the time of the event, there were no isolated or abandoned portions of the WCCPP system and the piping was pressurized to 52 psig per the system design. Based upon the system being pressurized, it is concluded that no water intrusion into the WCCPP system occurred.

The liner welds did not experience any effects of corrosion due to the flooding incident of 1980 since an environment for corrosion was not created. The WCCPPS was pressurized to 52 psig with dry instrument air thus preventing any potential leakage of service water into the channel areas. Therefore, there was no need to perform additional inspection of these welds. The integrity of the liner welds have been successfully verified by the last Integrated Leak Rate Testing (ILRT), which was performed subsequent to the flood but prior to the first WCCPPS section being disconnected.

General corrosion has occurred on the exterior of the WCCPPS piping which penetrates the containment floor and is the most likely cause for the localized failures of the abandoned WCCPPS zones. This has been directly attributed to the flooding incident of 1980. Further significant corrosion of the piping is not anticipated, as there has been no additional standing water on the floor or surrounding the piping, which penetrates the floor, and therefore no substantial mechanism for promoting corrosion. Current practice provides for keeping the containment floor dry by monitoring the condition during monthly inspections.

B. Beginning in 1993, portions of the WCCPPS that experienced excessive air consumption and that were not practicable to repair were abandoned in place with the air supply lines cut and capped and the air supplies isolated. The abandoned portions are the zones designated as W10, B6, D2, B2, B5 and W11.

<u>Zones W10 & B6</u>

Zone W10 is a sidewall zone of the containment liner that extends below and above the concrete floor within containment. Zone W10 extends from about 0° azimuth to approximately 135° azimuth. The 0° azimuth is plant north. Zone B6 is a bottom zone of the containment liner extending from an approximate azimuth of 200° to 270° in the outer region of the containment – predominantly consisting of the floor region outside of the crane wall.

Both Zone W10 and B6 were abandoned in April 1993 following the discovery of leakage in the air supply lines feeding the weld channels as noticed by increased air consumption to these zones. Investigation activities identified the leakage in WCCPPS air supply piping (1/2" Schedule 80) embedded within the concrete floor by direct visual inspection through the use of a boroscope. The inspection specifically identified holes within the carbon steel piping, not the containment liner. The most probable cause for the line failures was attributed to external corrosion from the flooding incident of 1980 and the interaction of brackish river water with carbon steel piping. After it was determined that repair of the WCCPPS air supply lines was not practicable, a license amendment was requested to allow portions of the WCCPPS to be disconnected from the system. The NRC approved License Amendment No. 162 on April 14, 1993, which permitted the disconnection of these zones.

The zones were disconnected from the WCCPPS as permitted by the license amendment by sealing the supply lines that penetrate the floor to these zones and then closing the respective air supply isolation valves. A leak repair compound was injected into the floor cracks surrounding zone W10 to seal the embedded lines and the holes below the concrete floor. That portion was then isolated from system pressure by closing the respective isolation valve located on the associated WCCPPS supply rack. For zone B6, its existing penetration sleeve was sealed with grout and the line isolated by closing its respective isolation valve on the associated WCCPPS supply rack.

Provisions remain available to test the containment liner welds impacted by the above abandonment utilizing vent connections provided at the respective flow-thru test stations. The WCCPPS is isolated and the vent connections at the flow-thru stations are opened during performance of an ILRT. Administrative controls are in effect to insure this is accomplished in future ILRTs.

Containment integrity for the containment liner and associated welds protected by the WCCPPS has been satisfactorily demonstrated based upon the fact that leaks were identified and found in the WCCPPS piping embedded within the containment floor through visual examination. Satisfactory performance via on-line monitoring of the WCCPPS air consumption rate during the previous operating cycle provided additional assurance that liner integrity was maintained during plant operation. High consumption WCCPPS flow rates would have alarmed in the control room had the flow exceeded allowable limits. The sealing activities provide assurance that, in the unlikely event a future water flooding incident occurs, it would not result in water intrusion into the weld channels and provide a mechanism for corrosion of the liner or associated welds protected by the weld channel.

Zones D2, B2 and B5

Zone D2 is located in the containment dome region and extends from approximately 0° azimuth to 80° azimuth. Zone B2 is a bottom zone of the containment liner extending from an approximate azimuth of 270° to 360° in the middle to outer region of the containment. Zone B5 is also a bottom zone of the containment liner extending from an approximate azimuth of 135° to 200° in the middle to outer region of the containment.

Zones B2 and B5 were disconnected in March 1997 when through-wall leakage was identified in air supply lines to the weld channels by visual examination of the leak near the floor penetrations. Zone B5 leakage was verified by applying a leak detection fluid to the area where the piping penetrated the floor and visually observing air bubbles at the penetration area while the WCCPPS was pressurized. Zone B2 leakage of the WCCPPS piping was verified by visual examination of a hole in the supply piping at approximately 1" below the containment floor as observed during the repair efforts. The lines were disconnected as permitted by the Technical Specification 3.3.D.2.c because the leaks were located in portions of the piping located below the containment floor, which were not practical to repair. The most probable cause for these line failures was attributed to external corrosion from the flooding incident of 1980 and the interaction of brackish river water with carbon steel piping as previously indicated for zones W10 and B6.

Zones B2 and B5 were disconnected from the WCCPPS by cutting and capping the supply lines that penetrate the floor to these zones, capping the system supply lines near the penetration area, and then closing the respective isolation valves for the zone. A mechanical plumbers plug was inserted into the leaking embedded piping to seal the leaking line of each zone. A pipe extension was placed on the piping penetrating the floor and capped above the containment floor to prevent future water intrusion. System supply piping was isolated at the associated WCCPPS supply rack for both zones.

Zone D2 was disconnected in May 1997 following a sensitive leak rate test, which had determined that the zone had excessive leakage. Filling this zone with demineralized water and visually verifying leakage to the containment atmosphere during the test verified the location of the WCCPPS leakage. As the location of this zone was not practical to reach for repair (i.e. location at elevation 250' inside containment), the zone was disconnected. The supply line at the associated WCCPPS supply rack was cut and capped and the isolation valve closed.

Provisions remain available to test the containment liner welds impacted by the above abandonment utilizing vent connections provided at the respective flow-thru test stations. The WCCPPS is isolated and the vent connections at the flow-thru stations are opened during performance of an ILRT. Administrative controls are in effect to insure this is accomplished in future ILRTs.

Containment integrity for the containment liner and associated welds protected by the WCCPPS for zones B2 and B5 has been satisfactorily demonstrated based upon the fact that leaks were identified and found in the WCCPPS piping embedded within the containment floor through visual examination. For zone D2, leakage from the WCCPPS was identified by visual examination of water leaking from the weld channel into containment. Satisfactory performance via on-line monitoring of the WCCPPS air consumption rate during the previous operating cycle provided additional assurance that liner integrity was maintained during plant operation. High consumption WCCPPS flow rates would have alarmed in the control room should the flow have exceeded allowable limits. The cutting and capping of the affected zones provides assurance that potential future water flooding incidents cannot result in water intrusion into the weld channels and provide a mechanism for corrosion of the liner or associated welds protected by the weld channels.

Zone W11

Zone W11 is a sidewall zone of the containment liner that extends below and above the concrete floor within containment (elevation 46'-0"). Zone W11 extends from about 135° azimuth to approximately 240° azimuth.

Zone W11 was disconnected in March 2000 after excessive air consumption for the zone was identified. Investigation activities included a visual inspection of all supply piping above the floor for this zone using a liquid leak detector. No leakage was found for the piping located above the containment floor. Leakage below the floor could not be confirmed and the repair was impractical to perform. Based upon previous experience with WCCPPS failures the most probable failure was likely the supply piping within the containment floor as had occurred for zones W10, B6, B2, and B5. The likely cause of this failure was corrosion from the flooding incident of 1980.

The supply line for zone W11 was cut and capped as permitted by Technical Specification 3.3.D.2.c at the associated WCCPPS supply rack. The isolation valve was closed for this zone.

Provisions remain available to test the containment liner welds impacted by the above abandonment utilizing vent connections provided at the respective flow-thru test stations. The WCCPPS is isolated and the vent connections at the flow-thru stations are opened during performance of an ILRT. Administrative controls are in effect to insure this is accomplished in future ILRTs.

The integrity of the containment liner and associated welds protected by the WCCPPS for zone W11 has been determined to be acceptable on the basis of the most probable failure being the WCCPPS piping embedded with the concrete floor. No past evidence or failures suggest that the liner is in jeopardy. Satisfactory performance via on-line monitoring of the WCCPPS air consumption rate during the previous operating cycle provided additional assurance that liner integrity was maintained during plant operation. High consumption WCCPPS flow rates would have been alarmed in the control room should the flow have exceeded allowable limits. Further justification is provided by the successful completion of the ILRT of June 1991. The cutting and capping provides assurance that potential future water flooding incidents cannot result in water intrusion into the weld channels and provide a mechanism for corrosion of the liner or associated welds protected by the weld channels.

Request No. 2

Provide additional details of the methodology used, including assumptions, for the sensitivity study of the Class 7 sequence contribution showing the results that were provided in the April 3, 2002, response to an NRC RAI.

Response to Request No. 2

As indicated in Step 8 of the sensitivity study methodology (Response to Request No. 2, NL-02-030, Attachment 1, March 13, 2002), the change in LERF due to extending the ILRT surveillance interval is the sum of the increase in the frequency of the Class 3b sequences and the increase in the frequency of that portion of the Class 7 sequences that could contribute to LERF. The Class 7 contribution is due to the potential for liner degradation and is determined, as a function of ILRT surveillance interval, by determining the probability of liner failure for a constant liner corrosion failure rate (See Response to Request No. 2, NL-02-047, Attachment 1, April 3, 2002) and applying the result to the Class 7 LERF contributors for degraded and non-degraded liner cases.

As described in Steps 2 and 3 of the sensitivity study methodology, the IP-2 IPE Level 2 analysis (Reference 1) was revised to determine the impact of the reduction in containment failure pressure due to an assumed potential for liner degradation on the source term category (STC) frequencies for early and late containment failure with successful isolation (i.e. Class 7). The results of this for the assessed 12% reduction in containment strength are:

Total Class 7 Frequency	2.956E-06 per year
Class 7 LERF Frequency	6.736E-08 per year

The frequency of the Class 7 LERF contributors are the frequencies of those STCs for which the containment fails early and the containment sprays have failed altogether or only operate late in the sequence. These are STCs 6-9 and 21.

For the non-degraded containment, the Class 7 LERF contribution was obtained from the results of the original IPE Level 2 analysis (Figure 4.7-1, Reference 1) and is 1.72E-08 per year.

The Class 7 LERF contribution as a function of ILRT interval, t, is then:

$$LERF_{Cl7} = (\text{Probability degraded}) * 6.736E\text{-}08 + (1 - \text{Probability degraded}) * 1.72E\text{-}08$$

$$= [1 - EXP(-\lambda t)] * 6.736E\text{-}08 + [EXP(-\lambda t)] * 1.72E\text{-}08$$

where:

λ = liner corrosion failure rate = 0.005714
t = ILRT interval = 3, 10 or 15 years

For t = 3 years,

$$LERF_{Cl7} = [1 - 0.9830] * 6.736E\text{-}08 + 0.9830 * 1.72E\text{-}08$$

$$= 0.115E\text{-}08 + 1.691E\text{-}08$$

$$= 1.81E\text{-}08 \text{ per year}$$

The Class 7 LERF contribution for the 10 and 15 year intervals were obtained in a similar manner yielding the results in the Response to Request No. 1 of NL-02-047, Attachment 1, April 3, 2002.

References:

1. Consolidated Edison Company of New York, Inc., "Indian Point Unit Two Nuclear Generating Station Individual Plant Examination," August 1992

ATTACHMENT 2 TO NL-02-075

Commitment

ENTERGY NUCLEAR OPERATIONS, INC
INDIAN POINT NUCLEAR GNERATING UNIT NO. 2
DOCKET NO. 50-247

Commitment

No.	Commitment Description	Implementation Schedule
1.	The Containment Integrated Leakage Test procedure will be revised to ensure the abandoned portions of the Weld Channels and Penetration Pressurization System are subjected to containment atmospheric pressure during the performance of the test.	Prior to the next performance of the Containment Integrated Leakage Test