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BVY 14-065

DATE: 8/28/14

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SUBJECT: VY's Third 6-month Update

Report for FLEX (Order EA-12-049)

LICENSING LEAD: J. MEYER

COMMITMENTS: YES (Enter EN-LI-110) **NO**

COMMENTS: \_\_\_\_\_

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**Latest update: August 7, 2014 (DWR)**



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Christopher J. Wamser  
Site Vice President

BVY 14-065

August 28, 2014

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

SUBJECT: Vermont Yankee's Third Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) and Request to Rescind Order  
Vermont Yankee Nuclear Power Station  
Docket No. 50-271  
License No. DPR-28

REFERENCES: 1. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012 (ML12054A736)  
2. NRC Interim Staff Guidance JLD-ISG-2012-01, Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, Revision 0, dated August 29, 2012 (ML12229A174)  
3. Vermont Yankee Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), BVY 13-017, dated February 28, 2013 (ML13064A300)  
4. Notification Of Permanent Cessation Of Power Operations, BVY 13-079, dated September 23, 2013 (ML13273A204)  
5. Vermont Yankee's Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), BVY 14-014, dated February 26, 2014 (ML14064A195)

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Entergy Nuclear Operations, Inc. (ENO). Reference 1 was immediately effective and directs ENO to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel

pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 1 also requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provided the Vermont Yankee Overall Integrated Plan.

Reference 4 notified the NRC that ENO had decided to permanently cease power operations of Vermont Yankee Nuclear Power Station (VY) in the fourth quarter 2014. Reference 5 provided the second VY six-month status report which reflected the decision to permanently cease power operations of VY.


The purpose of this letter is to (1) provide the third six-month status report pursuant to Section IV, Condition C.2, of Reference 1, and (2) request rescission of the order (Reference 1) upon docketing of the 10CFR50.82(a)(1) certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel.

Should you have any questions regarding this submittal, please contact Mr. Coley Chappell at (802) 451-3374.

This letter contains no new regulatory commitments.

I declare under penalty of perjury that the foregoing is true and correct; executed on August 28, 2014.

Sincerely,

 Michael Anthony Romeo Sr. for CJW

CJW / JTM

- Attachments:
1. Vermont Yankee's Third Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events
  2. Request to Rescind Order EA-12-049

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Mr. Christopher Recchia, Commissioner  
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**Attachment 1 to**

**BVY 14-065**

**Vermont Yankee's Third Six-Month Status Report for the  
Implementation of Order EA-12-049, Order Modifying Licenses with  
Regard to Requirements for Mitigation Strategies for Beyond-Design-  
Basis External Events**

**BVY 14-065 Attachment 1**

**Vermont Yankee’s Third Six-Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events**

**1. Introduction**

Entergy Nuclear Operations, Inc. (Entergy) developed an Overall Integrated Plan (OIP) for Vermont Yankee (VY) (Reference 1), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This attachment provides an update of milestone accomplishments since submittal of the Overall Integrated Plan, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

On September 23, 2013, Entergy notified the NRC that it has decided to permanently cease power operations at VY at the end of the current operating cycle (Reference 9). Entergy is requesting rescission of Order EA-12-049 upon docketing of the 10CFR50.82(a)(1) certifications for permanent cessation of operation and permanent removal of fuel from the reactor vessel (Attachment 2).

**2. Milestone Accomplishments**

The following milestone(s) have been completed since January 31, 2013, and are current as of July 31, 2014.

- Second Six-Month Status Report — February 2014

**3. Milestone Schedule Status**

The following provides an update to Attachment 2 of the Overall Integrated Plan. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed. Items that were changed are discussed below.

**Milestone Schedule**

Milestone	Target Completion Date*	Activity Status	Revised Target Completion Date
Submit 60 Day Status Report	October 26, 2012	Complete	

Milestone	Target Completion Date*	Activity Status	Revised Target Completion Date
Submit Overall Integrated Implementation Plan	February 28, 2013	Complete	
Submit 6 Month Status Report	August 28, 2013	Complete	
Develop Mods	TBD**	In Progress**	**
Develop Strategies/Playbook with RRC	TBD**	In Progress**	**
Purchase and Procure Equipment	TBD**	In Progress**	**
Perform Staffing Analysis	August 2016	Not Started	**
Issue FLEX Support Guidelines (FSGs)	TBD**	Not Started	**
Submit 6 Month Status Report	August 2014	Complete (with this submittal)	
Create Maintenance Procedures	TBD**	Not Started	**
Submit 6 Month Status Report including revised Overall Integrated Plan	August 28, 2014	Not Started	**
Procedure Changes Training Material Complete	TBD**	Not Started	**
Develop Training Plan	TBD**	Not Started	**
Implementation Outage	Not Applicable	Not Started	**
Implement Training	December 2016	Not Started	**
Implement Mods	December 2016	Not Started	**
Submit Completion Report	February 2017	Not Started	**
NRC FLEX RAI's (Reference 3)	TBD**		**
Validation Walk-throughs	December 2016	Not Started	**

\* - Target Completion Date is the last submitted date from either the OIP or previous six-month status report.

\*\* - Entergy is requesting rescission of Order EA-12-049 upon docketing of the 10CFR50.82(a)(1) certifications for permanent cessation of operation and permanent removal of fuel from the reactor vessel (Attachment 2).

#### 4. Changes to Compliance Method

On September 23, 2013, Entergy notified the NRC that it has decided to permanently cease power operations at VY at the end of the current operating cycle (Reference 6). Entergy is requesting rescission of Order EA-12-049 upon docketing of the 10CFR50.82(a)(1) certifications for permanent cessation of operation and permanent removal of fuel from the

reactor vessel (Attachment 2).

Although Entergy fully intends to permanently cease operations, should Entergy not permanently cease operations, Entergy plans to submit, in June 2015, a revised OIP.

## **5. Need for Relief/Relaxation and Basis for the Relief/Relaxation**

Entergy is requesting rescission of Order EA-12-049 upon docketing of the 10CFR50.82(a)(1) certifications for permanent cessation of operation and permanent removal of fuel from the reactor vessel (Attachment 2).

## **6. Open Items from Overall Integrated Plan and Interim Staff Evaluation**

Entergy is requesting rescission of Order EA-12-049 upon docketing of the 10CFR50.82(a)(1) certifications for permanent cessation of operation and permanent removal of fuel from the reactor vessel (Attachment 2).

## **7. Potential Interim Staff Evaluation Impacts**

The NRC has not yet issued an interim staff evaluation; therefore, there are no potential impacts to the interim staff evaluation identified at this time. Entergy is requesting rescission of Order EA-12-049 upon docketing of the 10CFR50.82(a)(1) certifications for permanent cessation of operation and permanent removal of fuel from the reactor vessel (Attachment 2).

## **8. References**

The following references support the updates to the Overall Integrated Plan described in this attachment.

1. Vermont Yankee Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), BVY 13-017, dated February 28, 2013.
2. NRC Order Number EA-12-049, Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012.
3. NRC Request for Additional Information Regarding Overall Integrated Plan in Response to March 12, 2012 Commission Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) (TAC No. MF0779), dated June 17, 2013.



4. Response to Request for Additional Information Regarding Overall Integrated Plan for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049) – Vermont Yankee Nuclear Power Station, BVY 13-064, July 17, 2013.
5. NRC Order Number EA-12-050, Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents, dated March 12, 2012.
6. NRC Order Number EA-13-109, Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions, dated June 6, 2013.
7. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, dated August 2012.
8. Vermont Yankee's First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), BVY 13-076, dated August 28, 2013 (ML13247A030)
9. Notification Of Permanent Cessation Of Power Operations, BVY 13-079, dated September 23, 2013 (ML13273A204)
10. ENO's Request for Rescission of and Schedule Relief from Commission Order Modifying License With Regard To Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions (Order Number EA-13-109) , BVY 13-101, dated November 22, 2013

**Attachment 2 to BVY 14-065**

**Request to Rescind Order EA-12-049**

**Order Modifying License with Regard to Requirements for Mitigation  
Strategies for Beyond-Design-Basis External Events**

## **BVY 14-065 Attachment 2**

### **Request to Rescind Order EA-12-049**

#### **1. Request to Rescind Order**

On March 12, 2012, the Nuclear Regulatory Commission (“NRC” or “Commission”) issued Order EA-12-049, “Order Modifying License with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events” (the Order) to Entergy Nuclear Operations, Inc. for the Vermont Yankee Nuclear Power Station (VY). The Order requires completion of full implementation of the requirements in the Order no later than two (2) refueling cycles after submittal of the overall integrated plan, or December 31, 2016, whichever comes first. VY responded to the Order by letters dated October 26, 2012 (BVY 12-071, ML12306A084), February 28, 2013 (BVY 13-017, ML13064A300), August 28, 2013 (BVY 13-076, ML13247A030) and February 26, 2014 (BVY 14-014, ML14064A195).

In a September 23, 2013 letter (BVY 13-079, ML13273A204) VY notified the NRC that Entergy had decided to permanently cease power operations of VY at the end of the current operating cycle (expected in the fourth quarter of 2014). Since VY will permanently cease power operations at the end of the current operating cycle (estimated to be the 4<sup>th</sup> quarter 2014), there will be no further refueling outages, startups from refueling outages, or refueling cycles. As a result, the full implementation date required by the Order is December 31, 2016.

In accordance with Section IV of the Order, Entergy requests that the NRC rescind the Order in its entirety upon docketing of the 10CFR50.82(a)(1) certifications for permanent cessation of operation and permanent removal of fuel from the reactor vessel. Good cause for this request is provided below.

#### **2. Basis for Rescission Request**

Section IV of the Order provides the NRC's Director of the Office of Nuclear Reactor Regulation the authority to relax or rescind any or all of the conditions of the Order upon demonstration by the licensee of good cause.

By letter dated September 23, 2013 (BVY 13-079, ADAMS Accession No. ML13273A204) VY notified the NRC that Entergy had decided to permanently cease power operations of VY at the end of the current operating cycle (expected in the fourth quarter of 2014).

Section III of the Order states that the Commission determined that all power reactor licensees and construction permit holders must develop, implement and maintain guidance and strategies to restore or maintain core cooling, containment, and SFP cooling capabilities in the event of a beyond-design-basis external event. This statement forms the basis of the Order and reflects the need to effectively deploy limited resources to mitigate very low frequency events with the potential to challenge both the reactor and SFP.

VY will permanently cease operations in the fourth quarter of 2014 and it is estimated that all fuel in the reactor will be relocated to the Spent Fuel Pool (SFP) by the end of the first quarter of 2015. Therefore, all nuclear fuel at VY will be permanently removed from the reactor vessel and primary containment before the required Order implementation date. The lack of fuel in the reactor vessel and the resulting absence of challenges to the primary containment render the development of guidance and strategies to maintain or restore core cooling and primary containment capabilities unnecessary.

Because the irradiated fuel in the VY SFP will have been last used for power generation in December 2014, the fuel will have decayed at least 2 years by the required Order implementation date. Based on the expected decay heat level at that date, the time to boil in the SFP is approximately 87 hours and the time to reduce SFP water inventory to a point 10 feet above the top of the spent fuel rack would be an additional 233 hours (320 hours total) if no makeup were available. As such, reliance on SFP inventory for passive cooling provides an equivalent level of protection as that which would be provided by the initial phase of the guidance and strategies for maintaining or restoring SFP cooling per the Order. Further, the low decay heat and long time to boil off the inventory to a point at which makeup would be necessary for radiation shielding purposes obviate the need for transition phase guidance and strategies using on site portable equipment per the Order. Lastly, the low decay heat and long time to boil off the inventory also provides sufficient time for Entergy to obtain off site resources on an ad hoc basis to sustain the SFP cooling function indefinitely, obviating the need for the final phase of guidance and strategies per EA-12-049.

Since VY has informed the NRC of the decision to permanently cease power operations and will become a permanently shutdown and defueled facility at the end of the current operating cycle, the safety of the fuel in the SFP becomes the primary safety function for site personnel. In the event of a challenge to the safety of fuel stored in the SFP, decision-makers would not have to prioritize actions and the focus of the staff would be the SFP condition. Thus, the basis for the Order will no longer apply to the configuration of VY at the end of the current operating cycle.

### **3. Spent Fuel Pool Cooling**

During VY decommissioning, the Standby Fuel Pool Cooling system will be maintained to provide SFP cooling until all spent fuel has been transferred to dry storage containers at the onsite Independent Spent Fuel Storage Installation (ISFSI). This is currently a two train, Seismic Class I system. In the unlikely event resulting in the loss of this system, existing VY design features and capabilities are available for mitigation until the system can be restored, alternate means of cooling established or offsite resources obtained.

The VY spent fuel pool has a large capacity for heat absorption. The normal SFP water level at the event initiation provides for a minimum of 21' of water inventory above the top of the spent fuel racks. Using the expected maximum heat load for the permanently defueled condition in which all fuel has been transferred to the pool 730 days after permanent shutdown of the reactor, the SFP water inventory will heat up from 110 to 212°F during the first 87 hours. If boiling is initiated, the level in the pool would decrease to 10 feet above the spent fuel rack only after an additional 233 hours of boiling without makeup. Existing 10 CFR 50.54(hh)(2) equipment and procedures will be available to provide makeup to the pool and can be deployed prior to the onset of pool boiling. Even without crediting the 10 CFR 50.54(hh)(2) equipment, there is sufficient time to obtain off site resources on an ad hoc basis to sustain SFP cooling indefinitely.

### **4. Conclusion**

Upon docketing of the 10 CFR 50.82(a)(1) certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, the 10 CFR 50 license will no longer authorize operation of the reactor or emplacement or retention of fuel into the reactor vessel. Spent nuclear fuel at VY will be stored either in the SFP or in dry storage at the onsite ISFSI. Since VY is permanently shutting down and defueling, no additional fission products will be generated from the plant after shutdown and defueling and the decay heat load on the spent fuel will continue to decline. Loss of SFP level due to lack of cooling would occur slowly due to

low decay heat load from spent fuel in the SFP. It has been determined that if SFP cooling is lost at the end of the two year period following shutdown that the time to boil would be 87 hours and the time to boil off to 10 feet above the top of the fuel rack would be an additional 233 hours (320 hours total) if no makeup were available.

After the station is permanently shutdown and the reactor permanently defueled, the requirements of the Order are unnecessary. In the event of a challenge to the safety of the fuel stored in the SFP, decision makers would not have to prioritize actions for core cooling and primary containment since the fuel will have been permanently removed from the reactor vessel; the focus of the staff would be the SFP condition. Thus, the basis for the order will no longer apply to the configuration of VY.

The evaluation that VY has performed demonstrates good cause to support VY's request that the Order be rescinded in its entirety upon docketing of the 10 CFR 50.82(a)(1) certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel.