Exelon Generation.

Order No. EA-12-049

RS-13-023
RA-13-006

February 28, 2013

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

Oyster Creek Nuclear Generating Station
Renewed Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: 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)

References:

1. 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
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
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August, 2012
4. Exelon Generation Company, LLC's 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), dated October 25, 2012

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Exelon Generation Company, LLC (EGC). Reference 1 was immediately effective and directs EGC 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 requires submission of an Overall Integrated Plan by February 28, 2013. The NRC Interim Staff Guidance (ISG) (Reference 2) was issued August 29, 2012 which endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 3 provides direction regarding the content of this Overall Integrated Plan.

Reference 4 provided the EGC initial status report regarding mitigation strategies, as required by Reference 1.

The purpose of this letter is to provide the Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 1. This letter confirms EGC has received Reference 2 and has an Overall Integrated Plan developed in accordance with the guidance for defining and deploying strategies that will enhance the ability to cope with conditions resulting from beyond-design-basis external events.

The information in the enclosure provides the Oyster Creek Nuclear Generating Station Overall Integrated Plan for mitigation strategies pursuant to Reference 3. The enclosed Integrated Plan is based on conceptual design information. Final design details and associated procedure guidance, as well as any revisions to the information contained in the Enclosure, will be provided in the 6-month Integrated Plan updates required by Reference 1.

This letter contains no new regulatory commitments. If you have any questions regarding this report, please contact David P. Helker at 610-765-5525.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 28th day of February 2013.

Respectfully submitted,

Michael D. Jesse
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosure:

1. Oyster Creek Nuclear Generating Station Mitigation Strategies (MS) Overall Integrated Plan

cc: Director, Office of Nuclear Reactor Regulation
NRC Regional Administrator - Region I
NRC Senior Resident Inspector – Oyster Creek Nuclear Generating Station
NRC Project Manager, NRR – Oyster Creek Nuclear Generating Station
Mr. Robert J. Fretz, Jr, NRRIJLD/PMB, NRC
Mr. Robert L. Dennig, NRRIDSS/SCVB, NRC
Manager, Bureau of Nuclear Engineering – New Jersey Department of Environmental Protection
Mayor of Lacey Township, Forked River, NJ

Enclosure 1

Oyster Creek Nuclear Generating Station

Mitigation Strategies (MS)

Overall Integrated Plan

(64 pages)

General Integrated Plan Elements BWR

Site: Oyster Creek Nuclear Generating Station (OCNGS)	
Determine Applicable Extreme External Hazard **Ref: NEI 12-06 section 4.0 -9.0 JLD-ISG-2012-01 section 1.0**	*Input the hazards applicable to the site; seismic, external flood, high winds, snow, ice, cold, high temps. Describe how NEI 12-06 sections 5 – 9 were applied and the basis for why the plant screened out for certain hazards.* Seismic events, except soil liquefaction, external flooding; severe storms with high winds; snow, ice and extreme cold; and high temperatures were determined to be applicable Extreme External Hazards for Oyster Creek Nuclear Generating Station (OCNGS) per the guidance of NEI 12-06 and are as follows: **<u>Seismic Hazard Assessment</u>** Per the Updated Safety Analysis Report (UFSAR) the basis for the seismic design criteria at the OCNGS is presented in Section 3.7. The historical seismicity of the site as described in the U.S. Coast and Geodetic Survey publication "Earthquake History of the United States, Part I" and the "Seismic Probability Map of the United States" (U.S. Coast and Geodetic Survey) were examined by Professor George W. Housner of the California Institute of Technology. The results of the study are as follows: a. Small earthquakes have occurred in the general New Jersey area and others can be expected to occur there in the future. b. The nearest large earthquakes were centered approximately 500 miles from the site. These were the Charleston, South Carolina shock of August 31, 1886, centered approximately 500 miles southwest of the site and the earthquake of February 28, 1925, near Quebec at 47.6°N, 70.1°W centered approximately 500 miles north of the site. c. The seismic probability map assigns New Jersey to Zone 1 with zones being classified as follows:

	Zone 0 - no damage Zone 1 - minor damage Zone 2 - moderate damage Zone 3 - major damage d. The nearest known fault is approximately 40 miles from the site at Morrisville, Pennsylvania, and there is no evidence of faulting near the site. It is concluded that the probability of fault displacements occurring in the vicinity of the reactor structure is negligibly small. e. The seismicity of the general region of the Oyster Creek Site is so low that it would be expected to have a low intensity of ground motion. The shocks in this region are too small to be listed in "Seismicity of the Earth" by Gutenberg and Richter, and the U.S. Coast and Geodetic survey publication does not give information on the magnitudes of the shocks. The response spectra, discussed in Section 3.7, are based upon a ground acceleration of 0.11g or 3.54 feet per second. The derivation of this ground acceleration is as follows: The spectrum intensity for California Zone 3 is assumed to be $I_{0.2} = 2.7$. Reference can be made to AEC publication TID-7024, Table 1.6. The corresponding spectrum intensities for other zones may be taken to be: $I_{0.2}$ Zone 0 0.33 Zone 1 0.67 Zone 2 1.35 Zone 3 2.70 The seismic probability map (Figure 1.10 of TID-7024) assigns New Jersey to Zone 1. Professor Housner recommended using an intensity $I_{0.2} = 0.67 \times 1.40 = 0.94$ as the probable maximum intensity to be expected at the site during the life of the plant. Table 1.6 in TID-7024 gives the maximum ground acceleration for the May 18, 1940, El Centro earthquake as 0.33g with a spectrum intensity of $I_{0.2} = 2.7$. This has been assumed to be equivalent to a California Zone 3 earthquake. Reducing the acceleration by the factor 0.94/2.70 gives a ground acceleration of 0.11g. The OCNGS response

	spectrum, corresponds to a spectrum intensity of $I_{0.2} = 0.94$ or an intensity of approximately one third that of Zone 3. The application of this spectrum to design was set forth in G.W. Housner's "Design of Nuclear Power Reactors Against Earthquake." A detailed explanation is given in the AEC publication TID-7024. Refer to Section 3.7 for further detail. In 1992, Weston Geophysical developed a new site specific design input response spectra generated from a suite of 67 horizontal earthquake time history records and the corresponding 34 vertical records. The peak ground accelerations associated with the Safe Shutdown Earthquake (SSE) are obtained from the 84% non-exceedance probability of the data and are equal to 0.184g. horizontal and 0.0952g. vertical. The operating basis earthquake accelerations are one-half the SSE accelerations and are, therefore, equal to 0.092g. horizontal and 0.0476g. vertical. The SSE Site Specific Response Spectra (SSRS) are contained in Reference 2 and were approved by the US NRC in March, 1992, as shown in Reference 1. **Building and Structure Foundations** Buildings and structures are founded generally in the third stratum (Cohansey sand) described in UFSAR Subsection 2.5.1.4. After excavation, backfilling and rolling, soil compression tests were made in the Reactor Building and Turbine Building areas, using loads up to 80,000 pounds on a four square foot plate. In the Reactor Building area a loading of 20,000 pounds per square foot gave a deflection of 0.003 inches in eight hours, and in the Turbine Building area the deflection from this loading was 0.009 to 0.14 inches in eight hours. These results were highly satisfactory from the standpoint of safety against overstressing the subsoil, for the 8000 pounds per square foot loadings used and even for the 13,000 pounds per square foot loadings used for the earthquake criteria. So far as settlements are concerned, the increased stresses during earthquakes would have no measurable effects upon the settlements in this type of highly compacted soils. Observed settlements of the Reactor Building from the start of construction until May 1968 range between 2/3 inch and 3/4 inch. All available information and test results confirm that the

	Cohansey sand has a dense to very dense relative density. Results also indicate a marked increase in standard penetration resistance (N-values) at about elevation (-)30 feet. The direct determination of relative densities from undisturbed samples indicated that the relative density of the Cohansey sand is greater than 70 percent. **Liquefaction** The potential for earthquake induced soil liquefaction and ground failures was evaluated for the Oyster Creek site by Geomatrix Consultants as documented in their report, " Assessments of potential for Liquefaction and Permanent Ground Displacement at Designated Facilities, Oyster Creek Nuclear Generating Station (December 1994)". The likelihood of soil liquefaction for varying water table conditions was evaluated and expressed in terms of probabilities of occurrence of a given ground acceleration. Should soil liquefaction occur, foundation bearing strength failures are not expected, but ground settlements on the order of 0.5 to 1.0 inch could be expected. The Reactor Building is founded on the Lower Cohansey formation, which consists of compacted sands with a geological age of more than 10 million years. Due to the compaction of these sands (equivalent strength of much higher than 30 blows /foot), significant liquefaction below the Reactor Building is unlikely to occur for any level of earthquake induced ground shaking. The assessment also notes that the "geological age of the Cohansey sands (10,000,000+ years old) would also indicate a low susceptibility to liquefaction, as such relatively old deposits have not been known to liquefy during historic earthquakes." For the Turbine Building, the assessment found that liquefaction of fill beneath portions of the building would require a peak ground acceleration in excess of 0.70g. The Emergency Diesel Generator building is founded on fill that was placed to construct the slope between the building and the discharge canal. For this construction, soil liquefaction can be expected to occur at peak ground acceleration of 0.40g. Therefore, soil liquefaction below the Emergency Diesel Generator Building was separately considered. The effect of this phenomena is to increase the likelihood of failure of the diesel generator building itself,

	as noted in Table 3-2 (Reference 3), in addition to increasing the failure likelihood of the diesel generators themselves, as noted in Table 3-6 (Reference 3). Incorporation of the failure is described in Section 3.1.5 (Reference 3), top event designator DU(DG Building Liquefaction). Finally, the fire protection piping may be vulnerable to permanent ground movements where it crosses the discharge canal. Soil liquefaction can be expected to occur at a ground acceleration of 0.40g; however, the discharge canal banks will serve to support the piping and significant displacement is not expected below 1.0g. Due to the extent of piping that is susceptible to this disruption, fire protection piping failure is conservatively assumed to occur following liquefaction at the 1.0g peak ground acceleration. The incorporation of this failure mode is described in Section 3.1.5 (Reference 3) under top event designator FX (Fire Protection System). Thus, the Oyster Creek site screens in for an assessment for seismic hazard. **<u>External Flood Hazard Assessment:</u>** The current licensing basis includes two bounding floods: the Probable Maximum Hurricane (PMH) and the Probable Maximum Precipitation (PMP). Tsunami events are not typical of the eastern coast of the United States and are not addressed in the Current Licensing Basis (CLB). Dam failure was evaluated and no flooding which would affect safety related structures was postulated for the site as stated in the UFSAR, Section 2.4. The PMH postulated for OCNGS is evaluated in UFSAR section 2.4, Appendix A. The hurricane considered is a Category 4 storm with wind speeds of 133 mph, a forward speed between 12 knots and 23 knots, occurring along with an astronomical high open-ocean tide of 2.7' MSL. This storm results in a storm surge still water level of 22' MSL, with waves at plant site of up to 1' high. The main plant grade is at 23' MSL. The PMP event postulated for OCNGS was evaluated most recently in the site Individual Plant Examination of External Events (IPEEE) Request for Additional Information (RAI) response (OCNGS Reply to RAI on IPEEE, 8/17/2000).

	The site was divided up into nine watersheds, two of which were postulated to have significant ponding. The turbine building and EDG building are not susceptible to this ponding. Onsite water levels were calculated to be 23.6' immediately adjacent to the Reactor Building and 23.5' over the remainder of the site. The PMP is not assumed to occur coincidental with the PMH. The Oyster Creek Nuclear Generating Station is considered a dry site. This is due to the Reactor, Turbine and Emergency Diesel Generator buildings being at or above the two bounding floods. The loss of the Ultimate Heat Sink (UHS) occurs when the PMH level is reached. However, Oyster Creek is considered a "Hot Shutdown Plant" and it does not require the UHS to be available to achieve this state. The Isolation Condensers are the Station Blackout credited source of decay heat removal. The station has two bounding floods with the potential to impact the protection and deployment of FLEX strategy equipment. Thus the Oyster Creek site screens in for an assessment for external flooding. **Snow, Ice and Extreme Cold Hazard Assessment:** The guidelines provided in NEI 12-06 (Section 8.2.1) generally include the need to consider extreme snowfall at plant sites in the northeastern U.S. above the 35th parallel. The OCNGS is located above the 35th parallel (actual latitude and longitude N 39° 49' and W 74° 12') and thus the capability to address impedances caused by extreme snowfall with snow removal equipment need to be provided. Icing effects have been considered during the Systematic Evaluation Program (SEP) assessment. During normal plant operation, icing has been limited to the canal area outside of the steel trash grates. The area in close proximity to the intake, where the suction of the pumps is taken, is kept from freezing by the thermal dilution gates, which recirculate discharge water through the intake bay, and by the turbulence induced by the circulating water pumps. The discharge canal remains free of ice during normal operation due to the plant-heated effluent. It is unlikely that ice blockage would cause problems to any safety related systems as the emergency service water flow utilizes approximately only 3 percent of the design capacity of the 6 screens on the intake structure (UFSAR section

	2.4.7). The FLEX equipment is housed in a building that is heated during the winter months. The FLEX pump engine and Ford F750 truck have block heaters that are maintained energized. The current building needs to be evaluated to determine if it meets the requirements of NEI 12-06 section 11. The site is subject to heavy winter storms. Based on figure 8-1 in NEI 12-06 (Section 8.2.1), impedance caused by extreme snowfall with snow removal equipment has to be considered for FLEX equipment deployment. The FLEX truck (Ford F750) is equipped with a plow for debris and snow removal. Thus, the Oyster Creek site screens in for an assessment for Extreme Cold Hazard Assessment. **High Wind Hazard Assessment:** Oyster Creek Nuclear Generating Station is located in Lacey Township, New Jersey, roughly 9 miles south of Toms River and 50 miles east of Philadelphia, Pennsylvania. The site is adjacent to Oyster Creek, about two miles inland from the shore of Barnegat Bay. Per NEI 12-06 guidance hurricanes and tornado hazards are applicable to Oyster Creek. Figure 7-2 from the NEI FLEX implementation Guide was used for this assessment. Thus, Oyster Creek screens in for an assessment for High Wind Hazard. **Extreme High Temperature Hazard Assessment:** The highest recorded temperature documented in the UFSAR for Southern New Jersey was listed as 106 °F (Reference 4). Per the NEI 12-06 guidance, extreme high temperature hazard should be considered by all sites. Thus, Oyster Creek screens in for an assessment for extreme High Temperature. References: 1. Letter, A. Dromerick, NRC, to J. J. Barton, GPUN, Review and Evaluation of the Site Specific Response Spectra - Oyster Creek Nuclear

	Generating Station (M68217), October 14, 1992. 2. Letter, G. C. Klimkiewicz, Weston Geophysical Corp. To A. O. Asfura, EQE, "Site Specific Response Spectra, Oyster Creek Nuclear Generating Station," October 14, 1992. 3. Oyster Creek Individual Plant Examination for External Events (IPEEE) 4. Oyster Creek Nuclear Generating Station Final Safety Analysis Report, Revision 17.
Key Site assumptions to implement NEI 12-06 strategies. **Ref: NEI 12-06 section 3.2.1**	*Provide key assumptions associated with implementation of FLEX Strategies:* • Flood and seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule commensurate with other licensing bases changes. • Plant initial response is the same as SBO • No additional single failures of any SSC are assumed (beyond the initial failures that define the ELAP/LUHS scenario in NEI 12-06). • Primary and secondary storage locations have not been selected; once locations are finalized implementation routes will be defined. • Storage locations will be chosen in order to support the event timeline. • BWROG EOP Revision EPG/SAG Rev.3, containing items such as guidance to allow early venting and to maintain steam driven injection equipment available during emergency depressurization, is approved and implemented in time to support the compliance date. • DC battery banks are available • AC and DC distribution is available • Additional staff resources are expected to begin arriving at 6 hours and the site will be fully staffed 24 hours after the event. • Maximum environmental room temperatures for habitability or equipment availability is based on NUMARC 87-00 (Reference 1) guidance if other design basis information or industry guidance is not available. • This plan defines strategies capable of mitigating a simultaneous loss of all alternating current (AC) power and loss of normal access to the ultimate heat sink

	resulting from a beyond-design-basis event by providing adequate capability to maintain or restore core cooling, containment, and SFP cooling capabilities. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the beyond-design-basis event may place the plant in a condition where it cannot comply with certain Technical Specifications, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p). (Reference 2) <u>References:</u> 1. NUMARC 87-00, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, Revision 1 2. Task Interface Agreement (TIA) 2004-04, "Acceptability of Proceduralized Departures from Technical Specifications (TSs) Requirements at the Surry Power Station," (TAC Nos. MC4331 and MC4332)," dated September 12, 2006. (Accession No. ML060590273)
Extent to which the guidance, JLD-ISG-2012-01 and NEI 12-06, are being followed. Identify any deviations to JLD-ISG-2012-01 and NEI 12-06. **Ref: JLD-ISG-2012-01 NEI 12-06 13.1**	*Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.* Full conformance with JLD-ISG-2012-01 and NEI 12-06 is expected with no deviations.

Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: NEI 12-06 section 3.2.1.7 JLD-ISG-2012-01 section 2.1**	*Strategies that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walk through of deployment).* *Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 1A* *See attached sequence of events timeline (Attachment 1A).* *Technical Basis Support information, see attached NSSS Significant Reference Analysis Deviation Table (Attachment 1B)* **General Technical Basis information** • Issuance of BWROG document NEDC-33771P, "GEH Evaluation of FLEX Implementation Guidelines" on 01/31/2013 did not allow sufficient time to perform the analysis of the deviations between Exelon's engineering analyses and the analyses contained in the BWROG document prior to commencing regulatory reviews of the Integrated Plan. This analysis is expected to be completed, documented on Attachment 1B, and provided to the NRC in the August 2013 6-month status update. • The times to complete actions in the Events Timeline are based on operating judgment, the conceptual designs, and the current supporting analyses. The final timeline will be time validated once detailed designs are completed and procedures are developed. The results will be provided in a future 6-month update. **<u>Time Constraints and Technical Basis (Action Items from Attachment 1A)</u>** **Action Item # 3** 10 min. Time critical Control room crew needs to determine that the EDGs failed to start and the ability to start the Combustion Turbines by the system operator has failed. Entry into ELAP/FLEX strategies will direct a cool down using the Isolation Condensers, lineup of shell makeup and RPV injection at times that support maintaining core cooling and limiting heat input into the containment. (References 6, 9 and 10)

	Action Item # 7 1.5 hrs DC Load shed complete. Time critical at time 1 hour and 30 minutes. Time period of 30 minutes past the declaration of an ELAP is selected to ensure that DC buses are available for >4 hours from battery sources. The Phase 2 battery recharging is assumed in item 11 to begin at 3 hours; therefore, there is conservatism in the DC power source. The DC buses are readily available for operator access to load strip. Breakers will be appropriately identified (labeled) to show which are required to be opened to effect a deep load shed. From the time that ELAP conditions are declared, it is reasonable to expect that operators can complete the DC bus load shed in approximately 30 minutes. (References 3, 4 and 5) **Action Item # 8** 1.5 hrs Aligning the FLEX pump and initiating makeup to the Isolation Condenser shell side in this time frame ensures the condenser tubes remain covered, and allows the Isolation Condenser to remain in service for RPV pressure control. Maintaining the Isolation Condensers available for pressure control and decay heat removal throughout the event will conserve RPV inventory and limit containment heat input from RPV system leakage, ensuring containment parameters remain within design limits for the 24 hour coping time (References 8, 9 and 10). **Action Item #10** 3 hrs. Closing the Recirculation suction, discharge, and discharge bypass valves will significantly reduce the Reactor leakage from the Recirculation loops thereby extending the Reactor coping time and reducing heat input into primary containment. **Action Item # 12** 3.8 hrs. Commence injecting into the reactor using the FLEX pump and restore level to the normal band. (References 9 and 10) **Action Item # 14** 12 hrs. Spent Fuel Pool (SFP) makeup is not a time constraint with the initial condition of 100% power, since the worst case fuel pool heat load conditions only exist during a refueling outage. Under non-outage conditions, the maximum SFP heat load is 5.04 MBTU/hr. Loss of

	SFP cooling with this heat load and an initial SFP temperature of 125° F (tech spec upper limit) results in a time to boil of 29.26 hours, and 305.3 hours to the top of active fuel. Therefore, completing the equipment line-up for initiating SFP makeup at 12 hours into the event ensures adequate cooling of the spent fuel is maintained. (References 1 and 7) The worst case SFP heat load during an outage is 20.3 MBTU/hr. Loss of SFP cooling with this heat load and an initial SFP temperature of 125° F results in a time to boil of 7.4 hours, and 68.66 hours to the top of active fuel. With the entire core being located in the SFP, manpower resources normally allocated to aligning core cooling along with the Operations outage shift manpower can be allocated to aligning SFP makeup which ensures the system alignment can be established within 8 hours. Initiation at 8 hours into the event ensures adequate cooling of the spent fuel is maintained. (References 2 and 7). Initial calculations were used to determine the fuel pool timelines. Formal calculations will be performed to validate this information during development of the spent fuel pool cooling strategy detailed design, and will be provided in a future 6-month update. <u>References</u>: 1. Oyster Creek Nuclear Generating Station Final Safety Analysis Report, Revision 17. 2. Oyster Creek Technical Specifications 3. C-1302-735-E320-047 Revision 1A, Oyster Creek Station Battery B and C Capacity for SBO 4. C-1302-735-E320-040 Revision 2, OC Station Battery A, B, & C Capacity Calculation 5. C-1302-735-E320-049 Revision 001, Oyster Creek 'B' and 'C' Station Battery Sizing Calculation 6. ABN 37 Station Blackout procedure 7. Technical Evaluation assignment # 777468-53 8. NEDC-33771P rev 0 9. MAAP 4.0.5/ OC405_091704.PAR 10 MAAP OC405_130123.inc, 1/30/2013 (Rev 0) 11. EMG 3200.01 12. EMG 3200.02

Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	*Describe how the strategies will be deployed in all modes.* Deployment of FLEX is expected for all modes of operation. Transportation routes will be developed from the equipment storage area to the FLEX staging areas. An administrative program will be developed to ensure pathways remain clear or compensatory actions will be implemented to ensure all strategies can be deployed during all modes of operation. This administrative program will also ensure the strategies can be implemented in all modes by maintaining the portable FLEX equipment available to be deployed during all modes. Identification of storage and creation of the administrative program are open items. Closure of these items will be documented in a 6-month update.

Provide a milestone schedule. This schedule should include:
• **Modifications timeline**
  o **Phase 1 Modifications**
  o **Phase 2 Modifications**
  o **Phase 3 Modifications**
• **Procedure guidance development complete**
  o **Strategies**
  o **Maintenance**
• **Storage plan (reasonable protection)**
• **Staffing analysis completion**
• **FLEX equipment acquisition timeline**
• **Training completion for the strategies**
• **Regional Response Centers operational**
 	
Ref: NEI 12-06 section 13.1
	The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports.
	
	See attached milestone schedule Attachment 2
	
	Exelon Generation Company, LLC (Exelon) fully expects to meet the site implementation/compliance dates provided in Order EA-12-049 with no exceptions. Any changes or additions to the planned interim milestone dates will be provided in a future 6-month update.

Identify how the programmatic controls will be met. **Ref: NEI 12-06 section 11** **JLD-ISG-2012-01 section 6.0**	*Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality. See section 11 in NEI 12-06. Storage of equipment, 11.3, will be documented in later sections of this template and need not be included in this section.* *See section 6.0 of JLD-ISG-2012-01.* Oyster Creek will implement an administrative program for FLEX to establish responsibilities, and testing & maintenance requirements. A plant system designation will be assigned to FLEX equipment which requires configuration controls associated with systems. This will establish responsibilities, maintenance and testing requirements for all components associated with FLEX. Unique identification numbers will be assigned to all components added to the FLEX plant system. Equipment associated with these strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control as outlined in JLD-ISG-2012-01 section 6 and NEI 12-06 section 11. Installed structures, systems and components pursuant to 10CFR50.63(a) will continue to meet the augmented quality guidelines of Regulatory Guide 1.155, Station Blackout. Standard industry PMs will be developed to establish maintenance and testing frequencies based on type of equipment and will be within EPRI guidelines. Testing procedures will be developed based on the industry PM templates and Exelon standards.
Describe training plan	*List training plans for affected organizations or describe the plan for training development* Training materials for FLEX will be developed for all station staff involved in implementing FLEX strategies. For accredited training programs, the Systematic Approach to Training, SAT, will be used to determine training needs. For other station staff, a training overview will be developed per change management plan.
Describe Regional Response Center plan	Oyster Creek has contractual agreements in place with the Strategic Alliance for FLEX Emergency Response (SAFER). The industry will establish two (2) Regional Response Centers (RRC) to support utilities during beyond design basis events. Each RRC will hold five (5) sets of equipment, four (4) of which will be able to be fully

	deployed when requested, the fifth set will have equipment in a maintenance cycle. Equipment will be moved from an RRC to a local Assembly Area, established by the SAFER team and the utility. Communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request.
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.	

Maintain Core Cooling

Determine Baseline coping capability with installed coping[1] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06:

- **RCIC/HPCI/IC**
- **Depressurize RPV for injection with portable injection source**
- **Sustained water source**

BWR Installed Equipment Phase 1:

Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC)and strategy(ies) utilized to achieve this coping time.

Reactor Level and pressure Control

At the initiation of the BDBEE the Main Steam Isolation valves (MSIVs) will close, Condensate and Feedwater is lost and the Isolation Condensers (ICs) will initiate to control reactor pressure. The ICs are designed to remove 410 X 10^6 Btu/hr and can provide emergency cooling for 1 hr. 40 min. without makeup (UFSAR section 6.3.1.1.2). The Isolation Condensers condensate return valves are DC operated and controlled by 3-position switches (Open/ Auto/ closed). The switches snap into the 3 positions; the only position that auto initiation or isolation function is active is in the auto position. Placing the switch in open or closed will bypass these functions.

Operators will limit the cool down to less than 10 °F per hour until it is determined that an ELAP condition exists. At this time, a 50°F per hour cool down will commence to support RPV injection at 3.8 hours assuming that ICs FLEX makeup is available at 1.5 hrs.

If the Isolation Condensers become unavailable then pressure control will shift to the Electromatic Relief Valves still maintaining a less than 10°F per hour cool down. This is maintained until an injection source becomes available or Top of Active Fuel (TAF) is reached at which time Emergency Depressurization is required. If no injection source is available, steam cooling will be entered per the EOPs. The EOPs direct the use of the Fire Diesels to provide makeup to the reactor and will be available for all events except seismic and PMH. Current battery coping times per UFSAR section 8.3.2.1.1 and section 8.3.2.1.2 are 8 hrs. for the "C" battery (power for "B" Isolation Condenser) and 3 hrs. for the "B" battery (power for the "A" Isolation Condenser). A DC load analysis is being performed to determine the battery coping time with no actions and with battery load shed. Oyster Creek currently does not have a battery load shed procedure. Using the results of the analysis, a load shed procedure will be developed to extend DC coping time.

Overall Response

The MAAP, Reference 4, was utilized to evaluate overall response of installed systems per the system utilization described above. Isolation condensers are cycled to maintain reactor pressure between 900 to 1000 psig until the shell side water level drops to below the tube bundle at 1.8 hrs.

[1] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

Water level drops to TAF at 4.2 hrs. At this point the EOPs will direct the operators to initiate Steam Cooling with no makeup available.

Based on the above information, the coping time for the Oyster Creek station using installed equipment is 4.2 hrs.

Cold shutdown and refueling

When in Cold Shutdown and Refueling, many variables exist which impact the ability to cool the core. In the event of an ELAP during these Modes, installed plant systems cannot be relied upon to cool the core; thus, transition to Phase 2 will begin immediately. All efforts will be made to expeditiously provide core cooling and minimize heat-up and repressurization. Exelon has a program in place, References 5 and 6, to determine the time to boil for all conditions during shutdown periods. This time will be used to determine the time required to complete transition to Phase 2.

To accommodate the activities of vessel disassembly and refueling, water levels in the reactor vessel and the reactor cavity are often changed. The most limiting condition is the case in which the reactor head is removed and water level in the vessel is at or below the reactor vessel flange. If an ELAP/LUHS occurs during this condition then (depending on the time after shutdown) boiling in the core may occur quite rapidly.

Deploying and implementing portable FLEX pumps to supply injection flow must commence immediately from the time of the event. This should be plausible because more personnel are on site during outages to provide the necessary resources. Strategies for makeup water include deploying a FLEX pump to take suction from the UHS (Intake or Discharge canal) as described in the Phase 2 Core Cooling section.

Guidance will be provided to ensure that sufficient area is available for deployment and that haul paths remain accessible without interference from outage equipment during refueling outages.

(Reference 6)

References

1. EMG 3200.01 RPV control
2. ABN-37 Station blackout
3. NEI 12-06
4. BWR MAAP 4.0.5 OC405_091704.PAR, 9/17/2004
5. OU-OC-103-1001 Shutdown Safety Management Program Attachment 8 (Estimation of time to boil)
6. OU-AA-103 Shutdown Safety Management Program
7. Oyster Creek Nuclear Generating Station Final Safety Analysis Report, Revision 17.

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Oyster Creek will use the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific

	procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* Currently, no modifications are planned for Phase 1 response.
Key Reactor Parameters	*List instrumentation credited for this coping evaluation.* **Key Instruments available:** **RE05/19B** Reactor Level **RE05B** Reactor Level **RE02C** Core Spray Logic Reactor Level **RE02D** Core Spray Logic Reactor Level **RE03C** Reactor Pressure **RE03D** Reactor Pressure The above instruments are located in panel 18R and 19R in the Main Control Room (MCR). Reactor Pressure and Level are fed to meters on the MCR panels. The panels are provided with DC backup power from the station batteries. **LT-IG06B** ("B") Isolation condenser shell level **PI-IG05B** ("B") steam pressure indicator **LI-211-1215** Local level indicator "B" isolation condenser shell **LI-211-1214** Local level indicator "A" isolation condenser shell **LI-622-1028** "C" fuel zone **LI-622-1029** "D" fuel zone **RE15C** Fuel Zone Reactor Pressure Input **RE15D** Fuel Zone Reactor Pressure Input The "B" Isolation condenser shell level, reactor pressure and reactor level can be read at the remote shut down panel 480VAC "A" vault also powered from the station DC station battery "B". Isolation Condenser shellside level can also be read locally at the isolation condensers. Currently, Torus level will not be available until AC power is restored. Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC)and strategy(ies) utilized to achieve this coping time. During Phase 2, reactor makeup will be provided by the FLEX pump taking suction from the UHS (Intake or Discharge canal). The pump has the capacity to make up to the Reactor and the Isolation Condenser shells. The new seismic connections are in the conceptual design phase and will be located inside the Reactor Building NW airlock. This central location will provide connections for the Reactor, Isolation Condenser shell and Spent Fuel Pool makeup accessible from the NW and NE Reactor Building airlocks. The FLEX pump will take suction from the Intake or Discharge canal and hoses will be run to the new connections. Makeup to the Reactor will be via Core Spray system 1. 480VAC power will be restored using modified spare breaker frames with cables adapted to plug into a portable 3-phase 480VAC generator. This will allow repowering the 480VAC USS 1A2 and 1B2 and restore the battery chargers for the station batteries and provide power to the MCCs to operate valves and other essential loads. After power is restored, the Recirculation Pump isolation valves on four (4) loops can be closed to reduce the recirculation pump seal leakage. The Isolation Condensers will be used to maintain Reactor pressure and remove decay heat for an indefinite period of time.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Oyster Creek will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* Modifications in the conceptual design stage are to provide a reactor makeup line to Core Spray system 1 at the fire water makeup tie-in. For the Isolation Condenser shell makeup, piping will be connected to the shell drains on the 95' elevation to the 23'elevation of the reactor building. All piping will meet the requirements of NEI 12-06. Alternate AC power will be provided by installing modified breaker

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
	frames into USS 1A2 and/or 1B2 by removing an unused breaker and powering the bus via a portable 3-phase 480VAC generator. Conceptual sketches are listed in Attachment 3. There is also a modification scheduled to provide DC power to the "A" Isolation Condenser shell level indication (IG06A).
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* **Key Instruments available:** **RE05/19B** Reactor Level **RE05B** Reactor Level **RE02C** Core Spray Logic Reactor Level **RE02D** Core Spray Logic Reactor Level **RE03C** Reactor Pressure **RE03D** Reactor Pressure The above instruments are located in panel 18R and 19R in the Main Control Room (MCR). Reactor Pressure and Level are fed to meters on the MCR panels. The panels are provided with DC backup power from the station batteries. **LT IG06B** ("B") Isolation condenser shell level **PI IG05B** ("B") steam pressure indicator **LI-211-1215** Local level indicator "B" isolation condenser shell **LI-211-1214** Local level indicator "A" isolation condenser shell **LI-622-1028** "C" fuel zone **LI-622-1029** "D" fuel zone **RE15C** Fuel Zone Reactor Pressure Input **RE15D** Fuel Zone Reactor Pressure Input The "B" Isolation condenser shell level, reactor pressure and reactor level can be read at the remote shut down panel 480V "A" vault also powered from the station DC station battery "B". Isolation Condenser shellside level can also be read locally at the Isolation Condensers. Currently, Torus level will not be available until AC power is restored.

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
	Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX

Maintain Core Cooling	
BWR Portable Equipment Phase 2:	
	equipment requirements relative to the external hazards applicable to Oyster Creek.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
High Temperatures	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Storage location and structure have not been identified at this time. One FLEX pump will be moved to the vicinity of the UHS (intake or Discharge canal) and hoses run to the NW corner of the Reactor Building.	Connections will be added to Core Spray system 1 fire water drain, Isolation Condenser common drain and electrical connections for the 480VAC USS's. Connections will be located at a central location at the NW side of the Reactor	FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.

Maintain Core Cooling		
BWR Portable Equipment Phase 2:		
	Building. All connections will be accessible from the NW or NE airlocks.	

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Core Cooling	
BWR Portable Equipment Phase 3:	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC)and strategy(ies) utilized to achieve this coping time. Phase 1 and 2 strategy will provide sufficient capability that no additional Phase 3 strategies are required. Phase 3 equipment for Oyster Creek includes backup portable pumps and generators. The portable pumps will be capable of providing the necessary flow and pressure as outlined in Phase 2 response for Core Cooling & Heat Removal, RCS Inventory Control and Spent Fuel Pool Cooling. The portable generators will be capable of providing the necessary 480 VAC power requirements as outlined in Phase 2 response for Safety Functions Support.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Oyster Creek will use the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* None
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation* **Key Instruments available:** **RE05/19B** Reactor Level **RE05B** Reactor Level **RE02C** Core Spray Logic Reactor Level **RE02D** Core Spray Logic Reactor Level **RE03C** Reactor Pressure **RE03D** Reactor Pressure The above instruments are located in panel 18R and 19R in the Main

Maintain Core Cooling	
BWR Portable Equipment Phase 3:	
	Control Room (MCR). Reactor Pressure and Level are fed to meters on the MCR panels. The panels are provided with DC backup power from the station batteries. **LT-IG06B** ("B") Isolation condenser shell level **PI-IG05B** ("B") steam pressure indicator **LI-211-1215** Local level indicator "B" isolation condenser shell **LI-211-1214** Local level indicator "A" isolation condenser shell **LI-622-1028** "C" fuel zone **LI-622-1029** "D" fuel zone **RE15C** Fuel Zone Reactor Pressure Input **RE15D** Fuel Zone Reactor Pressure Input The "B" Isolation condenser shell level, reactor pressure and reactor level can be read at the remote shut down panel 480V "A" vault also powered from the station DC station battery "B". Isolation Condenser shellside level can also be read locally at the Isolation Condensers. Currently, Torus level will not be available until AC power is restored. Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.

Deployment Conceptual Modification **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
None	None	None

Maintain Core Cooling
BWR Portable Equipment Phase 3:
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Containment	
Determine Baseline coping capability with installed coping[2] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06: • **Containment Venting or Alternate Heat Removal** • **Hydrogen Igniters (Mark III containments only)**	
BWR Installed Equipment Phase 1:	
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain core cooling. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time. Coping strategies for primary containment in Phase 1 will be to remove decay heat via the Isolation Condensers (ICs) to minimize heat input to primary containment. The ICs remove decay heat with no loss of inventory from the reactor coolant system and no addition of heat to the suppression pool. As long as the shell side of the ICs is replenished (Phase 2) with sufficient water, they will remove adequate decay heat to maintain core cooling and limit the heat input to the containment. During Phase 1, containment integrity is maintained by normal design features of the containment, such as the containment isolation valves. In accordance with NEI 12-06, the containment is assumed to be isolated following the event. Reliable Hardened Vent System (RHVS) will be available for use to vent containment. The Hardened Vent Containment Isolation valves will be operated by an independent DC system to ensure reliability. Monitoring of containment (drywell) pressure and temperature will be available via normal plant instrumentation. Early venting of the containment (BWROG EOP Revision EPG/SAG Rev.3) will serve to limit containment pressure rise and Torus temperature rise. BWROG EOP Revision EPG/SAG Rev.3, containing items such as guidance to allow early venting and to maintain steam driven injection equipment available during emergency depressurization, is approved and will be implemented in time to support the Oyster Creek compliance date.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Oyster Creek will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

[2] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

Identify modifications	*List modifications* Modification per NRC Order EA-12-050, Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents.
Key Containment Parameters	*List instrumentation credited for this coping evaluation.* **LI-IP0010A** Torus Narrow Range Level **LI-IP0010B** Torus Narrow Range Level **LI-243-2A** Torus Wide Range Level Panel 16R **LI-243-2B** Torus Wide Range Level Panel 16R **PT-IP-0007** Containment Pressure Transmitter **LT-IG06B.** ("B") Isolation Condenser Shell Level **PI-IG05B.** ("B") Steam Pressure Indicator **LI-211-1215** Local Level Indicator "B" Isolation Condenser Shell **LI-211-1214** Local Level Indicator "A" Isolation Condenser Shell **LI-622-1028** "C" Fuel Zone **LI-622-1029** "D" Fuel Zone **TI-664-43A** Suppression Pool Temperature Div 1 **TI-664-43B** Suppression Pool Temperature Div 2 The "B" Isolation condenser shell level, reactor pressure and reactor level can be read at the remote shut down panel 480VAC "A" vault also powered from the station DC station battery "B". Isolation Condenser shellside level can also be read locally at the Isolation Condensers. Currently, Torus level will not be available until AC power is restored. Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.

Maintain Containment	
BWR Portable Equipment Phase 2:	
Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain core cooling. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time. Oyster Creek will utilize portable equipment to provide shell-side makeup to the Isolation Condenser. Utilization of the Isolation Condenser as the RPV Pressure Control Mechanism will eliminate the need for EMRV operation and the subsequent heat addition to the containment. During Phase 2, Isolation Condenser makeup will be provided by the FLEX pumps taking suction from the UHS (Intake or Discharge canal). The pumps have the capacity to make up to the Reactor and the Isolation Condenser shells. The new seismic connections are in the conceptual design phase and will be located inside the reactor building NW airlock. This central location will provide connections for the Reactor, Isolation Condenser shell and Spent Fuel Pool makeup. The FLEX pumps will take suction from the Intake canal, and hoses will be run to the new connections.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Oyster Creek will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* • NRC Order EA-12-050, Issuance of Order to Modify Licenses with Regard to Reliable Hardened Containment Vents. • For the Isolation Condenser shell makeup, piping will be connected to the shell drains on the 95' elevation to the 23'elevation of the reactor building. All piping will meet the requirements of NEI 12-06.
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* **LI-IP0010A** Torus Narrow Range Level **LI-IP0010B** Torus Narrow Range Level **LI-243-2A** Torus Wide Range Level Panel 16R **LI-243-2B** Torus Wide Range Level Panel 16R **PT-IP-0007** Containment Pressure Transmitter

Maintain Containment	
BWR Portable Equipment Phase 2:	
	LT-IG06B. ("B") Isolation Condenser Shell Level **PI-IG05B.** ("B") Steam Pressure Indicator **LI-211-1215** Local Level Indicator "B" Isolation Condenser Shell **LI-211-1214** Local Level Indicator "A" Isolation Condenser Shell **LI-622-1028** "C" Fuel Zone **LI-622-1029** "D" Fuel Zone **TI-664-43A** Suppression Pool Temperature Div 1 **TI-664-43B** Suppression Pool Temperature Div 2 The "B" Isolation condenser shell level, reactor pressure and reactor level can be read at the remote shut down panel 480VAC "A" vault also powered from the station DC station battery "B". Isolation Condenser shellside level can also be read locally at the Isolation Condensers. Currently, Torus level will not be available until AC power is restored. Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future six (6) month update following identification.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be

Maintain Containment	
BWR Portable Equipment Phase 2:	
	constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
High Temperatures	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Deployment Conceptual Design	

Maintain Containment		
BWR Portable Equipment Phase 2:		
(Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Storage location and structure have not been identified at this time. One FLEX pump will be moved to the vicinity of the UHS (intake or Discharge canal). and hoses run to the NW corner of the Reactor Building	Connections will be added to Core Spray system 1 fire water drain, Isolation Condenser common drain and electrical connections for the 480VAC USS's. Connections will be located at a central location at the NW side of the Reactor Building. All connections will be accessible from the NW or NE airlocks.	FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.		

Maintain Containment	
BWR Portable Equipment Phase 3:	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time. Phases 1 and 2 strategy will provide sufficient capability such that no additional Phase 3 strategies are required. Phase 3 equipment for Oyster Creek includes backup portable pumps and generators. The portable pumps will be capable of providing the necessary flow and pressure as outlined in Phase 2 response for Core Cooling & Heat Removal, RCS Inventory Control and Spent Fuel Pool Cooling. The portable generators will be capable of providing the necessary 480 VAC power requirements as outlined in Phase 2 response for Safety Functions Support.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Oyster Creek will use the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications* None
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.
Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**	

Maintain Containment		
BWR Portable Equipment Phase 3:		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
None	None	None.
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.		

Maintain Spent Fuel Pool Cooling

Determine Baseline coping capability with installed coping[3] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06:

- **Makeup with Portable Injection Source**

BWR Installed Equipment Phase 1:

Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source)and strategy(ies) utilized to achieve this coping time.

There are no Phase 1 actions required at this time that need to be addressed. Below is a description of the SFSP and the decay heat loading for the pool. Effects from loss of cooling are also included which indicate no operator action is required for 68.66 hours (time to boil off to the top of fuel racks) after loss of cooling.

The spent fuel storage pool is 27 feet by 39 feet in plan with a total water depth of approximately 37 feet 9 inches, and an actual physical depth of 38'-9". The depth of water to the top of the stored fuel is approximately 25 feet, providing some 200,000 gallons of water above the fuel.

The pool is presently licensed to store 3035 fuel assemblies. Other equipment, such as control rods, spent nuclear instrumentation, and small vessel components, are temporarily stored in the spent fuel pool. Additional storage for large components, such as the steam dryer and the steam separator, is provided in a separate storage pool adjacent to the drywell heat cavity.

The fuel pool cooling system (UFSAR Subsection 9.1.3) cools, filters and demineralizes the fuel pool water. Failure of the fuel pool cooling system cannot cause the fuel to be uncovered. Normal demineralized water makeup to the pool is provided from the 525,000 gallon (nominal capacity) Condensate Storage Tank at a rate of 250 gpm by a single condensate transfer pump. The makeup capability from this system is increased to approximately 420 gpm if both condensate transfer pumps are used. Makeup water is added directly to the pool's surge tanks by manual valve operation on elevation 119'. Additional makeup, at a rate of 150 gpm, can be provided from the (nominal) 175,000 gallon Demineralized Water Storage Tank by the demineralized water transfer pumps through the use of hoses. Other sources of water are also available through the use of fire hoses or portable pumps. The makeup system for the spent fuel pool is not a Seismic Category I system. The 2000 gpm diesel driven fire pumps for the Fire Protection System can be used to provide makeup water from the Fire Pond to the Condensate Storage Tank through a permanent connection.

The pool is designed with substantial capability for withstanding the effects of a tornado. The design makes removal of more than five feet of water, due to tornado action, highly improbable. Protection is provided against all tornado generated missiles, having a probability of hitting the

[3] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

fuel larger than once per 1.4 billion reactor lifetimes. Large equipment stored on the refueling floor, such as the reactor vessel head, shielding blocks, and other components, have a mass-to-surface area ratio such that they cannot become missiles under the postulated tornado conditions and, thus, could not be blown into the pool.

The maximum normal decay heat load for the SFPC System corresponds to the decay heat from a normal refuel offload (~188 spent fuel assemblies) with the SFSP full from successive normal refuel offloads. The maximum normal decay heat load, ten days after a reactor shutdown, has been calculated at 8.66 MBTU/HR.

The maximum augmented decay heat load for the SFPC System corresponds to the decay heat from a full core offload (560 spent fuel assemblies) with the SFSP full from successive normal fuel offloads. Approximately 95% of this decay heat load is generated from the full core offload and the last two normal fuel offloads. The maximum augmented decay heat load, ten days after a reactor shutdown, has been calculated at 20.07 MBTU/HR. The ten-day duration is the minimum time necessary to offload the entire reactor core into the SFSP and to replace the gate between the SFSP and the Reactor Cavity. This duration is based upon past reactor refueling outages.

Per UFSAR section 9.1.3.2.3, a loss of the SFPC System may cause an increase in the temperature of the SFSP water inventory. This temperature increase may result in the heat-up and eventual boil-off of the SFSP water inventory. It would take ~14.5 hours for the SFSP water inventory to heat-up from an initial temperature of 90°F and reach the boiling temperature. Similarly, it would take ~10.3 hours for the SFSP water inventory to heat-up from an initial temperature of 125°F and reach the boiling temperature. These durations assume a maximum augmented decay heat load of 20.0 MBTU/HR, the SFSP gate is installed, an initial SFSP water inventory level at RB El. 117-11", the top of the spent fuel storage rack at RB El 94'-9" and no compensatory operator actions. Boil-off of the SFSP water inventory from RB El 117'-11" to RB El. 94'-9" is equivalent to a boil off rate of 41.2 GPM. Therefore, boil-off of the SFSP water inventory would have to continue for ~69.0 hours in order to expose the top of the spent fuel storage racks. The total elapsed time to heat-up and boil-off the SFSP water inventory to the top of the spent fuel storage rack is ~85.5 hours and ~79.2 hours when the SFSP water inventory is at an initial temperature of 90°F and 125°F, respectively.

Evaluation of the spent fuel pool area for steam and condensation has not yet been performed. The results of this evaluation and the vent path strategy, if needed, will be provided in a future 6-month update.

References:

UFSAR section 9.1

Oyster Creek Individual Plant Examination for External Events (IPEEE)

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	Oyster Creek will use the industry developed guidance from the Owners Groups, EPRI and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

Identify any equipment modifications	None
Key SFP Parameter	Per EA 12-051(SFP Level) Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.

Notes:
Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source) and strategy(ies) utilized to achieve this coping time. The FLEX diesel driven portable pump will be positioned near the intake structure, and the discharge hose will be run to a pipe connection adjacent to the North West (NW) Reactor Building (RB) stairwell. This piping will be used to make-up to spent fuel pool (SFP) from the 23' (grade) elevation. On the fuel floor (119' elev.) a hose will be connected to the SFP makeup piping and ran into the SFP, utilizing restraints at the SFP handrail. At approximately T=12 hours (see SFP timeline in Phase 1), the FLEX pump will be started, the SFP make-up piping pressurized, and makeup flow established via the SFP makeup connection on the 75' elevation by opening the isolation valve located in the NW RB stairwell. The hose connected on the fuel floor will be available as an alternative flow path. The 250 gpm spray flow will be provided by a FLEX pump taking suction from the intake structure and supplying water to the fuel pool makeup connection inside the NW airlock for the Reactor building. A fire hose will be connected to the connection located on the refuel floor, NW corner of the fuel pool, with an oscillating spray nozzle spraying over the pool. Evaluation of the spent fuel pool area for steam and condensation has not yet been performed. The results of this evaluation and the vent path strategy, if needed, will be provided in a future 6-month update.	
Schedule:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Oyster Creek will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	Seismically qualified piping running from the 23' elev. to the 119' elev. with a tee at the 75' elev., located inside the North West stairwell. The piping will have isolation valves inside the stairwell on the 23' elev., 75' elev., and 119' elev. The 23' elev. will have a hose connection for connecting the FLEX Diesel Driven Portable Pump (DDPP). The 75' elev. line will make a solid connection with the SFP makeup connection point that was added for B.5.b, upstream of check valve V-18-1269. On the 119' elev., the piping will extend through the security barrier into the fuel floor area, ending in a hose

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
	connection to allow a hose to be either run into the SFP or to connect to a portable nozzle for providing spray capability.
Key SFP Parameter	Per EA 12-051(SFP Level) Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future six (6) month update following identification.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2:	
	2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
High Temperatures	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use. Storage location and structure have not been identified at this time. The FLEX Diesel Driven Portable Pump (DDPP) will be deployed using the F-750 Ford truck with debris removal capability. Suction will provided from raw water in the	*Identify modifications* Connections will be added to spent fuel pool B.5.b connection. This central location for all connections is accessible from the NW or NE airlocks.	*Identify how the connection is protected* FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.

Maintain Spent Fuel Pool Cooling		
BWR Portable Equipment Phase 2:		
vicinity of the intake structure. Hose will connect the DDPP discharge to the SFP makeup header.		
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.		

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 3:	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source) and strategy(ies) utilized to achieve this coping time. Phases 1 and 2 strategy will provide sufficient capability such that no additional Phase 3 strategies are required. Phase 3 equipment for Oyster Creek includes backup portable pumps and generators. The portable pumps will be capable of providing the necessary flow and pressure as outlined in Phase 2 response for Core Cooling & Heat Removal, RCS Inventory Control and Spent Fuel Pool Cooling. The portable generators will be capable of providing the necessary 480 VAC power requirements as outlined in Phase 2 response for Safety Functions Support.	
Schedule:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Phase 2 strategy will provide sufficient capability such that no additional Phase 3 strategies are required.
Identify modifications	*List modifications* None
Key SFP Parameter	Per EA 12-051 (SFP Level) Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.
Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**	

Maintain Spent Fuel Pool Cooling		
BWR Portable Equipment Phase 3:		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
None	None	None

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Safety Functions Support
Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications.
BWR Installed Equipment Phase 1
Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. **Control room habitability.** Under ELAP conditions with no mitigating actions taken, initial analysis projects the Control Room to surpass 110°F (the assumed maximum temperature for efficient human performance as described in NUMARC 87-00 (Reference 1)). The Phase 1 FLEX strategy is to block open the Main Control Room door, observation room door and the back door. The outside door to the back hallway will be opened and the door by the MUX room will be opened to provide air flow from the outside. **Battery room habitability** Battery room HVAC doors will be blocked open to provide initial ventilation. **Refuel floor habitability** Initial ventilation to the SFP area is by opening the Reactor Building roof hatch air lock and the railroad airlock small doors. This will provide air flow to the refuel floor. References: 1. NUMARC 87-00, Revision 1, Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Oyster Creek will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.

[4] Coping modifications consist of modifications installed to increase initial coping time, i.e., generators to preserve vital instruments or increase operating time on battery powered equipment.

Identify modifications	*List modifications and describe how they support coping time.* None
Key Parameters	*List instrumentation credited for this coping evaluation phase.* None Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Safety Functions Support	
BWR Portable Equipment Phase 2	
Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Exelon Generation Company, LLC (Exelon) intends on maintaining Operational command and control within the Main Control Room. Habitability conditions will be evaluated and a strategy will be developed to maintain Main Control Room habitability. The strategy and associated support analyses will be submitted in a future 6-month update. Phase 2 with 480VAC power restored utilizes temporary fans/ blowers in conjunction with the blocked open doors to provide forced flow.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Guidance is provided in the procedure 331.1 for fan placement. Oyster Creek will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications necessary for Phase 2* None
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.

Safety Functions Support	
BWR Portable Equipment Phase 2	
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in

Safety Functions Support	
BWR Portable Equipment Phase 2	
	Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.
High Temperatures	*List how equipment is protected or schedule to protect* Structures to provide protection of FLEX equipment will be constructed to meet the requirements of NEI 12-06 Section 11. Schedule to construct permanent building is contained in Attachment 2, and will satisfy the site compliance date. Temporary locations will be used until building construction completion. Procedures and programs will be developed to address storage structure requirements, haul path requirements, and FLEX equipment requirements relative to the external hazards applicable to Oyster Creek.

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
Storage location and structure have not been identified at this time. Portable fans will be used to provide forced ventilation. Portable generators will be moved outside to operate the fans using extension cords stored with the generators, or if power is restored to the vital busses then installed receptacles will be used.	None	FLEX piping, valves, and connections (electrical & fluid) will meet NEI 12-06 Rev.0 protection requirements.

Safety Functions Support
BWR Portable Equipment Phase 2
Notes: Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

Safety Functions Support
BWR Portable Equipment Phase 3
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times Phases 1 and 2 strategy will provide sufficient capability such that no additional Phase 3 strategies are required. Phase 3 equipment for Oyster Creek includes backup portable pumps and generators. The portable pumps will be capable of providing the necessary flow and pressure as outlined in Phase 2 response for Core Cooling & Heat Removal, RCS Inventory Control and Spent Fuel Pool Cooling. The portable generators will be capable of providing the necessary 480 VAC power requirements as outlined in Phase 2 response for Safety Functions Support.

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* Oyster Creek will utilize the industry developed guidance from the Owners Groups, EPRI, and NEI Task team to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies in the current EOPs.
Identify modifications	*List modifications necessary for Phase 3* None
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* None Oyster Creek's evaluation of the FLEX strategy may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage. NEI 12-06 Rev. 0 Section 3.2.1.10 and any differences will be communicated in a future 6-month update following identification.

Deployment Conceptual Design **(Attachment 3 contains Conceptual Sketches)**		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how	*Identify modifications*	*Identify how the connection is*

Safety Functions Support		
BWR Portable Equipment Phase 3		
the equipment will be deployed to the point of use.		*protected*
None	None	None

Notes:

Exelon Generation Company, LLC (Exelon) has not finalized the engineering designs for compliance with NRC Order EA-12-049. Detailed designs based on the current conceptual designs will be developed to determine the final plan and associated mitigating strategies. Analysis will be performed to validate that the plant modifications, selected equipment, and identified mitigating strategy can satisfy the safety function requirements of NEI 12-06. Once these designs and mitigating strategies have been fully developed, Exelon will update the integrated plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the initial designs as submitted in the February 28, 2013 Integrated Plan.

BWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Two(2) FLEX self prime portable pumps	**X**	**X**	**X**			[500 gpm, 1300 gpm, 110 psig, 190 psig]	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01 section 6 and NEI 12-06 section 11
Two (2) 480 VAC Generators	**X**	**X**	**X**	**X**	**X**	To be determined as part of detailed design process.	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01 section 6 and NEI 12-06 section 11
Two (2) sets of Suction hoses and strainers, 5" discharge hoses, and fittings each set carried on two (2)	**X**	**X**	**X**			Discharge hoses shall fit on FLEX Pump and connect to the planned connection in the Reactor building NW corner for IC, Reactor and SFP makeup.	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01 section 6 and NEI 12-06 section 11

BWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
hose trailers							
One (1) Ford F750 flat bed Truck with debris plow					X	Tow vehicle, portable equipment refueling vehicle, and debris removal vehicle	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01 section 6 and NEI 12-06 section 11
3 portable 5KW diesel generators					x	**120/240 VAC 5KW**	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01 section 6 and NEI 12-06 section 11
3 industrial 2 speed blowers					X	**13,300/ 9,500 SCFM**	Equipment maintenance and testing will be performed in accordance with the industry templates, as outlined in JLD-ISG-2012-01 section 6 and NEI 12-06 section 11.

PWR/BWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
Note: The RRC equipment has not been procured at the time of this submittal. Once the SAFER committee determines the equipment specifications for bid, updates will be made as necessary to this table. The Phase 3 portable equipment table will be updated once all of the equipment has been procured and placed in inventory.							
Medium Voltage Diesel Generator	X	X	X	X	X	2 MW output at 4160 VAC, three phase	• Generator must be common commercially available. • Must run on diesel fuel.
Low Voltage Diesel Generator	X	X	X	X	X	500 kW output at 480 VAC, three phase	• Generator must be common commercially available. • Must run on diesel fuel.
Low Pressure Pump	X	X	X			300 psi shutoff head, 2500 gpm max flow	
Low Pressure Pump	X		X			500 psi shutoff head, 500 gpm max flow	
Low Pressure Pump					X	110 psi shutoff head, 400 gpm max flow	

PWR/BWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
						submersible	
Low Pressure Pump	**X**	**X**				150 psi shutoff head, 5000 gpm max flow	
Air Compressor		**X**				120 psi minimum pressure, 2000 scfm	

Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	The RRC will not stock this type of equipment but this equipment will be requested from site-to-site and utility-to-utility on an as required basis.
Commodities • Food • Potable water	The RRC will not stock these commodities but they will be requested from site-to-site and utility-to-utility on an as required basis.
Fuel Requirements • **Diesel fuel**	300 – 500 gallon bladders that can be delivered by air
Heavy Equipment • Transportation equipment • Debris clearing equipment	• TBD during site specific playbook development • Redundant Phase 2 equipment to be located at RRC

Attachment 1A
Sequence of Events Timeline

(insert site specific time line to support submittal)

Action item	Elapsed Time	Action	Time Constraint Y/N [5]	Remarks / Applicability
	0	Event Starts Reactor scram and isolation/ loss of all AC	N/A	Plant @100% power
1	T-0.	Isolation condensers are used for pressure control; pressure control may be augmented with the EMRVS if required	N	Maintain reactor pressure in a band specified by the ABN-37 (cool down < 10 degrees per hr). No time constraint. Isolation condensers will automatically initiate when required. Operator action will be to take manual control as directed by ABN-37
2	~0-5 min	Operators enter ABN-37 STATION BLACKOUT after it is determined that the EDGS failed to auto start. • Dispatch operators to investigate EDG failure to start. • Commence load shed of the "A", "B" and "C" batteries	N	ABN-37 provides direction for RPV control and attempted restoration of the "B" 4160 bus. Load shed of batteries support action item #8
3	10 min	Control Room crew has assessed SBO and plant conditions and declares an Extended Loss of AC Power (ELAP) event; enter ELAP/FLEX strategies . • Commence a Reactor cool down at 50° / hr	Y	Timely determination of an ELAP event will prioritize actions and

[5] Instructions: Provide justification if No or NA is selected in the remarks column
If yes, include technical basis discussion as requires by NEI 12-06 section 3.2.1.7

		using the isolation condensers • Commence lining up the FLEX pumps for Isolation Condenser shell side and Reactor makeup		allocation for deployment of FLEX equipment personnel. RPV cool down at 50° f/hr will allow makeup to the Reactor in Action Item #12. Lining up makeup to the Isolation Condenser shell will ensure makeup prior to uncovering the tubes. Supports Action Item#8
4	25 min	After it is determined that the EDGS can not be started locally, line up the SBO combustion turbines to the "B" 4160 bus IAW ABN-37 SBO procedure.	N	Lines up the SBO transformer and CT to the "B" bus ABN-37
5	25 min	Vent the Main Generator	N	This action will remove the bulk of the hydrogen from the Generator prior to loss of the ESOP, and support load shed of the "A" station battery.
6	1 hr	When it is determined that a combustion turbine can not be started and placed on the "B" bus • Personnel dispatched to FLEX strategy for supplying temporary power to battery chargers via normal power supplies (VMCC'S) through USS 1A2 and 1B2 from a 480VAC portable generator	N	Worst case for combustion turbine restart is the running turbine is available for restart at T=0. Turbine coast down time to restart and electrical line-ups would take 1 hr. (Reference ST 678.4.005)

7	1.5 hrs	Complete "A", "B" and "C" battery load shed	**Y**	This action will extend the battery coping time to support DC instrumentation and DC valve operation.
8	1.5 hrs	Makeup from the FLEX pump for supplying water to the Isolation Condenser shell-side.	**Y**	Time critical. Makeup must be available to allow continued use of the Isolation Condenser prior to uncovering the Isolation Condenser tube bundle.
9	2.5 hrs	Energize 480VAC USS's 1A2 and 1B2 using the portable generator. • Restore power to the station battery chargers • Restore power to the MCC's required to isolate the recirculation loop isolation valves.	**N**	Restoring power to the USS's will support restoration of the battery chargers and isolation of the recirculation loops. Restoration of MCC's will support action item #10
10	3 hrs	Close the Recirculation loop suction, discharge and discharge bypass valves on 4 loops.	**Y**	Isolating 4 of the 5 recirculation loops will reduce RPV leakage and ensure 1 loop un-isolated to maintain a flow path for the Isolation Condenser condensate return to the core.
11	3.5 hrs	FLEX pump connected for Reactor makeup complete.	**N**	Supports injection at 3.8 hrs.
12	3.8 hrs	Commence injecting into the reactor using the FLEX pump; restore level to the normal band	**Y**	Use of Isolation Condensers and injection at this point supports

				maintaining acceptable containment limits.
13	6 hrs.	Commence lining up the FLEX pumps to provide spent fuel pool makeup.	N	Supports Action Item 14.
14	12 hrs	Initiate makeup to the Spent Fuel Pool using FLEX pump strategy.	Y	Initiating makeup at 12 hrs. ensures adequate cooling/ level is maintained.
15	25 hrs. to 72 hrs.	Continue to maintain critical functions of core cooling (via IC and FLEX Pump injection), containment (via hardened vent opening) and SFP cooling (FLEX pump injection to SFP). Utilize initial RRC equipment in spare capacity.	N	Ensures long term cooling of the Reactor, containment and the spent fuel pool.

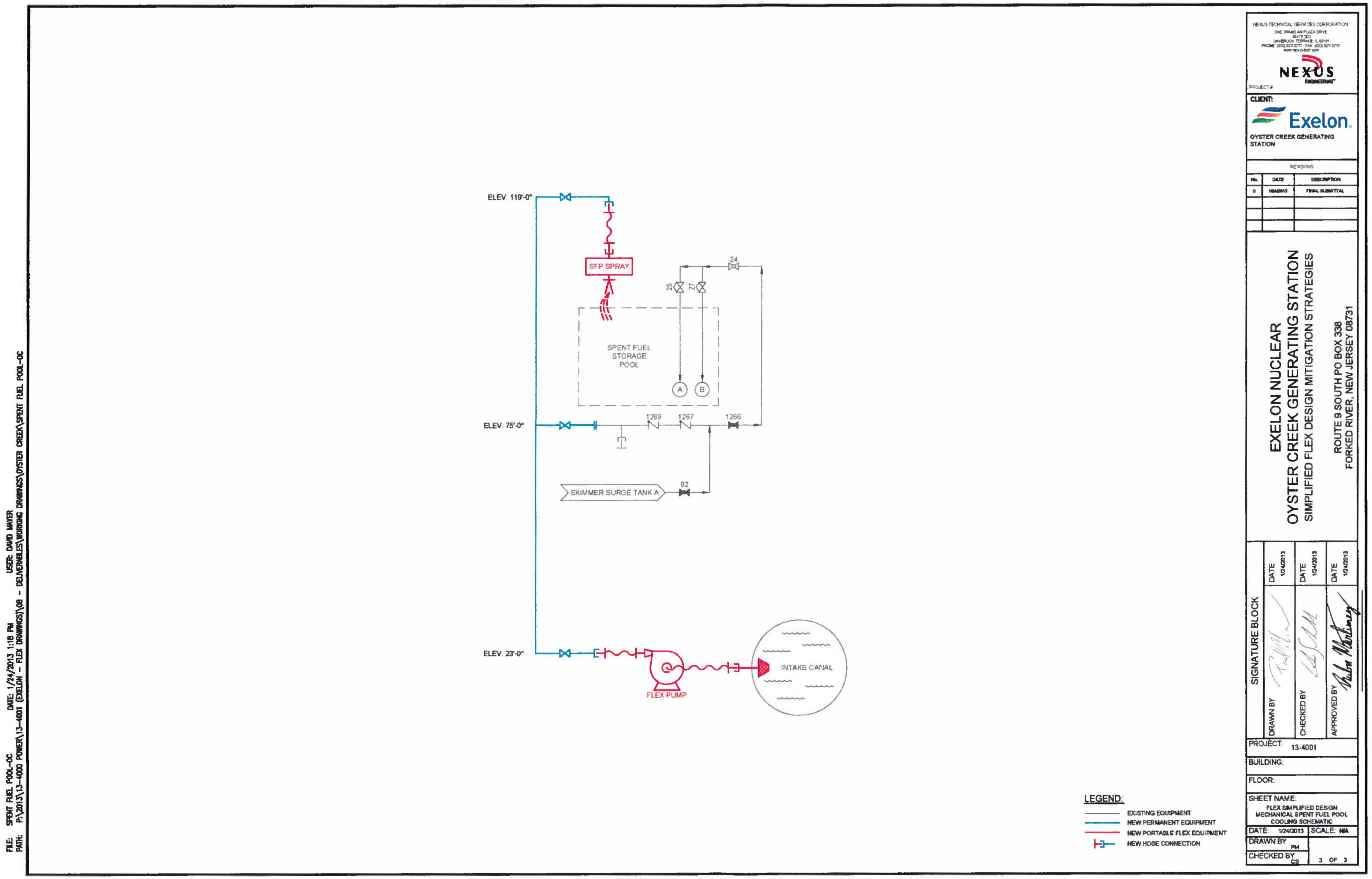
Attachment 2
Milestone Schedule

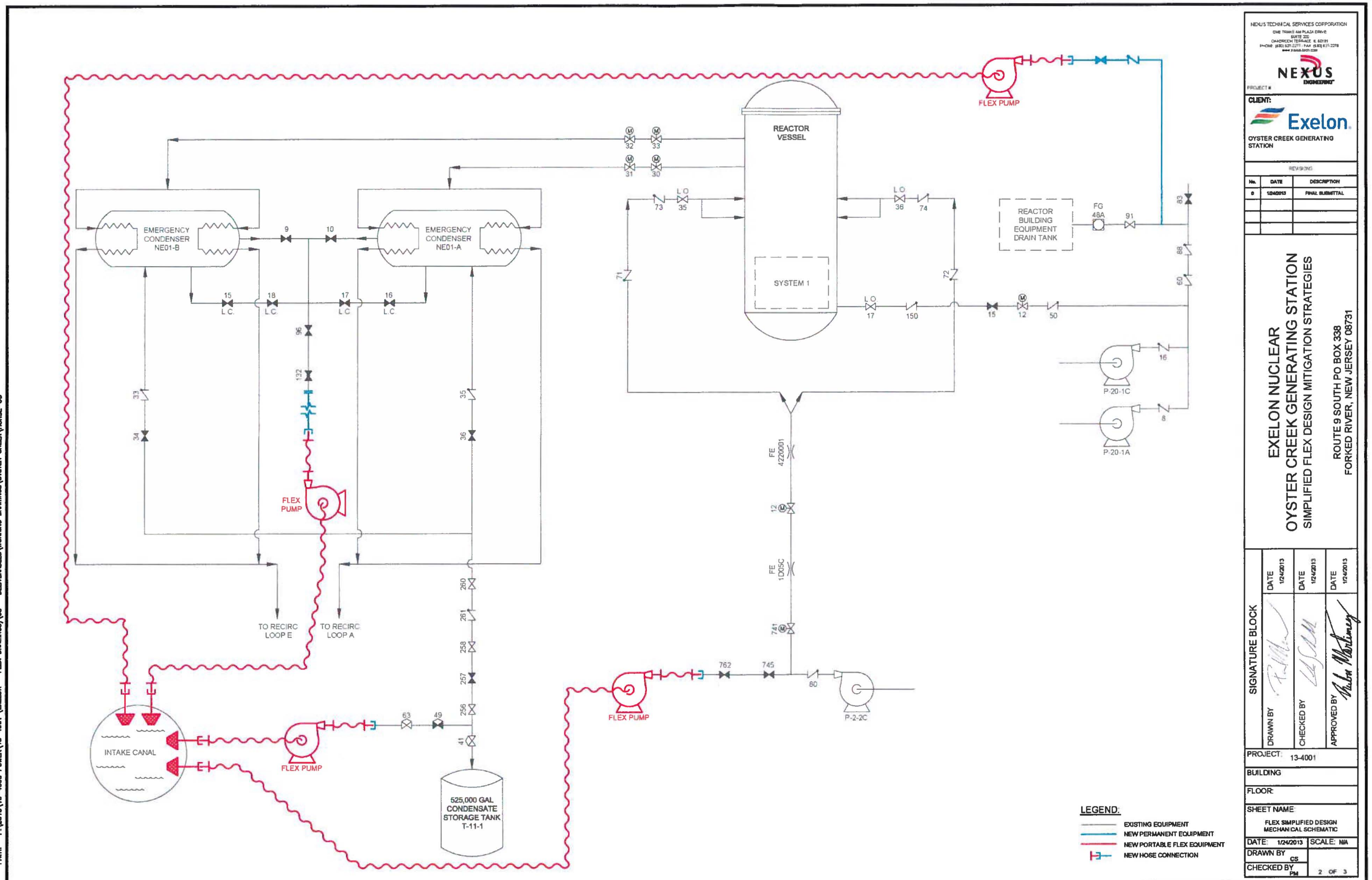
Original Target Completion Date	Activity	Status {Include date changes in this column}
	Submit 60 Day Status Report	Complete
	Submit Overall Integrated Implementation Plan	Complete
	Contract with RRC	Complete
Recurring action, Aug and Feb	Submit 6-month updates	Ongoing
	Modification Development	
Aug 2015	• Phase 1 modifications	Note 1
Aug 2015	• Phase 2 modifications	Note 1
Aug 2015	• Phase 3 modifications	Note 1
	Modification Implementation	
Oct 2016	• Phase 1 modifications	Note 1
Oct 2016	• Phase 2 modifications	Note 1
Oct 2016	• Phase 3 modifications	Note 1
	Procedure development	
Oct 2016	• Strategy procedures	Note 1
Oct 2016	• Maintenance procedures	Note 1
Jun 2016	Staffing analysis	Note 1
Oct 2016	Storage Plan and construction	Note 1
Oct 2016	FLEX equipment acquisition	Note 1
Oct 2016	Training completion	Note 1
Dec 2015	Regional Response Center Operational	(will be a standard date from RRC)
Oct 2016	Unit 1 Implementation date	Note 1

Note(s):

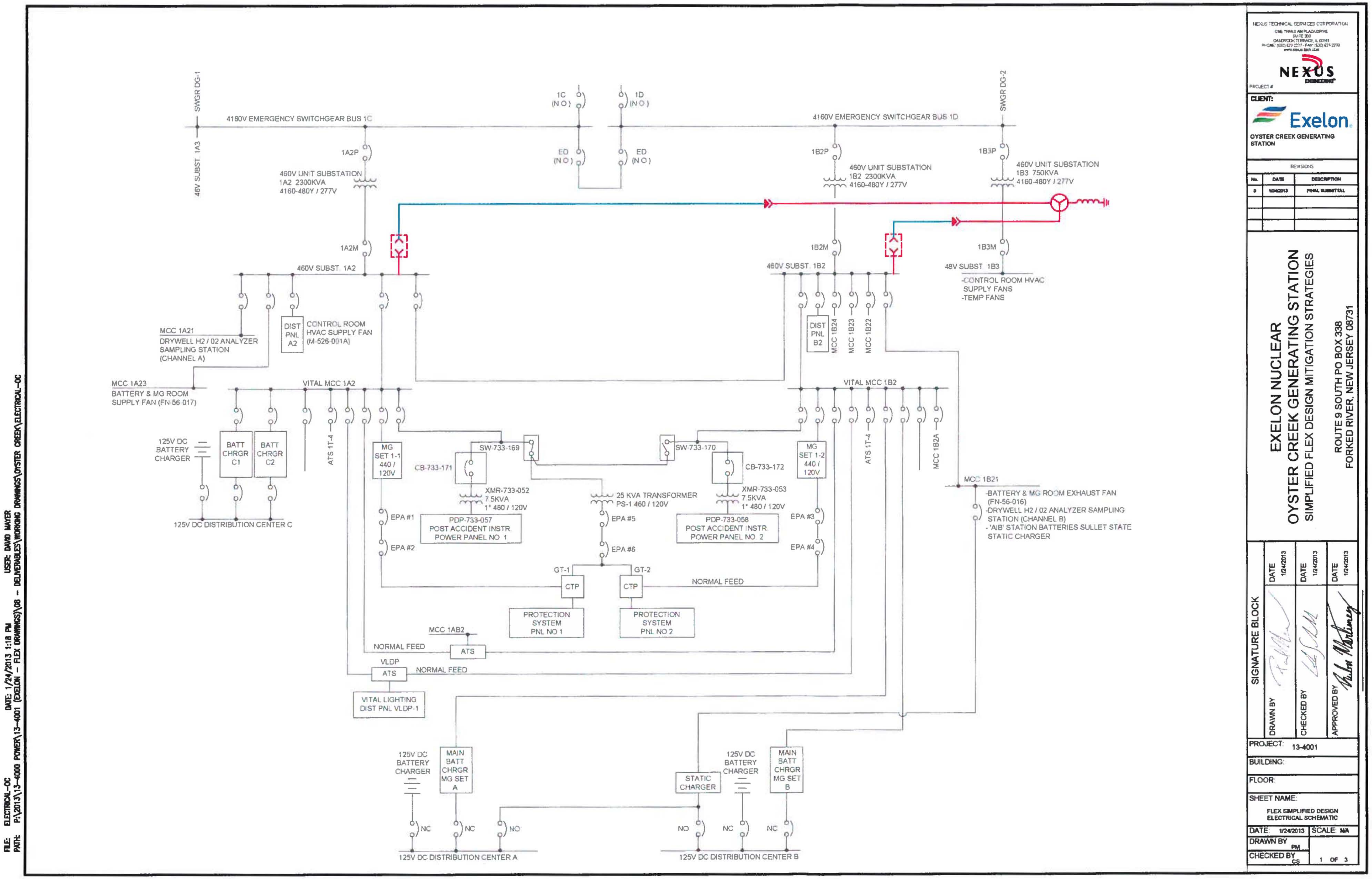
Exelon will update the status of ongoing and future milestones in the Integrated Plan for Oyster Creek during a scheduled 6-month update. This update will include any changes to the milestone schedule as submitted in the February 28, 2013 Integrated Plan.

Attachment 3
Conceptual Sketches





FILE: HORSE-OC DATE: 1/24/2013 1:18 PM USER: DAVID MAYER
PATH: P:\2013\13-4000 POWER\13-4001 (EXELON - FLEX DRAWINGS)\08 - DELIVERABLES\WORKING DRAWINGS\OYSTER CREEK\HORSE-OC


4160V EMERGENCY SWITCHGEAR BUS 1C
4160V EMERGENCY SWITCHGEAR BUS 1D
SWGR DG-1
SWGR DG-2
1C (N.O.)
1D (N.O.)
ED (N.O.)
460V UNIT SUBSTATION 1A2 2300KVA 4160-480Y / 277V
460V UNIT SUBSTATION 1B2 2300KVA 4160-480Y / 277V
460V UNIT SUBSTATION 1B3 750KVA 4160-480Y / 277V
460V SUBST. 1A2
460V SUBST. 1B2
48V SUBST. 1B3
-CONTROL ROOM HVAC SUPPLY FANS
-TEMP FANS
MCC 1A21 DRYWELL H2 / O2 ANALYZER SAMPLING STATION (CHANNEL A)
CONTROL ROOM HVAC SUPPLY FAN (M-526-001A)
MCC 1A23 BATTERY & MG ROOM SUPPLY FAN (FN-56-017)
VITAL MCC 1A2
VITAL MCC 1B2
125V DC BATTERY CHARGER
BATT CHRGR C1
BATT CHRGR C2
125V DC DISTRIBUTION CENTER C
MG SET 1-1 440 / 120V
MG SET 1-2 440 / 120V
SW-733-169
SW-733-170
CB-733-171
CB-733-172
XMR-733-052 7.5KVA 1φ 480 / 120V
XMR-733-053 7.5KVA 1φ 480 / 120V
25 KVA TRANSFORMER PS-1 460 / 120V
PDP-733-057 POST ACCIDENT INSTR. POWER PANEL NO. 1
PDP-733-058 POST ACCIDENT INSTR. POWER PANEL NO. 2
EPA #1
EPA #2
EPA #3
EPA #4
EPA #5
EPA #6
GT-1
GT-2
CTP
NORMAL FEED
PROTECTION SYSTEM PNL NO 1
PROTECTION SYSTEM PNL NO 2
MCC 1AB2
ATS
VLDP
VITAL LIGHTING DIST PNL VLDP-1
MCC 1B21
-BATTERY & MG ROOM EXHAUST FAN (FN-56-016)
-DRYWELL H2 / O2 ANALYZER SAMPLING STATION (CHANNEL B)
-'A/B' STATION BATTERIES SULLET STATE STATIC CHARGER
MAIN BATT CHRGR MG SET A
MAIN BATT CHRGR MG SET B
STATIC CHARGER
125V DC DISTRIBUTION CENTER A
125V DC DISTRIBUTION CENTER B
NC
NO
ATS 1T-4
MCC 1B2A
MCC 1B24
MCC 1B23
MCC 1B22
DIST PNL A2
DIST PNL B2
NEXUS
CLIENT:
Exelon
OYSTER CREEK GENERATING STATION
REVISIONS
FINAL SUBMITTAL
EXELON NUCLEAR
OYSTER CREEK GENERATING STATION
SIMPLIFIED FLEX DESIGN MITIGATION STRATEGIES
ROUTE 9 SOUTH PO BOX 338
FORKED RIVER, NEW JERSEY 08731
SIGNATURE BLOCK
DRAWN BY
CHECKED BY
APPROVED BY
PROJECT: 13-4001
BUILDING:
FLOOR:
SHEET NAME: FLEX SIMPLIFIED DESIGN ELECTRICAL SCHEMATIC
DATE: 1/24/2013
SCALE: N/A
DRAWN BY PM
CHECKED BY CS
1 OF 3