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BVY 13-076

August 28, 2013

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

SUBJECT: 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)
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. NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, Revision 0, dated August 2012 (ML12221A205)
4. Vermont Yankee Initial 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 12-071, dated October 26, 2012 (ML12306A084)
5. 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)
6. NRC Order Number EA-12-050, Order to Modify Licenses with Regard to Reliable Hardened Containment Vents, dated March 12, 2012 (ML12054A694)
7. NRC Order Number EA-13-109, Order to Modify Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions, dated June 6, 2013 (ML13143A321)

A151
NRR

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Entergy. Reference 1 was immediately effective and directs Entergy 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 2 endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the Vermont Yankee initial status report regarding mitigation strategies. Reference 5 provided the Vermont Yankee Overall Integrated Plan.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. The purpose of this letter is to provide the first six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The attached report provides an update of milestone accomplishments since the last status report, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

The FLEX strategies in the Overall Implementation Plan rely on the current conceptual design of the reliable hardened vent (RHV) system that was developed in response to Reference 6, NRC Order EA-12-050. Reference 7, NRC Order EA-13-109, June 6, 2013, rescinds the requirements of NRC Order EA-12-050. Compliance with the requirements of NRC Order EA-12-050, including applicable schedule deadlines for submittals or implementation, is no longer required. The industry, through NEI and the owners' group, is addressing the new requirements provided in NRC Order EA-13-109 on the schedule outlined in NRC Order EA-13-109. Because of the new order (NRC Order EA-13-109), the design of the hardened containment vent is being reevaluated. Any design changes resulting from the revised hardened vent order will be reflected in a future six month update.

On August 27, 2013, Entergy announced that it had decided to permanently cease power operations of Vermont Yankee Nuclear Power Station in the fourth quarter 2014. This status report was prepared prior to that decision. Entergy is evaluating its responses to Reference 1 in order to determine the appropriate actions in alignment with the decision to permanently cease operations. Entergy requests the NRC terminate its review of the responses related to the Order until Entergy can submit changes to its integrated plan to reflect the impact of this decision.

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, 2013.

Sincerely,

CJW / JTM

Attachment: Vermont Yankee's First 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

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BVY 13-076 Attachment

Vermont Yankee's First 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.

2. Milestone Accomplishments

The following milestone(s) have been completed since the development of the Overall Integrated Plan (Reference 1), as of July 31, 2013.

- Although not part of the original milestone schedule, NRC requests for additional information (RAIs) were received June 17, 2013 (Reference 3) and responded to on July 17, 2013 (Reference 4). The response to the RAIs was added to the milestone schedule. Any additional RAI responses will be provided in future six-month status reports as necessary. The status of individual RAIs is indicated in the Vermont Yankee RAI Status Table shown below. The addition of this milestone and target completion date does not impact the Order implementation date.

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.

- Purchase Equipment

This milestone was combined with the Procure Equipment milestone as the two were considered to be the same activity. The target date is not changed. This change does not impact the Order implementation date.

- Validation Walk-throughs

A target completion date has been added to the milestone listing for completion of the walk-throughs. The walk-throughs will be completed during the FLEX modification implementation outage. This new milestone target date does not impact the Order implementation date.

- Perform Staffing Analysis

The target completion date for performing staffing analysis has been revised from Summer 2013 to Summer 2014. The revised target completion date will have no impact on final implementation of the FLEX order.

- Submit Completion Report

Changed the Completion Report date to coincide with the date of the next regular six-month status report which would be February 2015. This new milestone target date does not impact the Order implementation date.

Milestone Schedule

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Submit 60 Day Status Report	October 26, 2012	Complete	
Submit Overall Integrated Implementation Plan	February 28, 2013	Complete	
Submit 6 Month Status Report	August 28, 2013	Complete	
Develop Mods	Fall 2013	In Progress	
Develop Strategies/Playbook with RRC	Spring 2014	In Progress	
Purchase and Procure Equipment	Spring 2014	In Progress	
Perform Staffing Analysis	Summer 2013	Not Started	Summer 2014
Issue FLEX Support Guidelines (FSGs)	Summer 2014	Not Started	
Submit 6 Month Status Report	February 28, 2014	Not Started	
Create Maintenance Procedures	Summer 2014	Not Started	
Submit 6 Month Status Report	August 28, 2014	Not Started	
Procedure Changes Training Material Complete	Summer 2014	Not Started	

Milestone	Target Completion Date	Activity Status	Revised Target Completion Date
Develop Training Plan	Spring 2014	Not Started	
Implementation Outage	Fall 2014	Not Started	
Implement Training	Fall 2014	Not Started	
Implement Mods	Fall 2014	Not Started	
Submit Completion Report	Fall 2014	Not Started	February 2015
NRC FLEX RAI's (Reference 3)	July 17, 2013	See RAI Table Below	
Validation Walk-throughs	Fall 2014	Not Started	

4. Changes to Compliance Method

The FLEX strategies in the OIP rely on the current conceptual design of the reliable hardened vent (RHV) system that was developed in response to Reference 5, NRC Order EA-12-050. Reference 6, NRC Order EA-13-109, June 6, 2013, rescinds the requirements of NRC Order EA-12-050. Compliance with the requirements of NRC Order EA-12-050, including applicable schedule deadlines for submittals or implementation, is no longer required. The industry, through NEI and the owners' group, is addressing the new requirements provided in NRC Order EA-13-109. Industry guidance documents are currently being developed on the schedule outlined in Reference 6. Therefore, the design of the hardened containment vent is being reevaluated based on the new Order and the guidance that is under development. Any design changes resulting from the new revised hardened vent order and new industry guidance will be reflected in a future six month update.

Changes to Compliance Method

There are no changes to the compliance method as documented in the Overall Integrated Plan.

Changes and Clarifications

During FLEX design implementation it was determined that, contrary to the VY FLEX OIP, there is not an automatic swap of the RCIC or HPCI suction valves from the CST to the torus on high torus water level. Therefore, the operator action at time 10-35 minutes, to override this auto-swap is not required as currently stated on page 5 of 54 (first time constraint) and page 47 of 54 in Attachment 1A) of the OIP (Enclosure to BVY 13-017, Reference 1). The VY FLEX strategy continues to meet the guidance of NEI 12-06 (Reference 7) with this change.

The following corrections and clarifications to the Overall Integrated Plan were identified as a result of the Vermont Yankee response (Reference 4) to the NRC's request for additional information (Reference 3). The VY FLEX strategy continues to meet the guidance of NEI 12-06 with these changes. Revised or inserted text is displayed as bold text.

- OIP Section: **General Integrated Plan Elements (PWR & BWR) – Key Site assumptions to implement NEI 12-06 strategies.**

  > Add the following statement to the eleventh bullet:

  No License Amendment Requests (LARs) have currently been identified as required. Identification of the necessary LARs for modifications proposed in the integrated plan will become available later in the design development process. It is not anticipated that any LARs are required as part of the interim modification to the Hardened Containment Vent System (HCVS) planned to support the FLEX strategy of early venting at 30 psig. (049-RAI-VY-1)

- OIP Section: **Maintain Core Cooling – BWR Installed Equipment Phase 1**

  > Revise first paragraph under "Power Operation, Startup, and Hot Shutdown" to the following:

  At the initiation of the BDBEE, main steam isolation valves (MSIVs) automatically close, feedwater is lost, and safety relief valves (SRVs) automatically open to control pressure, causing reactor water level to decrease. The RCIC and HPCI System starts automatically upon receipt of a low-low reactor water level signal, and provides its design flow rate with suction from the Condensate Storage Tank (CST) within a specified initiation time and over a wide range of reactor vessel pressures (Reference 2). This injection recovers the reactor level to the normal band. The SRVs control reactor pressure. (Reference 1, Section 2.2 B). The RCIC and HPCI valves and controls are powered by station DC power. HPCI and RCIC automatically start upon a receipt of a reactor vessel low-low water signal (Reference 9, Sections 4.7.5 and 6.4.1). At or before approximately **20 minutes**, HPCI is secured **with no requirements or plans for additional usage. HPCI has been analyzed as running for 20 minutes as part of its automatic start on low reactor level. There is no additional impact to the analysis for Vermont Yankee. The** RCIC **system** provides **sufficient** makeup flow to the reactor vessel **to maintain core cooling and is the only system credited in the analysis for maintaining core cooling during the initial stages of the BDBEE.** After determination that Emergency Diesel Generators (EDGs) cannot be started, the shift manager determines the event is a beyond-design-basis event at approximately 1 hour. RCIC is maintained feeding the reactor vessel with suction from the CST. **It is the goal of the FLEX strategy to maintain operation of RCIC as the primary method of the reactor core cooling function. If the automatic depressurization system (ADS) initiated during the FLEX event, the reactor pressure would quickly be reduced to a pressure that would not support RCIC operation. As described in UFSAR Section 1.6.2.11, the function of ADS is to rapidly reduce reactor pressure during a LOCA event in which the HPCI system fails to maintain reactor water level and thereby allow injection of low pressure ECCS systems. As noted in NEI 12-06, Section 3.2.1.4, no independent failures, other than those causing the ELAP/LUHS event, are assumed to occur in the course of the transient. Therefore ADS is not required for an ELAP/LUHS event. The** automatic depressurization system (ADS) will be placed in 'inhibit' to prevent automatic initiation of ADS **when the determination is made that an ELAP is in progress.** This is necessary to ensure reactor pressure is not

reduced to a pressure which would prevent operation of RCIC. **This action will be incorporated into EOPs or FLEX procedures that will be developed.** RCIC will trip on low steam line pressure of approximately 50 psig (Reference 4). The TS limit is ≥ 50 psig (Reference 1, Table 3.2.2). (049-RAI-VY-38 and 049-RAI-VY-42)

> Revise second paragraph under "Cold Shutdown and Refueling" to the following:

If an ELAP occurs during Cold Shutdown, water in the vessel will heatup. When temperature reaches 212°F (Hot Shutdown), the vessel will begin to pressurize. The turbine driven systems (RCIC and HPCI) are generally available for emergency use at the beginning and end of an outage, thus during the pressure rise RCIC can be returned to service, after testing, with suction from the CST to provide injection flow. When pressure rises to the SRV setpoints then pressure will be controlled by SRVs. **During Cold Shutdown and Refueling modes, RCIC is credited and HPCI is not credited for core cooling.** (049-RAI-VY-38)

- OIP Section: **Maintain Containment – BWR Installed Equipment Phase 1**

> Revise second paragraph to the following:

As determined by the MAAP analysis (Reference 3), torus venting is assumed to open at an approximate pressure of 30 psig via the RHV system at approximately time t = 14 hours. **The saturation temperature of 30 psig is approximately 274°F. An action to vent containment when suppression pool temperature/pressure reaches 274°F/30 psig was selected to provide torus water temperature a margin to the design limit of 281°F.** Phase 1 (i.e., the use of permanently installed plant equipment/features) containment integrity will be maintained throughout the duration of the event. No non-permanently installed equipment will be required to maintain containment integrity. Therefore, there is no defined end time for the Phase 1 coping period for maintaining containment integrity. (049-RAI-VY-49)

> Insert the following three paragraphs after the second paragraph:

The information used to make the venting decision is provided to operators in the control room by instruments LI/PI-16-19-12A/B for containment pressure and TI-16-19-33A/C for torus temperature. Other parameters that would require containment venting include high containment pressure and high torus water level. Based on MAAP analysis (Reference 3), these parameters will not exceed their limits if venting is initiated to control torus temperature as noted above; however, containment pressure and torus water level will be monitored from the Control Room by operators on instruments LI/PI-16-19-12A/B. The containment design pressure is 56 psig. Operators use the EOP primary containment pressure limit curve, PCPL-A, to make venting decisions associated with primary containment pressure. The maximum torus water level is 14.75 ft per EOP-3. (049-RAI-VY-54)

Containment venting is also required by the Severe Accident Guidelines (SAGs) for various extreme plant states such as torus temperatures and torus pressure. These are generally coupled with extended loss of core cooling and severe core damage. Based on evaluations of the VY FLEX strategy, these situations will not

be reached. In accordance with BWROG input, EOPs will be revised to reflect the guidance for venting as noted above. (049-RAI-VY-54)

The FLEX strategies in the OIP currently rely on the current conceptual design of the reliable hardened vent (RHV) system that was developed in response to NRC Order EA-12-050. However, due to the new hardened vent order (NRC Order EA-13-109) the design of the RHV is being reevaluated. Preceding the final design of the RHV in response to the new order (NRC Order EA-13-109), an interim hardened vent design to support FLEX actions is being considered. Specifically, the changes that will be made are to install taps between the rupture disc SDR-16-19-1 and MOV V16-19-86 (TVS-86) to facilitate pressurizing this section of the 8" line so the disc can be burst from the downstream side. A repeatable reverse direction pressure will be established to allow actuation of rupture disc in support of early venting. Nitrogen bottles will be sized and dedicated to pressurize the line. Interim staging will be installed so that the MOV can be manually opened and closed as necessary to maintain the desired torus pressure range required by FLEX. Any HCVS design changes resulting from the revised hardened vent order will be updated in the six month update following the completion of the design of the venting methodology. (049-RAI-VY-2, 39, 49, 50 and 51)

- OIP Section: **Maintain Containment – BWR Portable Equipment Phase 2**
  - > Insert the following 2 paragraphs after the first paragraph:

    Average drywell temperature as evaluated in ENTGVY033-CALC-002, Vermont Yankee Nuclear Power Station Containment Analysis of FLEX Strategies (MAAP analysis, Reference 1), remains below the design temperature limit of 281°F for the initial 72 hours of the ELAP event with only momentary spikes above 281°F that occur due to SRV cycling. At the end of the 72 hours, residual heat removal (RHR) and RHR service water (RHRSW) will be restored allowing shutdown cooling or suppression pool cooling to be utilized to cool the reactor and containment. According to MAAP projections, containment temperature begins to decrease at this point and will not challenge the integrity of the containment. (049-RAI-VY-53)

    The FLEX strategies in the OIP currently rely on the current conceptual design of the reliable hardened vent (RHV) system that was developed in response to NRC Order EA-12-050. However, due to the new hardened vent order (NRC Order EA-13-109) the design of the RHV is being reevaluated. Preceding the final design of the RHV in response to the new order (NRC Order EA-13-109), an interim hardened vent design to support FLEX actions is being considered. Specifically, the changes that will be made are to install taps between the rupture disc SDR-16-19-1 and MOV V16-19-86 (TVS-86) to facilitate pressurizing this section of the 8" line so the disc can be burst from the downstream side. A repeatable reverse direction pressure will be established to allow actuation of rupture disc in support of early venting. Nitrogen bottles will be sized and dedicated to pressurize the line. Interim staging will be installed so that the MOV can be manually opened and closed as necessary to maintain the desired torus pressure range required by

FLEX. Any HCVS design changes resulting from the revised hardened vent order will be reflected in the next six month update. (049-RAI-VY-50)

> Replace Reference 1 with the following:

1. **ENERCON Calculation ENTGVY033-CALC-002, "Vermont Yankee Nuclear Power Station Containment Analysis of FLEX Strategies", Revision 0**

- OIP Section: **Maintain Spent Fuel Pool Cooling – BWR Installed Equipment Phase 1**

> Revise first paragraph to the following:

There are no phase 1 actions required that need to be addressed. Fuel in the SFP is cooled by maintaining **Technical Specification minimum** 21' of water over top of fuel. Boiling of the SFP does not occur until 29 hours into the event. (049-RAI-VY-60)

- OIP Section: **Maintain Spent Fuel Pool Cooling – BWR Portable Equipment Phase 2**

> Revise the first sentence of the first paragraph as followings:

The **Technical Specification minimum** SFP water level at event initiation provides for 21' (Reference 1) of water inventory above the top of the stored spent fuel. Using the design basis maximum heat load, the SFP water inventory will heat up from 110 to 212°F during the first 29 hours (Reference 2). (049-RAI-VY-60)

> Revise first paragraph under "Full Core Offload" to the following:

ENERCON Report ENTGVY033-PR-002 (Reference 4) concludes that the time to boil in the SFP for full core offload is 8.5 hours and the water loss is approximately 439 ft^3/hr. This equates to a minimum required makeup rate of approximately 55 gpm. As the SFP water heats up, it expands and thus the water level rises. This rise in water level also takes into account evaporation from SFP while heating up to 212°F. This results in water level increase of 1 ft from **Technical Specification minimum** water level of 21 ft at 8 hours and it would take approximately 60.5 hours to boil off 21 feet of water. **The VY strategy is to stage FLEX equipment prior to eight (8) hours. SFP cooling/makeup, using one of the methods described below as Primary Strategy Methods 1, 2, or 3 will be provided to the SFP as level decreases. The level will be maintained between normal water level and Level 2 water level (as defined in NRC Order EA-12-051), thereby preventing reduction in water level to a point that would increase exposure levels beyond acceptable levels.** See Cold Shutdown and Refueling discussion in Core Cooling section for discussion on actions required if an ELAP occurs during a refueling outage. (049-RAI-VY-64)

> Insert the following discussion following the "*Alternate Strategy*":

Notes:

Sloshing losses from the spent fuel pool which may result from earthquake loads considered within the scope of the Order are not included in the time to boil analyses described in the OIP.

Vermont Yankee will follow the "Proposed Path Forward for NTTF Recommendation 2.1 Seismic Reevaluations" (VY letter to the NRC, Adams

Accession No. ML13123A161). The Proposed Path Forward is described in a letter from NEI to NRC dated April 9, 2013 (Adams Accession No. ML 13107B386), which incorporates use of the NRC-endorsed Seismic Evaluation Guidance: Screening, Prioritization, and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic (EPRI 1025287, Reference 5) for the NRC requested seismic hazard evaluations and risk assessments. EPRI Report 1025287, Section 7.3.2, discusses sloshing losses from the SFP in relation to a rapid drain-down analysis and provides a simplified and conservative method to determine sloshing losses. The EPRI report states that, "For most scenarios, it is judged that this conservative estimate of the inventory lost due to sloshing will not have a significant effect on the estimate of SFP drain-down."

The Vermont Yankee UFSAR, Section 10.3.4, indicates that there are no penetrations in the SFP below 10 feet above the top of the fuel assemblies. Therefore, a rapid drain-down assessment, which would include considerations of sloshing and its effects on time to boil, was not required as a part of the seismic walkdown efforts (Adams Accession No. ML123620055). EPRI Report 1025286 (Reference 6), "Seismic Walkdown Guidance," dated June 2012, discusses the need for a rapid drain-down assessment of the SFP, and actions which should be taken if the need for such an assessment is identified. As discussed in Section 3, Selection of SSCs, Spent Fuel Pool Related Items, a rapid drain-down analysis is not required to be performed specifically in cases where there are no penetrations in the SFP below 10 feet above the top of the fuel assemblies.

It follows from review of these two documents that the sloshing losses from earthquake loads considered within the scope of the Order would not have a significant effect on time to boil, as the overall volume reduction would be small, and the time to boil is long.

Given the long time to boil the SFP at Vermont Yankee (29 hours under design basis heat load and 8.5 hours for full-core offload), the additional 60.5 hours to boil the SFP inventory down to the top of the fuel (full-core offload heat load), and considering the SFP design does not have penetrations below 10 feet above the top of the fuel, evaluation of sloshing losses in the time to boil analysis from earthquake loads considered within the scope of the Order is not considered necessary. (049-RAI-VY-60)

> Add the following to the "References" listing:

5. **EPRI Report 1025287, Seismic Evaluation Guidance: Screening, Prioritization, and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic, dated February 2013**
6. **EPRI Report 1025286, Seismic Walkdown Guidance: For Resolution of Fukushima Near-Term Task Force Recommendation 2.3: Seismic, dated June 2012** (049-RAI-VY-60)

- OIP Section: **Safety Functions Support – BWR Portable Equipment Phase 2**
  - > Revise the second paragraph under Battery Room Ventilation to the following:

    Vermont Yankee is not committed to Regulatory Guide 1.128, Regulatory Guide 1.189, or IEEE Standard 484-2002. The accumulation of hydrogen from the batteries located in the Battery Room would not exceed 4% concentration in the Battery Room in 2 ½ days (**60** hours) with a complete loss of the ventilation system (Reference 2, Section 8.6.4). (049-RAI-VY-16)

- OIP Section: **Attachment 1A – Sequence of Events Timeline**
  - > Revise Action item 3 to the following:

3	**20 minutes**	HPCI secured.	N	If operators do not secure HPCI, HPCI will trip automatically when reactor level reaches the high level setpoint. With RCPB intact, RCIC can recover/maintain level.

(049-RAI-YY-38)

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

Vermont Yankee expects to comply with the order implementation date and no relief/relaxation is required at this time.

6. Open Items from Overall Integrated Plan and Draft Safety Evaluation

Below are the open items from the integrated plan submitted on February 28, 2013.

Overall Integrated Plan Open Item	Status
OIP Section: **General Integrated Plan Elements (PWR & BWR)** – Seismic Hazard Assessment Open Item: FLEX Storage locations have not been finalized, therefore, investigation of deployment routes for possible impacts due to liquefaction have not been performed	Started. Tentative storage locations have been selected. Seismic boring and evaluation has not commenced.
OIP Section: **General Integrated Plan Elements (PWR & BWR) – Key Site assumptions to implement NEI 12-06 strategies.** Open Item: 1. Structure, content and details of the Regional Response Center playbook will be determined.	Started.

7. Potential Draft Safety Evaluation Impacts

The NRC has not yet issued a draft safety evaluation; therefore, there are no potential impacts to the draft safety evaluation identified at this time.

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.

Vermont Yankee FLEX OIP RAI Status

RAI Number	RAI Topic	Status
049-RAI-VY-1	Identify LARs needed for FLEX mods	Open
049-RAI-VY-2	Early containment venting - provide technical and regulatory basis	Open Generic Industry Concern
049-RAI-VY-3	Timeline/time constraints - provide basis to justify there being no margin in timing of actions	Complete
049-RAI-VY-4	Identify equipment needed for the SBO coping duration that is being credited for ELAP during Phase 2	Complete
049-RAI-VY-5	Provide justification for long term habitability at temperatures over 110 °F in MCR	Open
049-RAI-VY-6	Actions to protect operators in hot areas	Open
049-RAI-VY-7	Security measures needed when doors or equipment hatches are propped open for ventilation purposes	Complete
049-RAI-VY-8	Batteries and load shedding: a. Provide load profile and actions and impacts due to load shed, b. Identify components that change state when de-energized for load shed, c. Identify breakers for load shed, d. Identify whether special markings will be applied to breakers selected for load shed	Open
049-RAI-VY-9	Provide documentation of battery duration and qualification	Open Generic Industry Concern
049-RAI-VY-10	Provide basis that time constraint of connecting Phase 2 DG can be met	Complete
049-RAI-VY-11	Describe how FLEX DG and EDG are isolated to prevent simultaneous operation on bus	Closed
049-RAI-VY-12	Provide minimum DC voltage for operation of elect equipment	Complete

RAI Number	RAI Topic	Status
049-RAI-VY-13	Justify how load shed can be complete at the same time ELAP is declared	Open
049-RAI-VY-14	Seismic capability of EDG fuel oil storage and day tanks	Complete
049-RAI-VY-15	Describe power requirements for HCVS valves and indication or instrumentation and how power will be supplied	Open Generic Industry Concern Related to Order EA-13-109
049-RAI-VY-16	Battery room hydrogen accumulation and venting	Complete
049-RAI-VY-17	Strategy for venting hydrogen from battery rooms	Open
049-RAI-VY-18	Provide additional information to address considerations 2 - 4 of Section 5.3.3 of NEI 12-06 regarding internal flood sources, power for mitigation of groundwater, and impact of non-seismic downstream dams	Open
049-RAI-VY-19	Long duration persistent flooding – discuss plans to move equipment and restock supplies	Open
049-RAI-VY-20	Regional Response Center (RRC) contracts/agreements – discuss items 2-10 of NEI Section 12.2	Complete
049-RAI-VY-21	Discuss portable lighting and communication in plant for deployment strategies	Complete
049-RAI-VY-22	Unavailability control for equipment/connections per NEI Sect 3.2.2 & 11.5	Complete
049-RAI-VY-23	Access to and protection of N2 bottles	Complete
049-RAI-VY-24	N2 bottle capacity to meet the required SRV operations	Complete
049-RAI-VY-25	Securing of large portable equipment to protect the plant during a seismic event and evaluation of stored equipment for seismic interaction	Open

RAI Number	RAI Topic	Status
049-RAI-VY-26	The effects of AC power loss on access to protected area and internal locked areas via security doors and gates when power is lost	Open
049-RAI-VY-27	Access to FLEX valves via seismically protected buildings and paths	Open
049-RAI-VY-28	Protection of tow vehicles	Open
049-RAI-VY-29	Provide procedure / reference that describes how to take local readings of instruments	Open
049-RAI-VY-30	What debris removal equipment is available for use prior to 72 hours	Open
049-RAI-VY-31	Provide information on how snow & ice will be removed if necessary	Open
049-RAI-VY-32	Discuss impact on portable equipment of high temperatures in area where it is deployed	Complete
049-RAI-VY-33	Provide analytical results to support the conclusions of MAAP which will indicate they are consistent with expected plant behavior and that core cooling is maintained	Open Generic Industry Concern
049-RAI-VY-34	Provide technical basis to support the conclusion that capability of MAAP code is sufficient to predict the adequacy of mitigating strategies to cool the core during an ELAP event	Open Generic Industry Concern
049-RAI-VY-35	MAAP - provide summary of techniques, assumptions, and boundary conditions	Open Generic Industry Concern
049-RAI-VY-36	QA process for MAAP	Complete
049-RAI-VY-37	Provide justification for assumptions made regarding primary system leakage from recirculation pump seals and other sources	Open

RAI Number	RAI Topic	Status
049-RAI-VY-38	Clarify whether the use of HPCI instead of RCIC would affect the analysis	Complete
049-RAI-VY-39	Stability of SP water level with long term injection of outside water sources	Open Generic Industry Concern Related to Order EA-13-109
049-RAI-VY-40	Will equipment protection features interfere with operation of RCIC	Complete
049-RAI-VY-41	Discuss time frame for staging and implementing Phase 2 FLEX pump operation	Complete
049-RAI-VY-42	Clarify how determination to place ADS inhibit will be used and justify how the planned 'monitoring' approach is acceptable to prevent system actuation	Complete
049-RAI-VY-43	CST Standpipe mod - provide reference or analysis that concludes that raising the standpipe adds 2.5 hours of RCIC operation	Complete
049-RAI-VY-44	Add discussion to describe the need and action of depressurization when implementing injection with FLEX pump	Complete
049-RAI-VY-45	What hydraulic analyses of FLEX pump/strategy were done or are planned to confirm the required flow	Complete
049-RAI-VY-46	Discuss impact regarding water quality for injection with west deep basin on Connecticut River on fuel assemblies	Open
049-RAI-VY-47	Develop timeline for startup of RCIC during cold shutdown conditions	Open Generic Industry Concern
049-RAI-VY-48	Time to boil when in mode 5, and vessel level below the head flange	Open Generic Industry Concern

RAI Number	RAI Topic	Status
049-RAI-VY-49	Explain the inconsistency between guidance of EOPs to vent containment and the actions in the mitigating strategies for venting containment	Complete
049-RAI-VY-50	Early containment venting - confirm that maintenance of containment integrity is intended to demonstrate the ability to quickly restore containment integrity in the future while supporting decay heat removal in the meantime	Open
049-RAI-VY-51	Provide clarification at to what is limiting factor for early containment venting	Complete
049-RAI-VY-52	Submittal report contains no instrumentation for measuring D/W temperature	Complete
049-RAI-VY-53	Containment integrity while at high containment temperatures	Complete
049-RAI-VY-54	Provide range of plant states that require containment venting – describe information used to make decision to vent	Complete
049-RAI-VY-55	What reliance was placed on BWR roadmap and what plant specific analysis was performed	Complete
049-RAI-VY-56	Provide site analysis commensurate with the BWR roadmap	Open
049-RAI-VY-57	Explain why two different MAAP reports are referenced in the submittal	Complete
049-RAI-VY-58	Confirm HCVS does not rely on additional consumable support (air/nitrogen, power, etc.)	Open Generic Industry Concern Related to Order EA-13-109
049-RAI-VY-59	Clarify intent of statement regarding use of portable equipment for HCVS	Open Generic Industry Concern Related to Order EA-13-109
049-RAI-VY-60	Discuss impact on time-to-boil from sloshing in the SFP	Complete

RAI Number	RAI Topic	Status
049-RAI-VY-61	Discuss venting the reactor building and impact to strategy without an adequate vent path	Open
049-RAI-VY-62	Discuss/provide analysis for use of FLEX pump for filling CST and SFP concurrently	Open
049-RAI-VY-63	Discuss/provide analysis for use of FLEX pump for spraying SFP and vessel injection concurrently	Complete
049-RAI-VY-64	Discuss timing of SFP cooling initiation during full core offload	Complete
049-RAI-VY-65	Discuss fueling provisions for portable equipment, time constraints, and protection of fuel cart	Open
049-RAI-VY-66	Discuss instrumentation used to monitor portable FLEX electrical power equipment	Complete
049-RAI-VY-67	Discuss maintenance and testing of electrical FLEX equipment	Open Generic Industry Concern
049-RAI-VY-68	Severe accident condition impact to FLEX strategies	Complete
049-RAI-VY-69	Severe accident condition impact to equipment transport, and response times	Complete
049-RAI-VY-70	Discuss additional FLEX equipment/actions needed for drywell flooding in severe accident conditions	Complete