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**John A. Ventosa**  
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July 10, 2012

NL-12-070

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

SUBJECT: Proposed Revision to Reactor Vessel Surveillance Capsule Withdrawal Schedule  
Per 10 CFR 50 Appendix H  
Indian Point Unit Number 3  
Docket No. 50-286  
License No. DPR-64

- REFERENCES:
1. NRC Administrative Letter 97-04, "NRC Staff Approval For Changes to 10 CFR 50, Appendix H, Reactor Vessel Surveillance Specimen"
  2. ASTM Standard E185.-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels".
  3. WCAP-16251-NP, "Analysis of Capsule X from Entergy's Indian Point 3 Reactor Vessel Radiation Surveillance Program"
  4. Entergy Letter NL-04-092 to NRC Regarding Capsule X Material Surveillance Report, dated July 29, 2004.

Dear Sir or Madam:

Entergy Nuclear Operations, Inc. (Entergy) hereby requests NRC approval of a revision to the reactor vessel surveillance specimen withdrawal schedule pursuant to 10 CFR 50, Appendix H, Section III.B.3 which requires that withdrawal schedules be submitted in accordance with 10 CFR 50.4 and that the proposed schedule must be approved by the NRC prior to implementation.

Reference 1 allows NRC approval of the proposed changes to the withdrawal schedule without a license amendment if the changes conform with the American Society for Testing and Materials (ASTM) Standard Practice E 185-82 (Reference 2). The proposed changes comply with the recommendations of ASTM Standard Practice E 185-82 as discussed in Attachment 1. Indian Point Unit 3 is currently at power with the next refuel outage scheduled for March 2013. The change will revise the schedule for one of the remaining End of Life (EOL) Capsules from approximately 25.5 effective full power years (EFPY) to approximately 29.0 EFPY. The basis for this proposed change is

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NRR

discussed in section 7 of WCAP-16251-NP (Reference 3) and in Attachment 1. Reference 3 was transmitted to the NRC in Reference 4.

A copy of this application and the associated attachments are being submitted to the designated New York State official.

Entergy requests approval of the proposed amendment prior to the IP3 refueling outage in March 2013 with immediate implementation to avoid the unnecessary dose associated with pulling the capsule prior to the end of life. There are no new commitments being made in this submittal. If you have any questions or require additional information, please contact Mr. Robert Walpole, IPEC Licensing Manager at (914) 254-6710.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 10, 2012.

Sincerely,

A handwritten signature in black ink, appearing to be 'JAV/sp', with a large loop at the end.

JAV/sp

Attachment: Proposed Revision to Reactor Vessel Surveillance Capsule Withdrawal  
Schedule Per 10 CFR 50 Appendix H

cc: Mr. Douglas Pickett, Senior Project Manager, NRC NRR DORL  
Mr. William Dean, Regional Administrator, NRC Region 1  
NRC Resident Inspector, IP3  
Mr. Francis J. Murray, Jr., President and CEO, NYSERDA  
Ms. Bridget Frymire, New York State Dept. of Public Service

**ATTACHMENT TO NL-12-070**

**PROPOSED REVISION TO REACTOR VESSEL SURVEILLANCE  
CAPSULE WITHDRAWAL SCHEDULE PER 10 CFR 50 APPENDIX H**

**ENTERGY NUCLEAR OPERATIONS, INC.  
INDIAN POINT NUCLEAR GENERATING UNIT NO. 3  
DOCKET NO. 50-286**

## **1.0 REQUIREMENTS**

Appendix H of 10 CFR 50 (Reference 1) describes reactor vessel material surveillance program requirements. Paragraph (III)(B)(3) requires "A proposed withdrawal schedule must be submitted with a technical justification as specified in Section 50.4. The schedule must be approved prior to implementation." Reference 2 allows NRC approval of the proposed changes to the withdrawal schedule without a license amendment if the changes conform with the American Society for Testing and Materials (ASTM) Standard Practice E 185-82 (Reference 3).

## **2.0 PROPOSED CHANGES**

The proposed amendment revises the withdrawal schedule for the remaining surveillance capsules to incorporate the results of the last surveillance capsule (Capsule X) analysis documented in WCAP-16251. The schedule currently included in the IP3 UFSAR was based on the previous surveillance capsule analysis (Capsule Z) and it does not include the results from the Capsule X analysis. The current surveillance capsule withdrawal schedule is provided below while the proposed revised schedule is provided in Table 2.

The FSAR identifies the current withdrawal schedule as follows (Note 2203 for capsule X should be 2003):

CAPSULE	REMOVAL TIME
T	Removed (1978 Refueling Outage, At the Replacement of the First Region of the Core, 1.34 EFPY*)
Y	Removed (1982 Refueling Outage, 3.13 EFPY)
Z	Removed (1987 Refueling Outage, 5.55 EFPY)
S	**
X	Removed (2203 Refueling Outage, 15.6 EFPY)
U	30 Years or 25.5 EFPY, assuming an 85% capacity)
V	Standby
W	Standby

\*NOTE: Effective full power years from plant startup.

\*\*Capsule S, scheduled for removal in the 2001 outage, was found to be inaccessible due to equipment interference and has therefore been removed from the program. The schedule for

specimen retrieval beyond Capsule Z was revised in 2003 in order to optimize the benefits gained from specimen analysis in the latter half of plant life.

This plan was developed assuming an 85% capacity factor over plant life. Accordingly, the times for removal may be extended to allow for historical capacity factor below 85%.

The proposed schedule is from WCAP-16251 Section 7 which reads as follows:

"The following surveillance capsule removal schedule meets the requirements of ASTM E185-82 and is recommended for future capsules to be removed from the Indian Point Unit 3 reactor vessel. This recommended removal schedule is applicable to 27.2 EFPY of operation.

Capsule	Capsule Location	Lead Factor <sup>(a)</sup>	Withdrawal EFPY <sup>(b)</sup>	Fluence (n/cm <sup>2</sup> ) <sup>(a)</sup>
T	40°	3.43	1.4	2.63 x 10 <sup>18</sup> (c)
Y	40°	3.49	3.2	6.92 x 10 <sup>18</sup> (c)
Z	40°	3.48	5.5	1.04 x 10 <sup>19</sup> (c)
S	40°	3.46	(d)	(d)
X	4°	1.49	15.5	8.74 x 10 <sup>18</sup> (c)
V	4°	1.52	EOL(e)(f)	(e)(f)
W	4°	1.52	EOL(e)(f)	(e)(f)
U	4°	1.52	EOL(e)(f)	(e)(f)

Notes:

- (a) Updated in Capsule X dosimetry analysis.
- (b) Effective Full Power Years (EFPY) from plant startup.
- (c) Plant specific evaluation.
- (d) Indian Point Unit 3 tried to remove Capsule S in May of 2001; however, the Capsule was not retrievable. Therefore, the Capsule Removal Schedule was revised to exclude Capsule S and make use of a spare capsule in its place. Due to the presence of spare capsules, the RV surveillance program is not degraded by the elimination of Capsule S
- (e) If Indian Point Unit 3 is following a withdrawal schedule for the standard EOL (27.2 EFPY), then it is recommended to remove the 5<sup>th</sup> & standby capsules any time after 16.1 EFPY, but not to exceed 27.2 EFPY (EOL). This would satisfy the ASTM E 185-82 requirement to withdrawal @ EOL, not less than once or greater than twice the peak EOL vessel fluence. The projected fluence on the capsules will be between 9.22 x 10<sup>18</sup> n/cm<sup>2</sup> (One times the EOL peak vessel) and 1.844 x 10<sup>19</sup> n/cm<sup>2</sup> (Two times the peak EOL vessel fluence), depending on the exact withdrawal time. The standby capsules should also be withdrawn and placed in storage. Alternative fluence measuring techniques must be applied.
- (f) If Indian Point Unit 3 is following a withdrawal schedule for License Extension (45.3 EFPY), then it is recommended to remove the 5<sup>th</sup> and standby capsules any time after 28.2 EFPY, but not to exceed 45.3 EFPY (EOLE). This would satisfy the ASTM E 185-82 requirement to withdrawal @ EOL, not less than once or greater than twice the peak EOL vessel fluence. The projected fluence on the capsules will be between 1.48 x 10<sup>19</sup> n/cm<sup>2</sup> (One times the EOLE peak vessel) and 2.96 x 10<sup>19</sup> n/cm<sup>2</sup> (Two times the peak EOLE vessel fluence), depending on the exact withdrawal time. The standby capsules should also be withdrawn and placed in storage. Alternative fluence measuring techniques must be applied."

Since IP3 has submitted an application to renew the operating license, the next surveillance capsule will be removed at approximately 29.0 EFPY consistent with the evaluations performed in WCAP-16251 to ensure that the accumulated fluence covers the period of extended operation. If the IP3 license is not renewed, then IP3 will remove one of the remaining capsules once operations have ceased at IP3.

The FSAR will be revised to read as follows (this also corrects the X capsule information):

CAPSULE	REMOVAL TIME
T	Removed (1978 Refueling Outage, At the Replacement of the First Region of the Core, 1.34 EFPY*)
Y	Removed (1982 Refueling Outage, 3.13 EFPY*)
Z	Removed (1987 Refueling Outage, 5.55 EFPY*)
S	**
X	Removed (2003 Refueling Outage, 15.5 EFPY*)
U	Remove at the refueling outage closest to 29.0* EFPY
V	Standby
W	Standby

\*NOTE: Effective full power years from plant startup.

\*\*Capsule S was retired in place in 2001.

### **3.0 TECHNICAL ANALYSIS**

This request proposes to revise the surveillance capsule withdrawal schedule to allow one of the remaining capsules to be removed at approximately 29.0 EFPY. The surveillance capsule withdrawal schedule for IP3 was documented in Reference 4 (except for the change to retire capsule S and withdraw capsule X due to removal difficulties that was approved in Reference 5). The stretch power uprate impact on the schedule was evaluated (Reference 6) and the NRC concluded (Reference 7) that the ASTM E 185-82 requirement for the fifth capsule to be withdrawn at a neutron fluence between the peak end of license fluence and twice the peak end of license fluence was acceptable. The proposed change to the schedule falls within this latter range.

The surveillance capsules are used to monitor the beltline materials. The surveillance capsules are located closer to the core than the reactor vessel beltline materials so that fracture toughness testing can be used to determine the nil-ductility transition temperature of the vessel at a later time in life. The current IP3 Pressure - Temperature

(P-T) Limit Curves specified in the Updated Final Safety Analysis Report were developed per 10 CFR 50 Appendix G and are based upon 27.2 Effective Full Power Years (EFPY) of operation (Reference 8). These limits are controlled by lower shell plate B-2803-3 which has a calculated 3/4T Adjusted Reference Temperature (ART) of 198.1° F and a 1/4T ART of 241.1° F. Plate B--2803-3 has valid surveillance data obtained from surveillance capsules T, Y and Z. This plate has been exposed to a fluence of  $1.04 \times 10^{19}$  n/cm<sup>2</sup> in capsule Z, which is well in excess of the calculated 1/4T fluence of  $6.08 \times 10^{18}$  n/cm<sup>2</sup> used in the calculation of the current 27.2 EFPY P-T curves. The proposed change in the capsule withdrawal schedule does not adversely affect the validity of the existing P-T curves for the 27.2 EFPY period that are projected to expire in 2015.

The proposed change to the surveillance capsule schedule is based on the requirements of the 1982 Edition of ASTM E-185, to the extent practicable as provided in 10 CFR 50, Appendix H. Since the  $\Delta RT_{PTS}$  is greater than 200° F, ASTM E-185-82 requires the withdrawal of five (5) capsules with the first four (4) required to be tested. IP3 has already removed and tested four (4) capsules and therefore has already met the requirements of ASTM E-185-82 with the only remaining capsule to be withdrawn at the end of the current operating license term. If IP3 continues to operate beyond the current license term, then the next surveillance capsule will be withdrawn at approximately 29.0 EFPY which is currently projected to occur at approximately 3R20 in March 2019.

In summary, the surveillance capsule withdrawal schedule proposed in this letter, is based on the analysis of the latest surveillance Capsule X removed from the IP3 reactor vessel and it complies with the requirements provided in ASTM E-185-82 as required by 10CFR50, Appendix H.

#### **4.0 REFERENCES**

1. 10 CFR 50, Appendix H, "Reactor Vessel Material Surveillance Program Requirements."
2. NRC Administrative Letter 97-04, "NRC Staff Approval For Changes to 10 CFR 50, Appendix H, Reactor Vessel Surveillance Specimen Withdrawal Schedules," dated September 30, 1997.
3. ASTM Standard E185-82, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels".
4. Westinghouse Report WCAP-11057, Revision 1, "Indian Point Unit 3 Reactor Vessel Fluence and RT-PTS Evaluations for Consideration of Life Extension," dated June 1989.
5. NRC Letter to Entergy Regarding Reactor Vessel Surveillance Capsule Withdrawal Schedule Change (TAC No. MC5069), dated November 16, 2004.
6. Entergy letter to NRC regarding Proposed Changes to Technical Specifications: Stretch Power Uprate (4.85%) and Adoption of TSTF-339, dated June 3, 2004.

7. NRC Letter to Entergy Regarding Issuance of IP3 Amendment 225 re: 4.85 Percent Stretch Power Uprate And Relocation of Cycle Specific Parameters (TAC NO. MC3553), dated March 24, 2005.
8. Entergy Letter to NRC Proposing Technical Specification Changes Regarding Updated Pressure-Temperature and Low Temperature Overpressure Protection System Limits, dated January 18, 2007.