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

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397
ENERGY NORTHWEST'S THIRD SIX-MONTH STATUS UPDATE REPORT FOR THE IMPLEMENTATION OF NRC ORDER EA-12-049 MITIGATION STRATEGIES FOR BEYOND DESIGN BASIS EXTERNAL EVENTS**

References:

1. Letter dated March 12, 2012, from E. J. Leeds (NRC) to Energy Northwest et.al, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events"

2. Letter dated March 12, 2012, from E. J. Leeds (NRC) to Energy Northwest et.al, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident"

3. Letter GO2-12-156 dated October 30, 2012, from D. A. Swank (Energy Northwest) to the NRC, "Energy Northwest's Response to the March 12, 2012 Information Request – Communication Assessment"

4. Letter GO2-13-034 dated February 28, 2013, from D. A. Swank (Energy Northwest) to the NRC, "Energy Northwest's Response to NRC Order EA-12-049 – Overall Integrated Plan for Mitigating Strategies"

5. Letter GO2-14-031 dated February 27, 2014, from D. A. Swank (Energy Northwest) to the NRC, "Energy Northwest's Second Six-Month Status Update Report for the Implementation of NRC Order EA-12-049 Mitigation Strategies for Beyond Design Basis External Events"

Dear Sir or Madam,

By Reference 1, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049, which required licensees to develop, implement, and maintain guidance and strategies for mitigation of beyond-design-basis external events. Reference 4 transmitted the Mitigation Strategies OIP for Columbia prepared in response to Reference 1.

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Reference 1 also required submittal of status reports at six month intervals following initial submittal of the OIP. Enclosure 1 to this letter provides Energy Northwest's third six-month status report regarding mitigation strategies.

By Reference 2, the NRC requested that licensees assess the communications systems and equipment that would be used during an emergency. By Reference 3, Energy Northwest submitted a communications assessment for Columbia, and committed to provide the NRC with the status of the implementing actions identified in the assessment as part of the six-month status reports prepared in response to Reference 1. Enclosure 2 to this letter provides Energy Northwest's third six-month status report regarding the communications assessment.

There are no new or revised regulatory commitments contained in this submittal. If you have any questions or require additional information, please contact Ms. L. L. Williams at (509) 377-8148.

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

Executed on this 28th day of August, 2014

Respectfully,

D. A. Swank
Assistant Vice President, Engineering

Enclosures: 1) Third Six-Month Status Update Report for the Overall Integrated Plan for Mitigation Strategies for Beyond Design Basis External Events and Attachments

2) Third Six-Month Status Update Report for the Implementing Actions Identified in Section 9.0 of the Communication Assessment Contained in Energy Northwest's Docketed Correspondence GO2-12-156 (ML12319A079)

cc: NRC Region IV Administrator
NRC NRR Project Manager
NRC Senior Resident Inspector/988C
MA Jones – BPA/1399

ENCLOSURE 1

COLUMBIA GENERATING STATION, DOCKET NO. 50-397

THIRD SIX-MONTH STATUS UPDATE REPORT FOR THE OVERALL INTEGRATED PLAN FOR MITIGATION STRATEGIES FOR BEYOND DESIGN BASIS EXTERNAL EVENTS AND ATTACHMENTS

1.0 Introduction

By Reference 1, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 to Columbia Generating Station (Columbia). The Order contained requirements for mitigation strategies for beyond-design-basis external events. Reference 1 also required submittal of a Mitigation Strategies Overall Integrated Plan (OIP), and submittal of status reports at six month intervals. References 2, 3, and 9 provided Energy Northwest's initial Mitigation Strategies OIP and the first and second six-month status reports. This enclosure provides Energy Northwest's third six-month status report. This third six-month status report provides an update of milestone accomplishments and open items since submittal of the second six-month status report, including any changes to the compliance method or schedule.

2.0 Milestone Accomplishments

The following milestones have been completed since the development of the Overall Integrated Plan and are current as of August 29, 2014.

1) The submittal of the Mitigation Strategies OIP has been completed.

2) Submittal of the first, second and third six-month status reports have been completed.

3) Storage plan (reasonable protection) design has been completed.

3.0 Milestone Schedule Status

The following table is provided as an update to the milestone schedule documented in the initial submittal of the Mitigation Strategies Overall Integrated Plan. This section provides the activity status of each item, and the expected commencement and completion dates, noting any changes. As detailed designs progress, milestone activities may be expanded, condensed or deleted from the current schedule. The dates are projected planning dates and are also subject to change as design and implementation details are further developed.

Changes to the Milestone Schedule made since the previous update are listed below:

- The target dates for "Perform FLEX procedure tabletop exercise" have been changed to commence in December of 2014 and complete in April of 2015 due to delays in equipment procurement and procedure development.

- The completion target date to "Procure and store necessary FLEX portable equipment" has been extended until November 2014 due to revised equipment delivery dates.

Milestones	Target Commence Date	Target Completion Date	Activity Status
Correspondence & Reports:			
Submit 60 Day Initial Mitigation Strategies Status Report	Oct. 2012	Oct. 2012	Completed
Submit Mitigation Strategies Overall Integrated Plan	Feb. 2013	Feb. 2013	Completed
First Status Update Report for the Mitigation Strategies Overall Integrated Plan	Aug. 2013	Aug. 2013	Completed
Second Status Update Report for the Mitigation Strategies Overall Integrated Plan	Feb. 2014	Feb. 2014	Completed
Third Status Update Report for the Mitigation Strategies Overall Integrated	Aug. 2014	Aug. 2014	Completed
Fourth Status Update Report for the Mitigation Strategies Overall Integrated Plan	Feb. 2015	Feb. 2015	Not Started
Issuance of Energy Northwest letter of compliance with NRC Order EA-12-049, Section IV.C.3	Aug. 2015	Aug. 2015	Not Started
Evaluations for Mitigation Strategies Phase 1, 2 & 3			
Perform Engineering Evaluations	Jun. 2013	Jan. 2015	Started
Engineering & Modifications for Mitigation Strategies Phase 1, 2 & 3			
Develop Engineering Design for Modifications	Jun. 2013	Jan. 2015	Started
Plant Modification Installation	Apr. 2014	Jun. 2015	Started

Flex Support Guidelines (FSG) Program & Procedures:			
Perform FLEX procedure tabletop exercise	Dec. 2014	Apr. 2015	Not Started
Develop FSGs	Jul. 2013	Dec. 2014	Started
Develop testing, calibration, maintenance and surveillance procedures for portable FLEX equipment	Jan. 2014	Dec. 2014	Started
FLEX Program Procedural Changes are placed in effect	Jun. 2015	Jun. 2015	Not Started
Procurement & Storage Plan:			
Complete modification and installation of FLEX buildings	Oct. 2013	Jun. 2014	Started
Procure and store necessary FLEX portable equipment	Jun. 2013	Nov. 2014	Started
Test portable FLEX equipment	Mar. 2014	Dec. 2014	Started
Establish programmatic controls for portable FLEX equipment	Jan. 2014	Dec. 2014	Started
Mitigation Strategies Staffing Analysis:			
Perform Mitigation Strategies Staffing Analysis	Aug. 2014	Dec. 2014	Started
Operations & Training:			
Development of Mitigation Strategies Program training modules	Jan. 2015	Mar. 2015	Started
Mitigation Strategies Program training of station personnel	Mar. 2015	Jun. 2015	Not Started
Operational/Functional Testing of Mitigation Strategies Program SSCs	Mar. 2015	Jun. 2015	Not Started
Final Mitigation Strategies Program turned over to Operations	Jun. 2015	Jun. 2015	Not Started

4.0 Changes to Compliance Method

Phase 2 Spent Fuel Pool (SFP) and Core Cooling

A. Loss of Power During Normal Operation

If the event occurs while the plant is operating, the Reactor Core Isolation Cooling (RCIC) system is relied upon for core cooling. It is assumed that the Condensate Storage Tanks (CST) are unavailable and that the RCIC suction is aligned to the suppression pool. In that alignment the RCIC system is able to maintain adequate core cooling by providing the Reactor Pressure Vessel (RPV) with makeup, while

steam flow through safety/relief valves (SRV) and RCIC steam discharge to the suppression pool provides cooling. The RPV is depressurized and maintained within a pressure range (175 to 300 psig). This pressure range will facilitate long term RCIC operation. RCIC will continue to operate and provide RPV injection during Phase 2.

MAAP analyses have been completed for several cases with the RCIC suction aligned to the suppression pool. It has been determined that the wetwell should be vented within 6 hours of the event to assure that containment conditions remain favorable for long-term operation of RCIC. Reactor Building (RB) area/room temperature/accessibility analyses show that during an extended loss of AC power (ELAP), it is advantageous to supply cooling to the SFP well before makeup would be required for any decrease in water level. The analysis shows that in order to maintain good accessibility in the RB, 300 gpm cooling water to the SFP is needed within 12 hours after the loss of AC power.

Cooling water will be supplied from the Standby Service Water (SW) system spray ponds to the SFP using one of the high head portable pumps (Godwin pump or pumper truck) and fire hoses. While cooling water is supplied to the SFP, the overflow will cascade down the Fuel Pool Cooling (FPC) and Residual Heat Removal (RHR) piping to the suppression pool as shown in Sketch 3, "Phase 2 Makeup Flow Diagram." This flow mitigates the temperature rise of the suppression pool and provides a means of suppression pool makeup. During the assumed three-day ELAP, with the 300 gpm makeup, the suppression pool level does not increase to the wetwell vent outlet level.

As shown in Sketch 3, makeup water can also be supplied to the RPV at the same time SFP cooling water is provided. RPV makeup, by this means, provides a backup source in case RCIC were to fail. Analyses show that the high head pumps can provide 300 gpm to the SFP while meeting the RPV makeup water requirements.

Implementation of the makeup function involves connecting hoses from the pump located near the spray ponds, across the yard area, and up the RB northeast stairwell (preferred path) or southeast stairwell (alternate path). In the RB, the hose will be connected to a tee with one discharge path supplying the SFP and the other supplying the RHR piping at valve RHR-V-63B (preferred) or RHR-V-63A (alternate). The RHR supply will be able to provide makeup water to the suppression pool and/or the RPV. These valves will be manually aligned as necessary to direct the flow.

B. Loss of Power with a Full Core Off-Load

With a full core off-load, the increased heat load in the SFP significantly reduces the reaction time to an ELAP and the refueling floor (606' el) will become inaccessible within 4 or 5 hours. It has been determined that with a full core offload, establishment of 600 gpm of cooling water and additional ventilation is needed to maintain suitable accessibility in the RB. To maintain accessibility in the areas/rooms in the upper elevations of the RB and to expedite cooling of the SFP, some mitigating actions will be taken in anticipation of an ELAP if a full core off-load is planned.

For example, a high head pump will be staged at the spray ponds with hoses routed as noted above to expedite establishment of cooling capability to the SFP.

Secondary containment will be maintained until the ELAP occurs. To preserve accessibility to the RB at elevations below the refueling floor, the RB must be opened up for additional ventilation. While secondary containment is being breached, the final hose connections will be made to establish SFP cooling.

During a full core off-load, it is expected that typical outage staffing will be available to facilitate completion of the required actions.

Phase 3 SFP and Core Cooling

In Phase 3, equipment from the Regional Response Center (RRC) will be available to transition the plant from the Phase 2, use of portable pumps available on site, to the alternate shutdown cooling alignment shown in Sketch 4, "Phase 3 Service Water Flow Diagram." In this alignment, an RHR pump takes suction from the suppression pool and supplies water through the RHR heat exchanger, then to the RPV for makeup. The water from the RPV flows through an SRV back to the suppression pool. The dashed lines in Sketch 4 show the transition lineup, in which RCIC continues to run while the RHR system is lined up for suppression pool cooling. Once flows are stabilized and suppression pool and RPV temperatures reduced to the point that RCIC is no longer desired, the return to the suppression pool would be redirected to the RPV, and RCIC shut down.

The standby SW system piping provides the pathway for cooling the RHR heat exchanger and the FPC heat exchanger. An RRC pump takes suction from a SW spray pond and provides approximately 5000 gpm to the SW piping at the SW pump discharge check valve. A special adapter designed to enable the connection of the RRC pump discharge (via hoses) is connected to the bonnet of the discharge check valve. Flow can then be established in the normal direction in the SW piping. The cooling water flow established in the SW piping also provides cooling to room coolers in the reactor and radwaste buildings. Cooling water is returned to the SW spray pond's oriented spray cooling system (OSCS) for heat dissipation to the atmosphere.

Analyses indicate that the OSCS associated with the spray ponds can provide sufficient heat transfer to provide cooling water at less than 85 degrees Fahrenheit with the lower flow rate of the RRC pump (~5000 gpm vs ~10000 gpm normally) if half of the spray nozzles are plugged. Since the RRC equipment is not expected to arrive until at least 24 hours after the loss of AC power, there is sufficient time and staff to install the SW adapter at the discharge check valve, install the OSCS nozzle plugs, and valve out SW flow to the unavailable station emergency diesel generators.

5.0 Need for Relief/Relaxation and Basis for the Relief/Relaxation

The mitigation strategies contained in the initial OIP (Reference 2) were dependent, in part, on the hardened containment wetwell venting capabilities that were to be implemented by NRC Order EA-12-050 (Reference 4) coincident with the implementation of the FLEX strategies. NRC Order EA-13-109 (Reference 5) rescinded Reference 4 requirements and imposed additional requirements for severe accident capable hardened containment venting capabilities. Consistent with EA-13-109 Phase 1 requirements, Energy Northwest plans to complete installation of the hardened containment wetwell vent during the spring 2017 refueling outage. However, full compliance with EA-12-049 is required by restart from the spring 2015 Columbia refueling outage. As requested in Reference 7 and approved in Reference 8, full compliance with NRC Order EA-12-049 was relaxed until the completion of the spring 2017 refueling outage to allow sufficient time to implement a severe accident capable hardened containment wetwell vent.

No additional relief or relaxation has been identified. Additionally, the need for an amendment request to support pending modifications has not been identified.

6.0 Open Items from Overall Integrated Plan

The following table provides a summary of, and status for, the open items documented in the initial submittal of the Mitigation Strategies OIP (Reference 2) and Revision 1 of the Mitigation Strategies OIP (Reference 9), and responses to NRC Audit Questions regarding the mitigation strategies. Changes since the previous update are indicated by a revision bar.

Mitigation Strategies Overall Integrated Plan Open Items List	Status
Hazards:	
OI-FLEX-01 - FLEX equipment will be stored in structures capable of withstanding the hazards applicable to Columbia described above. These structures are generally referred to as "FLEX Buildings." Two FLEX buildings or structures will be utilized to provide diverse storage locations that can maintain an appropriate environment for the stored equipment and	Started

Mitigation Strategies Overall Integrated Plan Open Items List	**Status**
Hazards:	
provide generator backed power as necessary. The construction of the storage facilities is in progress. The list of equipment to be stored therein has been developed, including any vehicles required to move the equipment. The storage of equipment within buildings has been specified to limit seismic interactions. (This OI has been changed to reflect completion of basic design, selection of location, and completion of most construction.)	
OI-FLEX-02 - The potential failure of a circulating water (CW) pipe, coincident with the ELAP, will be considered to ensure that the FLEX storage areas are located such that deployment of at least one set of portable equipment can be accomplished.	Completed
OI-FLEX-03 - Equipment stored outside will be evaluated for seismic interactions, cold weather operation and ashfall.	Started
OI-FLEX-04 - The locations and design of equipment connection points are being developed and will ensure at least one connection point for the FLEX equipment requires access only through seismically robust structures including both the connection point and any areas that plant personnel will have to access.	Started
OI-FLEX-05 - The procedural interface in NEI 12-06 Section 5.3.3.1 (alternate instrument readouts) will be developed once the critical monitoring parameters are identified.	Started
OI-FLEX-06 - Evaluation of FLEX equipment will be completed to ensure proper functioning under the design basis temperatures and ashfall conditions. This includes manual actions to transport and set up the equipment.	Started
OI-FLEX-07 - Actions will be developed to ensure the continued availability of the water inventory sources from the SW ponds in cold weather. In addition, actions will be developed to thaw any frozen service water piping that will be required in Phase 3. The plan to remove ice and snow from equipment haul paths is under evaluation and actions will be developed as needed. (This OI has been changed to eliminate reference to CW basin because the basin will not be credited in the baseline coping capability.)	Started

Assumptions: *(Some Assumptions may be impacted by the completion of activities developed for Hardened Vents)*	
OI-FLEX-08 - The sequence of events developed to address the ELAP and LUHS will take into account sources of expected reactor coolant inventory loss.	Completed See Summary Below

OI-FLEX-08 Summary

During an ELAP the RCIC system provides RPV makeup water for core cooling. The turbine driven pump is powered by steam from the RPV with turbine exhaust to the suppression pool. Water is pumped from the suppression pool to the RPV and steam from the RPV is blown down to the suppression pool through SRVs. The RCIC system and its capability for RPV makeup exceeds the makeup required during an ELAP. The RCIC pump is capable of providing 625 gpm at 610 ft. head with reactor pressure at 165 psia, and at 3016 ft. head with reactor pressure at 1225 psia (FSAR Section 5.4.6.2.2.2). During an ELAP the reactor pressure is reduced to cycle in the range 175 psig to 300 psig. Under those conditions the RCIC pump can provide up to 625 gpm.

During normal operation, reactor coolant system leakage is limited by Technical Specification 3.4.5 to less than 25 gpm averaged over a 24 hour period. During an ELAP, reactor pressure is much lower (175 to 300 psig) so leakage would be less. A 25 gpm loss is not significant considering RCIC's capability.

The MAAP computer model as developed at Energy Northwest includes a feature that regulates RCIC system flow within its capability as needed to maintain normal RPV water level. The MAAP model does not include reactor recirculation pump leakage because the RCIC system capability exceeds the RPV water makeup requirement during an ELAP. Reactor recirculation pump seal leakage will not challenge the ability to keep the level in the RPV at the normal level and would be an insignificant contributor to the results of the analyses.

OI-FLEX-09 - MAAP analysis will be performed. The resulting time line will establish the necessary actions that will be taken to protect both the core and containment.	Completed See update to Appendix 2
OI-FLEX-10 - GOTHIC calculations will evaluate the effects of a loss of heating, venting and air conditioning (HVAC) on the plant response. An evaluation of the GOTHIC results on equipment qualification will be performed. Areas of the plant requiring access by personnel (including activities identified in the Appendix 1 Timeline) will be evaluated to ensure conditions will support the actions. (This OI has been changed to explicitly include activities identified in the Timeline for completeness.)	Completed See Summary below and update to Appendix 2

OI-FLEX-10 Summary:

A GOTHIC calculation has been completed which shows the expected temperature and relative humidity in rooms and areas in the RB during an ELAP. Included in the calculation are the heat loads associated with DC power operation of equipment and the repowering of equipment with a FLEX 400 kW AC generator.

A review of the results concluded that by implementing a number of mitigating actions, the RB is accessible for operation of equipment, repowering of equipment and local reading of instrumentation necessary for continued coping with the event during an ELAP.

OI-FLEX-11 – The design of the permanent structures, systems, and components (SSCs) used to mitigate the ELAP and LUHS will be verified to be robust with respect to seismic events, floods, and high winds.	Started
Sequence of Events:	
OI-FLEX-12 - The SBO/ELAP procedure will require all load shed actions to be completed in 1 hour. These load shed actions will be validated to ensure they can be completed within this time limit. (This OI has been changed because the existing 1 hour procedural limit will be maintained. This OI has also been closed because the changed action has been completed.)	Completed
OI-FLEX-13 - A plant modification will be performed to address the potential for flooding of the RCIC room from the barometric condenser. (This OI has been changed because it was determined that a modification is needed.)	Started
OI-FLEX-14 - It is estimated to take 15 minutes to complete the additional load shedding necessary for an ELAP. The 15 minute duration for shedding the additional loads will be validated. (This OI has been deleted because the ELAP load shed will be combined with the SBO load shed and performed at the start of the event.)	Deleted
OI-FLEX-15 - The maximum time needed for connection of a 480V FLEX generator to power the Division 1 batteries will be determined. (OI-FLEX-15) (This OI has been changed to eliminate reference to the 4 hour time previously demonstrated for DG4, and to reflect the need to determine a new time for connection of either DG4 or DG5 following an ELAP.)	Started

Programmatic:	
OI-FLEX-16 - Portable FLEX equipment will be initially tested or otherwise evaluated to ensure acceptable performance.	Started
OI-FLEX-17 - The maintenance and testing program for FLEX equipment will be documented in the next OIP update following finalization of the program. (This OI has been changed because additional options will be investigated regarding maintenance and testing.)	Started
OI-FLEX-18 - Unavailability of equipment and applicable connections that directly perform a FLEX mitigation strategy for core, containment, and spent fuel pool (SFP) will be managed in accordance with NEI 12-06.	Not Started
OI-FLEX-19 - Procedures will ensure that changes to the plant design, physical plant layout, roads, buildings, and structures used for the storage of portable FLEX equipment will not adversely impact the approved FLEX strategy.	Started
OI-FLEX-20 - Changes to FLEX strategies will be assessed using the change process provided in NEI 12-06 Section 11.8.	Not Started
OI-FLEX-21 – Periodic training will be provided to site emergency response leaders on Beyond Design Basis emergency response strategies and implementing guidelines. (This OI has been changed to reflect the requirement for periodic training stated in NEI 12-06 paragraph 11.6.2)	Started
OI-FLEX-22 - Personnel assigned to direct execution of the mitigation strategies for Beyond Design Basis events will receive the necessary training to ensure familiarity with the associated tasks.	Started
OI-FLEX-23 - Establish staging area for the receipt of offsite resources.	Completed
OI-FLEX-24 - Establish Site Specific SAFER Response Plan for Columbia with the RRC to define and coordinate RRC and plant actions in response to events. (This OI has been changed to use the formal designation of the "playbook.")	Started
OI-FLEX-69 - Energy Northwest will perform an evaluation of the acceptability of the Tri-Cities Airport and the Yakima Municipal Airport as SAFER Staging Areas. (This OI has been added to reflect the selection of the Tri Cities and Yakima Airports.) As a result of the evaluation, the Seattle and Portland airports were chosen as the SAFER staging areas.	Completed

Phase 1 Core Cooling: *(Some Mitigation Strategies related to Phase 1 Core Cooling may be impacted by the completion of activities developed for Hardened Vents)*	
OI-FLEX-25 - Procedure guidance will be developed to support implementation of Phase 1 Core Cooling strategies as described in the Overall Integrated Plan.	Started
OI-FLEX-26 - Strategies for maintaining core cooling during an ELAP and LUHS event during shutdown and refueling will be developed, including the necessary actions and equipment required during Phases 1, 2, and 3. Energy Northwest will incorporate the supplemental guidance provided in the NEI position paper entitled "Shutdown / Refueling Modes" to enhance the shutdown risk process and procedures. (OI-FLEX-26)(This OI has been changed to document the intent to follow the NRC approved industry position.)	Started
OI-FLEX-27 - System modifications and evaluations will be completed to support implementation of Phase 1 Core Cooling strategies as described in the Overall Integrated Plan.	See Items a – e below
a. A reliable containment hardened vent system will be installed to vent heat from the RPV/containment to the atmosphere. Details of this design will be provided in the Hardened Vent Overall Integrated Plan required by NRC Order EA-13-109.	Started
b. Analyses of RCIC operation at elevated temperatures have been undertaken by General Electric Hitachi (GEH) and Energy Northwest to identify changes to the RCIC pump or turbine necessary to ensure reliable operation at elevated temperatures. Energy Northwest will evaluate potential actions including changes to procedures or maintenance practices or implementation of modifications.	Started
c. An assessment of RCIC system piping, hangers and supports will be conducted at the elevated temperatures to ensure satisfactory performance. If needed, modifications will be performed.	Started
d. An evaluation of the feasibility of redesigning or repowering the barometric condenser's level switch will be performed to determine if it can remain functional during an ELAP to provide automatic control of RCIC-P-4.	Completed

e. MAAP cases using the suppression pool will be re-run using finalized design parameters of the containment hardened vent. The results will be used to define additional actions. (See Open Item OI-FLEX-09). (This OI has been changed because the suppression pool will be the credited water source for initial RCIC operation.)	Completed
OI-FLEX-73 - GOTHIC analyses will be confirmed, or revised, to bound the design of the hardened containment vent after the design is finalized. (This OI has been added to assure that the subject analyses reflect the design required by EA-13-109.)	Not started
Phase 1 Containment: *(Some Mitigation Strategies Open Items not originally identified in the Overall Integrated Plan related to Phase 1 Containment have been created due to the potential impact of the schedule for activities developed for Phase 1 & 2 Hardened Vents)*	
OI-FLEX-27 (continued) f. It is anticipated that temporary interim strategies will be developed for venting the containment until the completion of containment hardened vent activities. (This OI has been deleted because an interim venting strategy will not be credited for compliance with EA-12-049.)	Deleted
g. It is anticipated that revisions to procedures will be developed to implement the temporary interim strategies for venting the containment until the completion of containment hardened vent activities. (This OI has been deleted because an interim venting strategy will not be credited for compliance with EA-12-049.)	Deleted
Phase 2 Core Cooling:	
OI-FLEX-28 - Procedure guidance will be developed to support implementation of Phase 2 Core Cooling strategies as described in the Overall Integrated Plan.	Started
OI-FLEX-29 - System modifications and evaluations will be completed to support implementation of Phase 2 Core Cooling strategies as described in the Overall Integrated Plan.	See items a – d below
a. Alternate connection points will be provided to connect FLEX generators to the electrical distribution system.	Started

b. An evaluation of running underground cabling from the FLEX Building(s) to the existing electrical connection points outside the Diesel Generator Building will be performed.	Completed
c. DG4 or DG5 will have the capability of providing power to Division 1 and Division 2. (This OI has been changed to eliminate duplication of OI-FLEX-29.b and to reflect the planned capability of the FLEX DGs)	Completed
d. Provisions will be made to allow the installation of hoses through fence(s). (This OI has been changed to reflect a change in the strategy for hose routing with respect to fences.)	Completed
OI-FLEX-30 - An evaluation will be completed to ensure a diverse supply of fuel is available, maintained and diverse means are provided for refueling the portable equipment.	Started
OI-FLEX-31 - Strategies for mitigating an ELAP and LUHS event during cold shutdown and refueling will be developed as described in the Overall Integrated Plan.	Started
OI-FLEX-70 - An analysis will be performed to confirm that the Phase 2 configurations described in the OIP for suppression pool makeup can provide adequate flow through the spray header. (This OI has been deleted as the suppression pool makeup will not use the spray nozzles as part of the makeup flow path.)	Deleted
OI-FLEX-71 - A wind and seismic evaluation in accordance with ASCE 7-10 Building Risk Category IV will be performed on the above ground alternate gasoline tank located outside the protected area. (This OI has been added to track completion of the subject evaluation.)	Started
Phase 3 Core Cooling:	
OI-FLEX-32 - Energy Northwest will establish a Site Specific SAFER Response Plan for Columbia with the RRC to define and coordinate RRC and plant actions in response to events. (This OI has been changed to reference the appropriate higher tier document.)	Started
OI-FLEX-33 - Modifications and evaluations will be completed to support implementation of Phase 3 Core Cooling strategies as described in the Overall Integrated Plan.	See Items a – b below

a. Two separate connection points will be installed to provide critical bus power from a 4160-V ac FLEX generator (From the RRC).	Started
b. A strategy for connecting the large FLEX pump to the SW system will be developed. SW system piping will be modified if needed to provide connection points.	Started
OI-FLEX-72 - The spray pond temperature rise while operating in the shutdown cooling mode without sprays will be determined. (This OI has been added to determine if cooling tower makeup (TMU) pump operation will be needed.)	Completed
Phase 1 SFP Cooling:	
Procedure guidance will be developed to support implementation of Phase 1 SFP Cooling strategies. *(As discussed in the Overall Integrated Plan, the SFP does not require any action in Phase 1. The inventory of water in the pool is generally maintained greater than or equal to 22 feet above the top of irradiated fuel assemblies stored in the fuel pool. The heat up of the pool water will remove heat from the stored fuel during Phase 1, therefore this open item can be Deleted)*	Deleted
OI-FLEX-34 - Modifications will be completed to support implementation of Phase 1 SFP Cooling strategies. a. SFP instrumentation will be installed to provide reliable indication of the water level in the SFP capable of supporting identification of the following pool water level: (1) level that is adequate to support operation of the normal fuel pool cooling system, (2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) level where fuel remains covered and actions to implement make-up water addition should no longer be deferred. Details of this design will be provided in the Integrated Plan required by NRC Order EA-12-051.	Started

Phase 2 SFP Cooling:	
OI-FLEX-75 - Procedure guidance will be developed to support implementation of Phase 2 SFP Cooling strategies as described in the OIP. (This OI has been added to track the procedure development needed to support Phase 2 SFP Cooling.)	Started
OI-FLEX-74 - The time that makeup to the SFP must be initiated after an ELAP will be determined for a full core offload. (This OI has been added to track the performance of the subject determination.)	Completed See update to Appendix 2
Phase 3 SFP Cooling:	
OI-FLEX-35 - Procedure guidance will be developed to support implementation of Phase 3 SFP Cooling strategies.	Started
OI-FLEX-36 - Evaluations will be completed to support implementation of Phase 3 SFP Cooling strategies.	Started
a. An evaluation of the ability of the 4160-V ac FLEX generator (from the RRC) to repower a Fuel Pool Cooling (FPC) pump will be completed. An evaluation of the ability of the large-capacity FLEX pump (from the RRC) to provide cooling to the FPC heat exchanger will be completed.	Completed
Phase 1 Safety Support Functions:	
OI-FLEX-37 - Procedure guidance will be developed to support implementation of Phase 1 Safety Function Support strategies as described in the Mitigation Strategies Overall Integrated Plan.	Started
OI-FLEX-38 - System modifications will be completed to support implementation of Phase 1 Safety Function Support strategies as described in the Mitigation Strategies Overall Integrated Plan. a. GOTHIC modeling is ongoing in support of the ELAP that will identify heat loads in the key locations between the buildings. This analysis will then define additional actions that may be required using portable equipment, or any modifications to support operation of installed equipment during Phase 1.	Started

Phase 3 Safety Support Functions:	
OI-FLEX-39 - An evaluation of the conditions of the residual heat removal (RHR) pump rooms under an ELAP event will be completed to determine if additional actions are needed to remove heat from the rooms prior to and during operation of the pump.	Completed
Appendix 1 – Sequence of Events Timeline:	
OI-FLEX-40 - Modification to the sequence of events timeline will be provided in future status update reports as analyses, strategies and evaluations are completed.	Started
Appendix 2 – Milestone Schedule:	
None – Revisions to the milestone schedule are identified in Section 2 of this and subsequent future status update reports.	N/A
Appendix 3 – Conceptual Sketches:	
OI-FLEX-41 – Updated sketches will be provided in future status reports if needed to reflect changes. (This OI has been changed because an initial set of sketches were provided in Reference 9, Appendix 3 of Enclosure 3.)	Started
NRC Audit Question Responses:	
OI-FLEX-42 – NEI 12-06, Section 5.3.3 Consideration 2: "Consideration should be given to the impacts from large internal flooding sources that are not seismically robust and do not require ac power (e.g., gravity drainage from lake or cooling basins for non-safety-related cooling water systems," will be addressed in future six-month updates. (Response to NRC Audit Question 02)	Completed See Summary Below

OI-FLEX-42 Summary

Energy Northwest has reviewed the potential internal sources of flooding and will proceduralize actions to mitigate its effects if flooding in those areas occurs.

OI-FLEX-43 – The flooding hazards analysis will provide information about site water level associated with a probable maximum precipitation (PMP) event and a local intense precipitation (LIP) event. These water levels will be compared to elevations for the FLEX buildings as well as the deployment routes for the equipment. A LiDAR survey of the site was performed and a topographic plan of the site has been generated to assist in this evaluation. The flooding analysis is currently in progress. The results will be used to provide a response to this question in a future OIP update. (Response to NRC Audit Question 03) (This OI has been changed because the flooding analysis remains in progress and the OI was not closed in the February 2014 update.)	Started
OI-FLEX-44 – A future update to the OIP will address the applicability to Columbia of each of the nine considerations in NEI 12-06, Section 6.2.3.2, Deployment of FLEX Equipment. (Response to NRC Audit Question 04) (This OI has been changed because the flooding analysis remains in progress and the OI will be closed in a future update.)	Not Started
OI-FLEX-45 – The flooding analysis will be used to determine if any of the external flooding procedures should be changed. (Response to NRC Audit Question 04)	Not Started
OI-FLEX-46 – The NRC has endorsed generic resolutions of concerns regarding use of the MAAP code in mitigation strategies. Energy Northwest will assess the applicability of the generic resolutions to Columbia. Columbia has completed an assessment of the generic resolution of the issues related to use of MAAP4 for our ELAP work. The assessment focused on the limitations imposed by the NRC on their acceptance of the use of MAAP4 for timeline purposes as stated in the NRC letter dated October 3, 2013, from Jack R. Davis (NRC) to Joseph E. Pollock (NEI). Columbia has used MAAP4 for the determination of wetwell vent timing, fuel pool cooling/makeup timing, and for RCIC operability assessments based on calculated suppression pool temperature. All the limitations in the NRC letter have been addressed in the assessment which is available for review upon request. (Response to NRC Audit Question 09)	Completed

OI-FLEX-47 – A review of the current fire protection ring header shows that it was designed to Seismic Category II standards outside Seismic Category I structures. Except for minor portions, it is buried in engineered fill and is largely protected from the effects of high winds and missiles. While use of the fire protection ring header is an operational convenience, its availability is not credited. The February 2014 OIP update, Reference 9, pg. 26/68, clarified the wording to reflect the above results. (Response to NRC Audit Question 13)	Completed
OI-FLEX-48 – The NRC has endorsed a generic resolution of concerns regarding use of the MAAP code in mitigation strategies. Energy Northwest will assess the applicability of the generic resolution to Columbia. See the response in OI-FLEX-46 above. (Response to NRC Audit Question 14)	Completed
OI-FLEX-49 – GOTHIC analyses of the Vital Island will evaluate hydrogen generation in the battery rooms. The results of those analyses will determine the need, if any, for measures needed to control hydrogen concentrations in the battery rooms. The results were reported in the February OIP 2014 update, Reference 9, pg. 24/68. (Response to NRC Audit Question 28)	Completed
OI-FLEX-50 – At the point when ELAP mitigation activities require tie-in of FLEX generators, in addition to existing electrical interlocks, procedural controls, such as inhibiting generator start circuits and breaker rack-outs, will be employed to prevent simultaneous connection of both the FLEX generators and Class 1E generators to the same AC distribution system or component. FLEX strategies, including the transition from installed sources to portable sources (and vice versa), will be addressed in the FLEX procedures. (Response to NRC Audit Question 50)	Not Started
OI-FLEX-51 – Energy Northwest will address the considerations in NEI 12-06, Section 12.2. (Response to NRC Audit Question 34)	Completed
OI-FLEX-52 – Plant specific ELAP analysis results will be provided in the format and detail equivalent to NEDC-33771P. Energy Northwest will provide the information in a subsequent six-month update. (Response to NRC Audit Question 36)	Started

OI-FLEX-53 – The issue of maintenance and testing of portable FLEX equipment is being addressed and coordinated on an industry-wide basis. Energy Northwest will continue to monitor and participate in these industry activities so that it can develop a maintenance and testing program that meets acceptable standards (including NEI 12-06), and is consistent with those used generically throughout the industry. Energy Northwest will also utilize existing station procedures coupled with vendor technical information for establishing preventive maintenance activities and schedules. The Columbia maintenance and testing program for FLEX equipment will be documented in the next OIP update following finalization of the program. (Response to NRC Audit Question 40)	Started
OI-FLEX-54 – Finalize the sizing calculation for the FLEX generators for phase 2 and 3. Completion of this activity is necessary to provide a comprehensive response to this question (i.e. NRC Audit Question 42 requesting a summary of the sizing calculation for the FLEX generators to show that they can supply the loads assumed in phases 2 and 3). (Response to NRC Audit Question 42)	Completed See Summary Below

Summary of OI-FLEX-54:

The evaluation of the electrical power requirements for Phase 2 shows that one FLEX generator rated at 480-V ac and 400 kW will have adequate capacity for the estimated load. This capacity is based on the capacity of Columbia's Diesel Generator 4, which provides an alternate AC source to Division 1 or Division 2 loads.

The evaluation of the electrical power requirements for Phase 3 shows that two generators from the RRC, rated at 4160-V ac and 1 MW, will have adequate capacity to supply one RHR pump, related valves, and miscellaneous required loads when connected in parallel. The miscellaneous required loads include a fuel pool recirculating pump, the DC battery chargers, and the room coolers for the control room, cable spreading room switchgear room and RHR room.

OI-FLEX-55 – Finalization of the capacity and power requirements calculation for Phase 3 is not complete. Completion of this activity is necessary to provide a comprehensive response to this question (i.e. NRC Audit Question 45 requesting a description of the electrical power requirements for Phase 3 of the mitigating strategies integrated plan and the capacity of the power sources). (Response to NRC Audit Question 45)	Completed See OI-FLEX-54 Summary Above
OI-FLEX-56 – Not used	

OI-FLEX-57 – Energy Northwest will validate the ability to successfully accomplish each bypass under the expected conditions of a prolonged station blackout as part of the procedure approval process. Based on incorporation of the GEH recommended trip bypasses, the potential for equipment protection features to interfere with operation of RCIC will be minimized. (Response to NRC Audit Question 56)	Started
OI-FLEX-58 - Energy Northwest will perform an evaluation to compare (1) the quantity of water required to dissipate, for 72 hours, the decay heat of the reactor core and spent fuel pool during Phases 1 and 2, (2) the volume of water normally in the spray ponds. The results of that evaluation were reported in the February 2014 OIP update, Reference 9, pg. 24/68. (Response to NRC Audit Question 05)	Completed
OI-FLEX-59 - Energy Northwest's periodic OIP updates will identify any planned modifications that it determines may require NRC approval per 10 CFR 50.90. (Response to NRC Audit Question 22) (This OI has been changed because it is more appropriate for OIP updates to identify modifications that will require NRC approval, rather than modifications that will not require NRC approval.)	Started
OI-FLEX-60 - The Spent Fuel Pool section of the OIP will be updated to reflect actions taken in the event of full core offload to the pool. (Response to NRC Audit Question 24)	Completed See Summary Below

Summary of OI-FLEX-60:

When the full core is planned to be off loaded, the following actions will be taken prior to off-loading the core to the spent fuel pool.

1. Open the large hatch on the RB 471 foot elevation, above the railway bay.
2. Open the identified doors.
3. Be prepared to provide 600 gpm spray pond water to the spent fuel pool within 2 hours after a loss of power.

Upon a loss of power classified as an ELAP perform the following actions within 15 minutes:

1. Open the railroad bay doors.
2. Open the RB roof hatch above the 606 foot elevation.

Within 2 hours of an ELAP perform the following actions:

1. Complete/secure activities on the refueling floor.
2. Evacuate personnel from the refueling floor as required by actual environmental conditions in the area.
3. Commence spent fuel pool makeup of 600 gpm.

OI-FLEX-61 - This issue (early venting) was identified as a generic concern or question which the nuclear industry will resolve generically through the Nuclear Energy Institute (NEI) and the applicable industry groups (e.g., BWROG, EPRI, etc.). Provided in the February 2013 OIP update, Reference 9, pgs. 36 and 62/68. (Response to NRC Audit Question 25)	Completed
OI-FLEX-62 - An updated schedule for the Energy Northwest identified open items will be included in the six-month updates of the Columbia OIP. This was included as Section 6.0 starting with the August 2013 six-month update. (Response to NRC Audit Question 46)	Completed
OI-FLEX-63 - Calculations NE-02-12-02, ME-02-12-06, ME-02-12-07, 2.05.0,1 and CMR-11179 have been uploaded to the Columbia Fukushima portal. Additional calculations that have been uploaded are listed below. (Response to NRC Audit Question 47)	Started

Summary of OI-FLEX-63:

NAI-1721-00 Rev. 0, GOTHIC Analysis of GCS Radwaste Building Response to SBO

ME-02-12-03 Rev 0, RHR HX Heat Removal under SW Flow ELAP Condition

NAI-1721-001 Rev 1 Gothic Analysis of Radwaste Building in Response to SBO

NAI-1721-002, Final GOTHIC Analysis of RB

NE-02-11-07 Rev 0, Cycle 21 SFP Time to 200 degrees F

ME-02-14-03 Rev 0, RHR-HX Heat Removal under Low SW Flow ELAP Conditions

ME-02-14-10, Rev 1, Spray Pond Temperature Response during ELAP

ME-02-12-06 Rev 1, Evaluation of the Use of Portable Equipment during an Extended Station Blackout

OI-FLEX-64 - The timeline in Appendix 1 of the February 28, 2013 Overall Integrated Plan (OIP) for Order EA-12-049 will be revised as necessary to reflect use of the existing ductwork rather than the hardened containment vent. (Response to NRC Audit Question 58) (This OI has been deleted because use of ductwork for containment venting will not be credited for compliance with EA-12-049)	Deleted
OI-FLEX-65 - Energy Northwest will address the conformance to the guidance of NEI 12-06, Section 3.2.2, Guideline (12). (Response to NRC Audit Question 61)	Completed See Summary Below

Summary of OI-FLEX-65:

As stated in NEI 12-06, Section 3.2.2, Guideline 12, heat tracing is used to ensure cold weather conditions do not result in freezing important piping and instrumentation systems with small diameter piping. Energy Northwest has changed the primary source of water for Phase 1 FLEX strategy. The initial source of water for RCIC has been changed from the condensate storage tanks to the suppression pool. Therefore, no specific action is required to compensate for a loss of heat trace during ELAP.

OI-FLEX-66 - The NEI position paper includes instructions for licensees to incorporate the following template wording into their OIPs: "(Name of licensee) will incorporate the supplemental guidance provided in the NEI position paper entitled "Shutdown / Refueling Modes" to enhance the shutdown risk process and procedures." Energy Northwest incorporated this template wording into the February 2014 OIP update, Reference 9, pgs. 20, 22, and 26/68. (Response to NRC Audit Question 62A)	Completed
OI-FLEX-67 - The NEI white paper includes instructions for licensees to incorporate the following template wording into their OIPs: "[Insert Licensee] confirms that the FLEX strategy station battery run-time was calculated in accordance with the IEEE-485 methodology using manufacturer discharge test data applicable to the licensee's FLEX strategy as outlined in the NEI white paper on Extended Battery Duty Cycles. The detailed licensee calculations, supporting vendor discharge test data, FLEX strategy battery load profile, and other inputs/initial conditions required by IEEE-485 [are or will] be available on the licensee's web portal for documents and calculations. The time margin between the calculated station battery run-time for the FLEX strategy and the expected deployment time for FLEX equipment to supply the dc loads is ["X"] hours." Energy Northwest will incorporate this template wording into a future OIP update. (Response to NRC Audit Question 62B)(This OI has been changed because the validation of actual time deploying the 480-V ac FLEX generators per OI-FLEX-15 has not been completed.)	Started

OI-FLEX-68 - The load shedding procedure is in the process of being developed. The procedure will also direct operators to depressurize the main generator manually if the generator is pressurized with hydrogen before shedding the air side seal oil backup pump. These actions are expected to preclude a potential fire and/or explosion from the hydrogen. (Response to NRC Audit Question 50)	Completed

7.0 Interim Staff Evaluation

Reference 6 transmitted an NRC Interim Staff Evaluation and Audit Report (ISE) which documented the results of a review of the Columbia OIP (Reference 2), six-month update (Reference 3), and information obtained through the NRC's mitigation strategies audit process. The ISE documented the staff's conclusion that Energy Northwest has provided sufficient information to determine that there is reasonable assurance that the OIP, when properly implemented, will meet the requirements of Order EA-12-049 at Columbia. That conclusion was based on the assumption that Energy Northwest would implement the OIP as described, including the satisfactory resolution of the Open and Confirmatory Items tabulated in the ISE. The Open Items and Confirmatory Items tabulated in the ISE are listed below. Energy Northwest will coordinate with the staff to facilitate closure of the Open and Confirmatory Items.

OPEN ITEMS	
Item Number	Description
3.2.3.A	With regard to maintaining containment, the implementation of BWROG EPG/SAG, Revision 3, including any associated plant specific evaluations, must be completed in accordance with the provisions of NRC letter dated January 9, 2014.
3.2.3.B	The licensee's proposed strategy for maintaining containment will rely on installation of the HCVS as required by Order EA-13-109. When complete, the licensee's calculations supporting the revised containment response and sequence of events timeline should be reviewed to confirm that the timeline is appropriate and that containment functions will be restored and maintained following an ELAP event.
CONFIRMATORY ITEMS	
Item Number	Description

3.1.1.3.A	During the audit, the licensee stated that NEI 12-06, Section 5.3.3, consideration 2 (impacts from large internal flooding sources), will be addressed in future six-month updates of the Integrated Plan. Confirm that the strategies consider large internal flooding sources that are not seismically robust and do not require ac power, as necessary.
3.1.2.1.A	The licensee stated that information related to Columbia's considerations of the potential effects of a local intense precipitation event will be included in the February 2014 update to the Integrated Plan. Confirm that FLEX equipment can be adequately protected and deployed in such an event, and whether flooding procedures properly account for the use of FLEX equipment. [Energy Northwest note: The date for the associated OIP update has been changed as stated in the OI-FLEX-43 status above.]
3.1.2.4.A	When Columbia's plan for coordination with the RRC is developed, confirm that it adequately addresses potential regional impacts on transportation and delivery of off-site equipment during an extreme regional flooding event, and during conditions of snow, ice, and extreme cold.
3.1.3.A	Confirm that the spray ponds contain enough water to dissipate, for 72 hours, the decay heat of the reactor core and SFP during Phases 1 and 2, with sufficient margin to account for some potential loss of inventory due to a tornado.
3.1.4.2.A	Confirm that the transport of FLEX equipment is addressed during cold weather conditions, including ice and snow removal from appropriate haul paths.
3.2.1.1.A-E	Regarding the use of the Modular Accident Analysis Program (MAAP) 4 code for simulating an ELAP event for BWRs, the NRC endorsed the generic June 2013 NEI position paper, with five conditions, as stated in Section 3.2.1.1 of the TER. These conditions are identified as Confirmatory Items 3.2.1.1.A-E.
3.2.1.2.A	When the licensee's evaluations related to its open item OI-FLEX-08 are completed, confirm that issues related to primary system leakage from the recirculation pump seals have been adequately addressed.
3.2.1.4.A	The licensee has not completed calculations supporting the design of the FLEX equipment. Confirm that portable FLEX equipment is adequate to perform its credited mitigation function(s).

3.2.1.5.A	Confirm completion of licensee's open item, OI-FLEX-05, which states, "The procedural interface in NEI 12-06, Section 5.3.3.1 (alternate instrument readouts) will be developed once the critical monitoring parameters are identified."
3.2.2.B	When the GOTHIC analyses are completed and spent fuel pool cooling strategies are fully developed, confirm that the licensee's strategy for venting of the refueling floor is consistent with guidance in NEI 12-06, or provides an acceptable alternative to that guidance.
3.2.2.C	When complete, confirm that the licensee's strategy and actions during an ELAP when a full core offload is in the SFP are adequate to maintain satisfactory SFP cooling.
3.2.2.D	Confirm that Columbia's SFP makeup strategy provides for SFP makeup without accessing the refueling floor, as recommended in NEI 12-06, Table 3-1 and Table C-3, or that an acceptable alternate approach is developed.
3.2.4.2.A.1	Confirm that the licensee's analysis of hydrogen buildup in the battery room appropriately considers measures needed to control hydrogen concentrations.
3.2.4.2.A.2	Confirm the licensee's evaluation of the need for forced ventilation on the refueling floor.
3.2.4.2.B	Confirm that the GOTHIC analyses appropriately address RCIC room, SFP area, and battery room temperatures.
3.2.4.3.A	The licensee stated that it will address the considerations in NEI 12-06, Section 3.2.2, Guideline (12), related to potential loss of heat tracing, in an Integrated Plan update no later than August 28, 2014. Confirm that heat tracing is appropriately considered.
3.2.4.4.A	The NRC staff reviewed the licensee's communications assessment and determined that it was reasonable (ADAMS Accession No. ML 13091A295). Confirm that the upgrades to Columbia's communications systems are implemented.
3.2.4.6.A	Analyses and procedure development addressing personnel habitability issues are still in progress. Confirm that the actions conform to the guidance in NEI 12-06, Section 3.2.2, Guideline (11), or that an acceptable alternative is developed.

3.2.4.8.A	The licensee is performing sizing calculations to show that the FLEX DGs can supply the loads assumed in Phases 2 and 3 of Columbia's mitigating strategies. The results will be submitted in the February 2014 Integrated Plan update. Confirm that the results are acceptable. [Energy Northwest note: The date for the associated OIP update has been changed as stated in the OI-FLEX-54 status above.]
3.2.4.10.A	The licensee intends to follow the generic resolution related to extended battery duty cycles. Confirm adherence to the NRC staff's position related to this concern.
3.2.4.10.B	Confirm that the ability of operators to complete specified battery load shed actions within the times stated is validated.
3.2.4.10.C	Confirm the licensee's development of the ELAP load shedding procedure and that the procedure includes directions for operators to depressurize the main generator manually before shedding the air-side seal oil backup pump if the generator is pressurized with hydrogen.

8.0 References

1. NRC Order EA-12-049, dated March 12, 2012, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events"

2. Letter GO2-13-034 dated February 28, 2013, from A. L. Javorik (Energy Northwest) to NRC, "Energy Northwest's Response to NRC Order EA-12-049 – Overall Integrated Plan for Mitigating Strategies"

3. Letter GO2-13-123 dated August 28, 2013, from D.A. Swank (Energy Northwest) to NRC, "Energy Northwest's First Six-Month Status Update Report for the Implementation of NRC Order EA-12-049 Mitigation Strategies for Beyond Design Basis External Events"

4. NRC Order EA-12-050 dated March 12, 2012, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents"

5. NRC Order EA-13-109 dated June 6, 2013, "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents Capable of Operation Under Severe Accident Conditions"

6. NRC letter dated January 29, 2014, from J. S. Bowen (NRC) to M. E. Reddemann (Energy Northwest), "Columbia Generating Station - Interim Staff

Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC No. MF0796)"

7. Letter GO2-14-26 dated February 21, 2014, from D. A. Swank (Energy Northwest) to NRC, "Request for Relaxation from NRC Order EA-12-049, 'Order Modifying Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'"

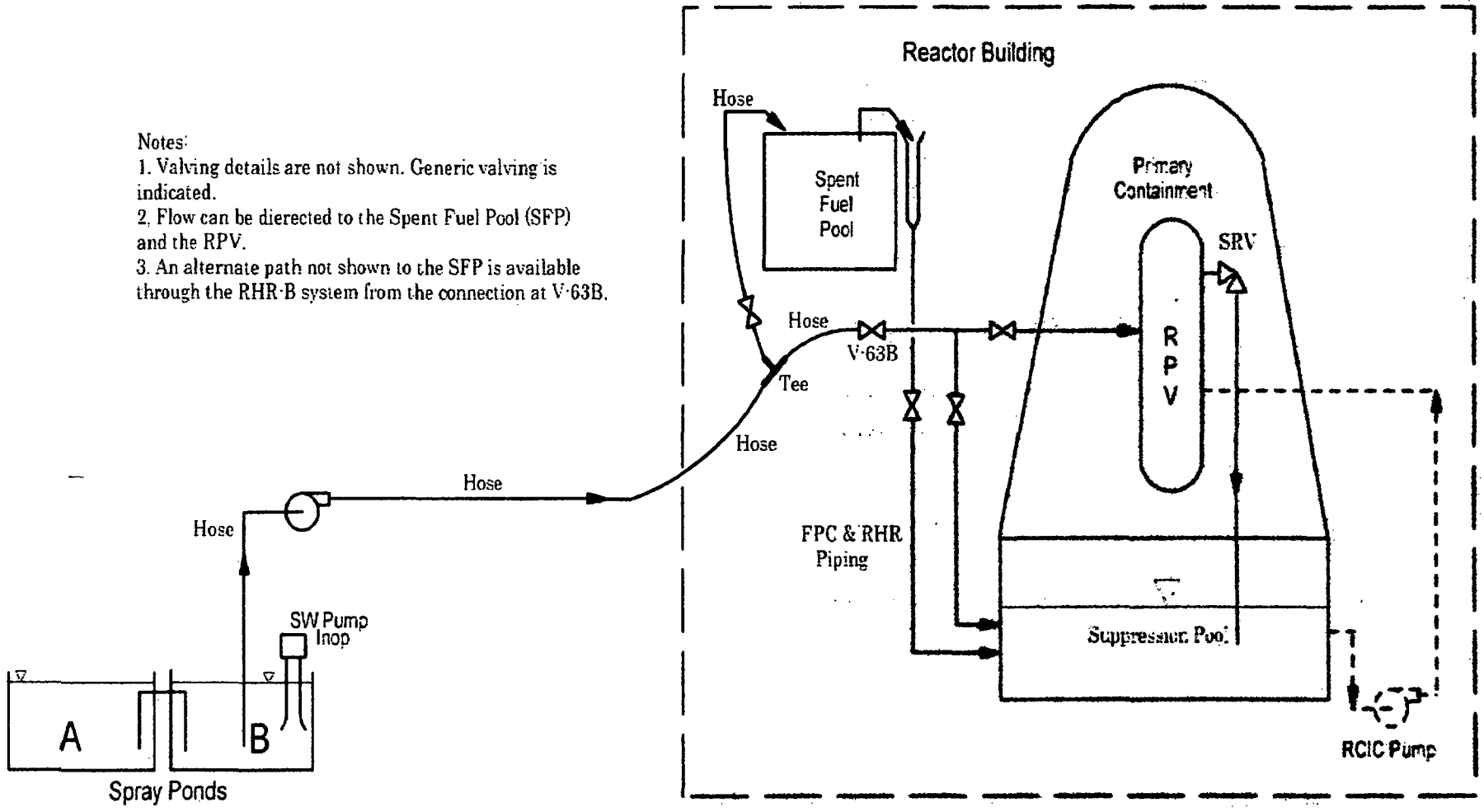
8. Letter dated April 15, 2014, from E. J. Leeds (NRC) to M. E. Reddemann (Energy Northwest), "Columbia Generating Station – Relaxation of Certain Schedule Requirements for Order EA-12-049 'Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events'"

9. Letter GO2-14-031, from D. A. Swank (Energy Northwest) to NRC, "Energy Northwest's Second Six-Month Status Update Report for the Implementation of NRC Order EA-12-049 Mitigation Strategies for Beyond Design Basis External Events"

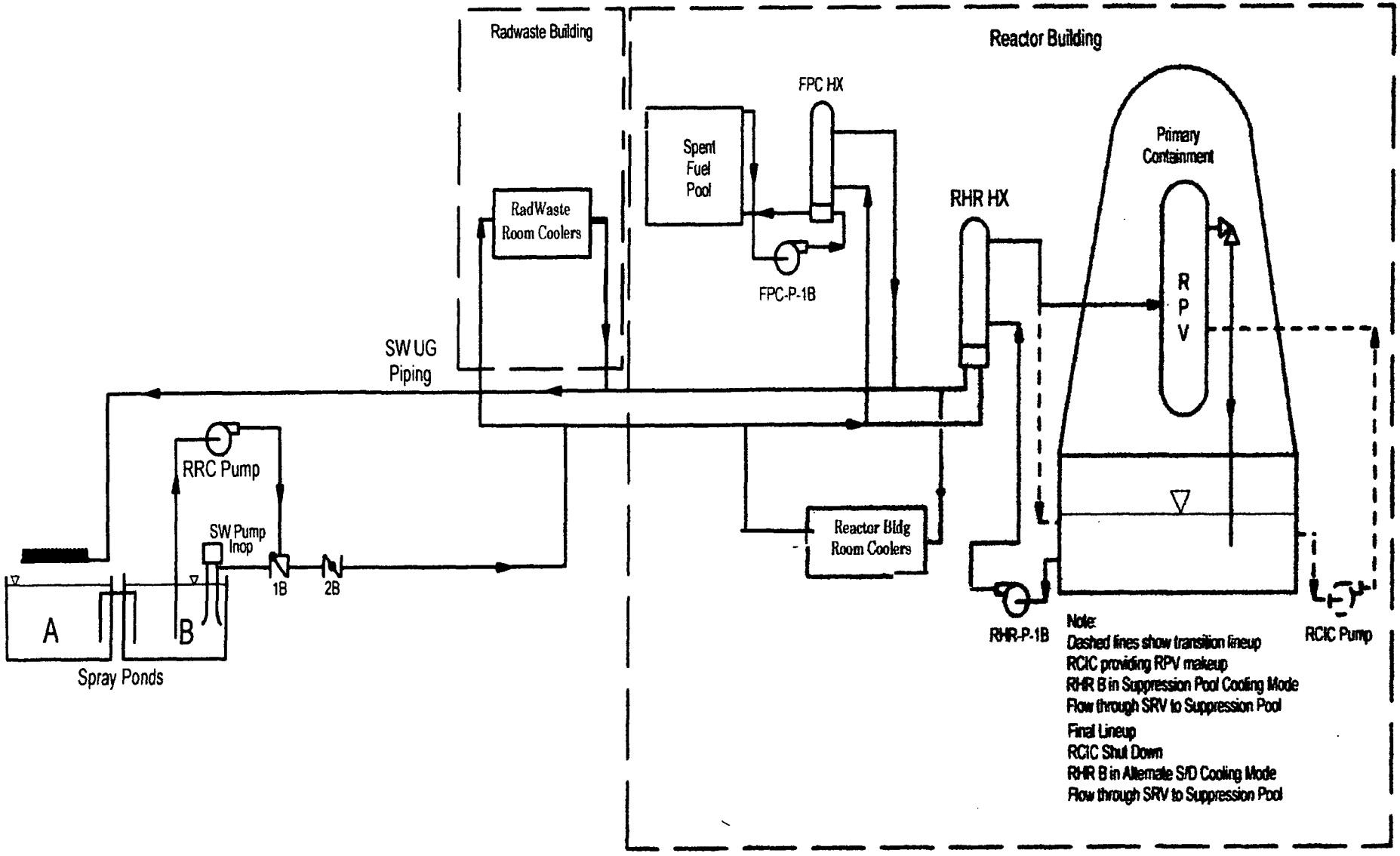
Revised Conceptual Sketches
(Appendix 3 of the Overall Integrated Plan for Mitigating Strategies, Revision 1)

Sketch 3 – Phase 2 Makeup Flow Diagram

Sketch 4 – Phase 3 Service Water Flow Diagram



Sketch 3 – Phase 2 Makeup Flow Diagram



Sketch 4 – Phase 3 Service Water Flow Diagram

Appendix 2
Sequence of Events Timeline

Action	Elapsed Time	Action	ELAP Time Constraint Y/N	Remarks / Applicability
	0	**Event Starts**	NA	Plant at 100% power at time = 0. All AC power is lost including that from the installed emergency diesel generators (EDGs).
1	1 min	Reactor Core Isolation Cooling (RCIC) starts	N	Existing station blackout (SBO) coping strategy. Reference FSAR 8A.2.2.
2	0-15 min	Operations crew enters SBO/ELAP procedure	N	The timing is consistent with requirements for classifying an emergency.
3	0-end	Monitor reactor pressure vessel (RPV) and containment parameters and initiate RPV cool down	N	SBO/ELAP procedure directs stabilizing reactor pressure using safety relief valves (SRVs) and verifying containment isolations. Reference FSAR 8A.2.5.3 and 8A.2.5.5. RPV cool down is initiated at an appropriate point in the procedure. Temperature change is limited to less than or equal to 100°F per hour. Pressure is maintained as required to ensure continued RCIC operation.
4	0-45 min	Consult with regional load centers on offsite power recovery	Y	Priority restoration of power to Columbia is provided for in agreements with the Bonneville Power Administration (BPA). Reference FSAR 8A.2.2.
5	0-45 min	Assess likelihood of recovery of an EDG	Y	This action coupled with the above action determines whether or not an AC power source will be recovered within the functional life of the batteries. Based on battery capacity calculations, load reductions must be completed within the first hour. See Discussion Item 1 below.
6	5-30 min	Perform actions to promote Main Control Room cooling	Y	Cooling measures are to be established per the SBO/ELAP procedure. These actions are to be completed within 30 minutes to assure availability of Control Room equipment. Reference FSAR 8A.2.5.4.
7	15-60 min	Perform 125-V dc load shed	Y	The 125-V dc loads that will be shed are the previously identified loads that must be shed in response to an SBO plus the loads that must be shed in response to an ELAP. The loads are shed to reduce station battery loads. See Discussion Item 1 below.

Action	Elapsed Time	Action	ELAP Time Constraint Y/N	Remarks / Applicability
8	30 min to 10 hrs	Bypass RCIC trips	Y	Selected RCIC trips are to be bypassed per the SBO/ELAP procedure to ensure continued operation of RCIC. Reference FSAR 8A.2.2. Generally this action is completed within 30 minutes, but may be allowed to take as long as 10 hours. RCIC trips will be bypassed consistent with the Boiling Water Reactor Owners Group (BWROG) recommendations.
9	30 min	If not already initiated, depressurize RPV at a rate not to exceed 100°F per hour and maintain the RPV pressure required for RCIC operation.	N	Under ELAP conditions the RPV should be depressurized to facilitate long term RCIC operation. Generally, this action will begin at no later than 30 minutes. The primary factor the shift manager will use for determining if this is a time constraint will be the time to reach the Heat Capacity Temperature Limit (HCTL). Depressurizing the RPV will increase the margin to HCTL.
10	45 min	Determine if AC power will not be restored within the normal SBO coping period (4 hours)	Y	If AC power will not be restored within 4 hours, initiate additional compensatory measures to promote cooling in required areas of the Reactor Building, Control Room and Vital Island.
11	45 min – 2 hr	Perform 250-V dc load shed	Y	In order to extend the ability of the 250-V batteries to meet the extended demand during an ELAP, additional loads are shed.
12	12 hrs	Perform actions to promote RCIC room and general Reactor Building cooling	Y	Actions to open doors to the RCIC pump room, building stairwells, refueling floor ceiling hatch, 471' floor hatch, and doors in other areas in the Reactor Building are necessary to provide added ventilation for the RCIC pump room and the Reactor Building in general. Establish 300 gpm makeup to the Spent Fuel Pool to support habitability in the Reactor Building.
13	1-6 hr	Vent containment using the hardened containment vent system	Y	MAAP analyses have been performed that determine the relationship between the timing of initiation of containment (wetwell) venting and the maximum suppression pool temperature. Maximum suppression pool temperature can affect the long term availability of RCIC. It is assumed that the normal RCIC suction source from condensate storage tanks (CSTs) is unavailable, and RCIC is taking suction from the suppression pool. Analysis indicates that maximum suppression pool temperature is acceptable if venting is initiated within 6 hours.

Action	Elapsed Time	Action	ELAP Time Constraint Y/N	Remarks / Applicability
14	0-10 hr	Connect FLEX equipment for battery charging	Y	Battery calculations indicate that the batteries will provide power for at least 10 hours. Thus, battery charging must be established at or before 10 hours. This action will generally be started as soon as possible with the available on-shift staff. See Discussion Item 2 below.
15	1 to 6 hr	Connect FLEX equipment to refill RPV.	N	In order to protect the fuel in case of RCIC failure the makeup potential of the FLEX high head pumps will be established as early as possible, considering staffing and site conditions. See Discussion Item 3 below.
16	12 hr	Connect FLEX equipment to refill SFP	Y	GOTHIC analyses indicate that Spent Fuel Pool makeup is required within 12 hours to preserve accessibility in the Reactor Building higher elevations. See Discussion Item 4.
17	12 hr	Connect FLEX equipment to refill suppression pool	N	The Spent Fuel Pool makeup will be cascaded to the Suppression Pool, so separate provision is not required for makeup. In three days of operation, the cascaded makeup will not flood the Wetwell vent.
18	Approx. 36 hrs	Connect 4160-V ac generator from the Regional Response Center (RRC)	N	Equipment from offsite sources will be available approximately 36 hours following the ELAP event. The 4160-V ac RRC generators will allow repowering a residual heat removal (RHR) pump to establish shutdown cooling using the RHR system. This action is not anticipated to be a time constraint due to the ample supplies of makeup water and diesel fuel available supporting the Phase 2 strategies.
19	Approx. 36 hrs	Connect a large capacity pump from the RRC to the service water (SW) system	N	Equipment from offsite sources will be available approximately 36 hours following the ELAP event. A large capacity pump that is connected to the SW system piping will provide the heat sink for the RHR heat exchanger. Heat will be transferred from the reactor to the environment via the SW spray ponds. This action is not anticipated to be a time constraint due to the ample supplies of makeup water and diesel fuel available supporting the Phase 2 strategies.
	15 min	Open Rail Bay door, open roof hatch	Y	Full-Core Off-Load Response time is very limited for actions on the refueling floor. These actions are required to preserve accessibility at lower levels in the Reactor Building. Floor hatch at the 471' elevation is opened during a full core off-load.

Action	Elapsed Time	Action	ELAP Time Constraint Y/N	Remarks / Applicability
	2 hr	Complete activities on refueling floor, evacuate refueling floor area as actual area environmental conditions require, commence 600 gpm SFP makeup.	Y	Full-Core Off-Load Response time is very limited for actions on the refueling floor. These actions are required to preserve accessibility at lower levels in the Reactor Building. Equipment is pre-staged to enable 2 hour response on makeup.

Discussion Items for ELAP Time Constraints:

1. The action to assess the likelihood of recovery of an EDG and perform load shedding will be completed within 45 minutes. The SBO/ELAP procedure will require that actions to shed loads be completed at 1 hour; the action to load shed will be validated to ensure it can be completed within this time limit.

2. Battery calculations indicate that the batteries will provide power for at least 10 hours. Thus, battery charging must be established at or before 10 hours. The maximum time needed for connection of a 480-V ac FLEX generator will be determined.

3. It is assumed that the RCIC system will be available throughout the event. Connection of FLEX equipment for RPV makeup will be performed on a priority basis as a contingency when personnel resources are not needed for higher priority tasks.

4. The establishment of 300 gpm makeup to the SFP within 12 hours preserves the accessibility to the refueling floor for an ELAP from normal operation.

   If an ELAP occurs with a full core off-load, procedures will require pre-staging of FLEX equipment so makeup of 600 gpm can be provided within 2 hours. In addition, some anticipatory preparations will be made for ventilation in the Reactor Building. Access to the refueling floor, in the full core off-load case, is expected to be lost within 4 to 5 hours after loss of power.

ENCLOSURE 2

COLUMBIA GENERATING STATION, DOCKET NO. 50-397

THIRD SIX-MONTH STATUS UPDATE REPORT FOR THE IMPLEMENTING ACTIONS IDENTIFIED IN SECTION 9.0 OF THE COMMUNICATION ASSESSMENT CONTAINED IN ENERGY NORTHWEST'S DOCKETED CORRESPONDENCE GO2-12-156 (ML12319A079)

INTRODUCTION

By Reference 1, the Nuclear Regulatory Commission (NRC) requested information based upon Near-Term Task Force (NTTF) Recommendation 9.3. The NRC requested that licensees assess their current communications systems and equipment used during an emergency event. Reference 2 and Reference 3 provided Energy Northwest's communications assessment for the Columbia Generating Station, and a response to an NRC request for additional information, respectively. The NRC staff documented its review of the communication assessment in Reference 4. The staff's review determined that the assessment was reasonable, and that the interim measures and proposed enhancements identified in the assessment would help to ensure that communications are maintained.

STATUS UPDATE

In Reference 2, Energy Northwest committed to include the status of the Implementing Actions identified in Section 9.0 of the Communication Assessment as part of the six-month status reports prepared pursuant to Section IV.C.2 of NRC Order EA-12-049. This enclosure provides Energy Northwest's third six-month status report. The table below provides the status of the implementing activities considered necessary to provide communication capabilities during a Beyond Design Basis Event that are consistent with the assumptions specified in Nuclear Energy Institute (NEI) 12-01.

CHANGES TO ASSESSMENT

In Reference 5, Energy Northwest provided the following updates to the Communications Assessment:

- The Reference 2 Communications Assessment stated that the in-plant radios would be available as a backup communication system. It has been determined that the mounting of some radio system components does not meet the seismic requirements necessary to assure system availability. Nevertheless, the portable radio-to-radio capability, portable satellite phones, and sound powered phones will be available as stated in the Communications Assessment. These devices ensure the communication capability in Section 2.6 of Reference 2 will be met. Additionally, sufficient quantities of portable radios, portable satellite phones, sound powered phones, and sound powered phone kits are available to minimize the reliance on multi-use equipment as required by NEI 12-01.

- The Reference 2 Communications Assessment also stated that power to the in-plant radio system and battery chargers would be provided by portable generators. The current plan is to power the in-plant radio system from FLEX generator DG4 or DG5, and to power the radio battery chargers from the

generators that will power house loads in the FLEX buildings in the event of a loss of normal power.

No additional changes to the Communication Assessment are being made. Changes to the Communication Implementing Activities Open Item List made since the last update are indicated by a Revision Bar.

Communication Implementing Activities - Open Item List	**Status**
OI-COMM-01 - Sound Powered Phones:	
a. Develop and procure sound powered phone kits	Completed
b. Stage sound powered phone kits in FLEX buildings	Started
c. Expand line loss test procedure with additional jacks/locations	Completed
d. Update inventory procedure to include sound powered phone kits	Completed
e. Identify any preventive maintenance/testing required for sound powered phone kits	Completed
f. Review existing functional test procedure for sound powered system headsets for any enhancements	Completed
g. Revise communication procedure(s) to include the use of the sound powered phone kits	Completed
OI-COMM-02 - Satellite Phones:	
a. Design, procure, and install fixed base station units, antennas, and uninterruptable power supplies for the:	
1) TSC/OSC	Started
2) Control Room	Started
3) EOF	Completed
4) JIC	Completed
5) Alternate EOF	Completed
b. Stage spare satellite phones, batteries, and chargers in FLEX buildings	Not Started
c. Update work instructions for satellite phone inventory with final location of portable phones, batteries, and chargers	Started
d. Develop preventive maintenance and testing procedures for the fixed base station units and uninterruptable power supplies	Started
e. Develop procedure on portable satellite phone battery rotation	Completed

Communication Implementing Activities - Open Item List	**Status**
f. Include information on fixed base station locations and usage in procedures	Completed
OI-COMM-03 - Radios:	
a. Determine radio system coverage requirements for an extended loss of AC power event	Completed
b. Develop design to support coverage requirements and meet requirements of NEI 12-01 (This OI has been deleted because the radios will not be assumed to be available as a backup communication system.)	Deleted
c. Incorporate design into overall radio upgrade project (This OI has been deleted because the radios will not be assumed to be available as a backup communication system.)	Deleted
d. Complete Phase 1 of radio upgrade project	Completed
e. Develop estimates of required radio talk time	Completed
f. Determine battery life based on talk time estimates and procure additional batteries as required	Completed
g. Procure portable generators (FLEX) to provide power to radio system	Completed
h. Stage portable generators in FLEX buildings	Not Started
i. Identify final storage locations of radios and ensure locations are diverse and reasonably protected. Stage radios in final locations.	Not Started
j. Stage batteries and battery chargers in FLEX buildings	Not Started
k. Update work instructions for radio inventory with final location of radios, batteries, and chargers	Not Started
l. Develop procedure on radio battery rotation	Completed
m. Develop preventive maintenance and testing procedures for new radio system equipment required for an extended loss of AC power event (This OI has been deleted because the radios will not be assumed to be available as a backup communication system.)	Deleted

Communication Implementing Activities - Open Item List	**Status**
n. Develop procedure on radio system use for radios required for an extended loss of AC power event (This OI has been deleted because the radios will not be assumed to be available as a backup communication system.)	Deleted
OI-COMM-04 - PA System:	
a. Identify those onsite office buildings that do not have a battery-backed PA system	Completed
b. Identify personnel to perform alternate notification of onsite office buildings if PA system is not available	Completed
c. Develop procedure for performing alternate notifications to ensure staff can be notified within 30 minutes	Completed
d. Develop policy requiring building occupants to automatically evacuate buildings and assemble in designated areas for an extended loss of AC power event	Completed
e. Evaluate upgrading power supplies to PA system in onsite office buildings that are not battery-backed	Completed
OI-COMM-05 - Communication with ORO Facilities:	
a. Provide each ORO identified in Section 4.0 with instructions for proper storage and rotation of satellite phone batteries	Completed
b. Verify the capability of the satellite phones at the ORO facilities to be powered for 24 hours consistent with the assumptions in NEI 12-01	Completed
OI-COMM-06 - FLEX Buildings:	
a. Design, procure and install FLEX buildings to include portable generator-backed power supply to meet requirements of NEI 12-06	Refer to mitigation strategies open item OI-FLEX-01
OI-COMM-07 - Portable Generators:	
a. Develop portable generator fueling plan to ensure ability to provide power for a minimum of 24 hours	Refer to mitigation strategies open item OI-FLEX-30

OI-COMM-08 - Training:	
a. Evaluate training needs specific to the use of sound powered phones, satellite phones, and radios during an extended loss of AC power event	Completed

References

1. Letter dated March 12, 2012, from EJ Leeds (NRC) to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3 and 9.3 of the Near Term Task Force Review of Insights from the Fukushima Dai-ichi Accident"

2. Letter GO2-12-156, dated October 30, 2012, from D. A. Swank (Energy Northwest) to the NRC, "Energy Northwest's Response to the March 12, 2012 Information Request – Communications Assessment"

3. Letter GO2-13-026, dated February 21, 2013, from D. A. Swank (Energy Northwest) to the NRC, "Energy Northwest's Response to Follow-Up Letter on Technical Issues for Resolution Regarding Licensee Communication Submittals Associated with Near-Term Task Force Recommendation 9.3"

4. Letter dated April 11, 2013, from C. F. Lyon (NRC) to M. E. Reddemann (Energy Northwest), "Columbia Generating Station - Safety Assessment In Response to Information Request Pursuant to 10 CFR 50.54(f) Recommendation 9.3 Communications Assessment (TAC No. MF0002)"

5. Letter GO2-14-031, from D. A. Swank (Energy Northwest) to NRC, "Energy Northwest Second Six-Month Status Update Report for the Implementation of NRC Order EA-12-049 Mitigation Strategies for Beyond Design Basis External Events"