Exelon Generation®

10 CFR 50.54(f)

RS-15-063
RA-15-015

March 12, 2015

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

Oyster Creek Nuclear Generating Station, Unit 1
Renewed Facility Operating License No. DPR-16
NRC Docket No. 50-219

Subject: Exelon Generation Company, LLC Response to March 12, 2012, Request for Information Enclosure 2, Recommendation 2.1, Flooding, Required Response 2, Flood Hazard Reevaluation Report and Request for Relief from Flooding Integrated Assessment

References:

1. NRC Letter, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident; dated March 12, 2012.
2. NRC Letter, Prioritization of Response Due Dates for Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Flooding Hazard Reevaluations for Recommendations 2.1 of the Near-Term Task Force Review of Insights From the Fukushima Dai-ichi Accident, dated May 11, 2012.
3. U.S. Nuclear Regulatory Commission, NUREG/CR-7046, "Design-Basis Flood Estimation for Site Characterization at Nuclear Power Plants in the United States of America", dated November 2011.
4. Letter from David L. Skeen, U.S. Nuclear Regulatory Commission, to Joseph E. Pollock, Nuclear Energy Institute – "Trigger Conditions for Performing an Integrated Assessment and Due Date for Response", dated December 3, 2012.
5. U.S. Nuclear Regulatory Commission, JLD-ISG-2012-05, "Guidance for Performing the Integrated Assessment for External Flooding", dated November 30, 2012.
6. Letter from Exelon Generation Company (EGC), LLC to U.S. Nuclear Regulatory Commission, "180-day Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Flooding Aspects of Recommendation 2.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated November 19, 2012 (RS-12-178 and RA-12-117) (Oyster Creek Nuclear Generating Station).

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7. NRC Letter, Endorsement of Nuclear Energy Institute (NEI) 12-07, "Guidelines For Performing Verification Walkdowns of Plant Flood Protection Features," dated May 31, 2012.
8. Letter from Exelon Generation Company, LLC, Permanent Cessation of Operations at Oyster Creek Nuclear Generating station, dated January 7, 2011.
9. Letter from AmerGen to U.S. Nuclear Regulatory Commission, Oyster Creek Generating Station, Docket No. 50-219, Reply to RAI (Request for Additional Information) on IPEEE (Individual Plant Examination of External Events), dated August 17, 2000.

On March 12, 2012, the NRC issued Reference 1 to request information associated with Near-Term Task Force (NTTF) Recommendation 2.1 for Flooding. One of the Required Responses in this letter directed licensees to submit a Flood Hazard Reevaluation Report (FHRR), including the interim action plan requested in Item 1.d of Reference 1, Enclosure 2, if appropriate. On May 11, 2012, the NRC issued the prioritization plan developed by the NRC and resultant Flood Hazard Reevaluation due dates for all sites. Reference 2, Enclosure 1 identified Oyster Creek Nuclear Generating Station, Unit 1, as a Category 3 Site requiring a Flood Hazard Reevaluation Report submittal due date of March 12, 2015. The information in the enclosed provides the Oyster Creek Nuclear Generating Station, Unit 1, Flood Hazard Reevaluation Reports. The Oyster Creek Nuclear Generating Station, Unit 1, Flood Hazard Reevaluation Reports follow the reevaluation process described in Reference 3.

Information Requested in Reference 1, Enclosure 2

a. Site information related to the flood hazard. Relevant SSCs important to safety and the UHS are included in the scope of this reevaluation, and pertinent data concerning these SSCs should be included. Other relevant site data includes the following:

i. Detailed site information (both designed and as-built), including present-day site layout, elevation of pertinent SSCs important to safety, site topography, as well as pertinent spatial and temporal data sets;

Response:

- Site layout and topography – See Sections 3a and 3b, and Figure 2 of Enclosure 1.
- Pertinent Site Data is provided in Enclosure 3.

ii. Current design basis flood elevations for all flood causing mechanisms;

Response:

- See Section 2d of Enclosure 1 and Section 2a of Enclosure 2, which describe the current design basis flood hazards for all flood causing mechanisms.

iii. Flood-related changes to the licensing basis and any flood protection changes (including mitigation) since license issuance;

Response:

- See Section 2b of Enclosure 2 for a description of flood-related changes to the licensing basis and any flood protection changes (including mitigation) since license issuance.

iv. Changes to the watershed and local area since license issuance;

Response:

- See Section 2c of Enclosure 2 for a description of changes to the watershed and local area since license issuance.

v. Current licensing basis flood protection and pertinent flood mitigation features at the site;

Response:

- See Section 2d of Enclosure 2 for a description of Current License Basis (CLB) flood protection and pertinent flood mitigation features at the site.

vi. Additional site details, as necessary, to assess the flood hazard (i.e., bathymetry, walkdown results, etc.)

Response:

- See Reference 6 for results of the flooding walkdowns.

- See Section 3 of Enclosure 2 for additional site and watershed information used to assess the flood hazard.

b. Evaluation of the flood hazard for each flood causing mechanism, based on present-day methodologies and regulatory guidance. Provide an analysis of each flood causing mechanism that may impact the site including local intense precipitation and site drainage, flooding in streams and rivers, dam breaches and failures, storm surge and seiche, tsunami, channel migration or diversion, and combined effects. Mechanisms that are not applicable at the site may be screened-out; however, a justification should be provided. Provide a basis for inputs and assumptions, methodologies and models used including input and output files, and other pertinent data.

Response:

A description of the flood hazard reevaluation for each flood-causing mechanism and the basis for inputs, assumptions, methodologies, and models are referenced below. Per NRC/NEI public meeting dated January 16, 2013, input-output files are not included with this submittal package but are available upon request.

- Local Intense Precipitation (LIP) and Site Drainage: See Sections 4 and 5 of Enclosure 1.
- Flooding in Streams and Rivers: See Section 3 of Enclosure 2.
- Dam Breaches and Failures: See Section 3 of Enclosure 2.
- Storm Surge: See Section 3 of Enclosure 2.
- Seiche: See Section 3 of Enclosure 2.
- Tsunami: See Section 3 of Enclosure 2.
- Ice-Induced Flooding: See Section 3 of Enclosure 2.
- Channel Migration or Diversion: See Section 3 of Enclosure 2.
- Combined Effects (including wind-waves and runup effects): See Section 3 of Enclosure 2.
- Other Associated Effects (including hydrodynamic/debris loading and effects caused by sediment deposition and erosion): See Section 3 of Enclosure 2.

c. Comparison of current and reevaluated flood causing mechanisms at the site. Provide an assessment of the current design basis flood elevation to the reevaluated flood elevation for each flood causing mechanism. Include how the findings from Enclosure 4 of the 50.54(f) letter (i.e., Recommendation 2.3 flooding walkdowns) support this determination. If the current design basis flood bounds the reevaluated hazard for all flood causing mechanisms, include how this finding was determined.

Response:

This section provides comparisons with the current design basis flood hazard and applicable flood scenario parameters per Section 5.2 of Reference 5, including:

1. Flood height and associated effects
    a. Stillwater elevation;
    b. Wind waves and run-up effects;
    c. Hydrodynamic loading, including debris;
    d. Effects caused by sediment deposition and erosion (e.g., flow velocities, scour);

e. Concurrent site conditions, including adverse weather conditions; and
f. Groundwater ingress.

2. Flood event duration parameters
   a. Warning time (may include information from relevant forecasting methods (e.g., products from local, regional, or national weather forecasting centers) and ascension time of the flood hydrograph to a point (e.g. intermediate water surface elevations) triggering entry into flood procedures and actions by plant personnel);
   b. Period of site preparation (after entry into flood procedures and before flood waters reach site grade);
   c. Period of inundation; and
   d. Period of recession (when flood waters completely recede from site and plant is in safe and stable state that can be maintained).

3. Plant mode(s) of operation during the flood event duration

4. Other relevant plant-specific factors (e.g. waterborne projectiles)

For the Oyster Creek Nuclear Generating Station, the following flood-causing mechanisms were determined to be completely bounded by other mechanisms:

1. Seiche;
2. Tsunami;
3. Ice Induced Flooding;
4. Channel Migration or Diversion; and
5. Combinations in Section H.2 of Reference 3 (Floods caused by Seismic Dam Failure).

Oyster Creek Nuclear Generating Station was considered potentially exposed to the flood hazards (individual flood-causing mechanisms and/or combined-effects flood scenarios per Appendix H of Reference 3) listed below. In some instances, an individual flood-causing mechanism (i.e. Flooding in Streams and Rivers, Dam Breaches and Failure, and Storm Surge) are addressed in one or more of the combined-effect flood scenarios.

1. Local Intense Precipitation

2. Combinations in Section H.3.2 of Reference 3 (Floods along the Shores of Open and Semi-Enclosed Bodies of Water, Streamside Location)

The current design basis flood does not bound the reevaluated hazard for all applicable flood-causing mechanisms, combined-effect floods, associated effects, and/or flood event duration parameters. The tables below summarize the parameters for each flood hazard and provide comparisons with the current design basis flood. The summary below describes how this finding was determined for the applicable flood hazards.

1. Local Intense Precipitation (LIP)

   The maximum reevaluated flood elevation (23.94 feet mean seal level (MSL)) is not bounded by the design basis flood elevation (23.50 feet MSL). Note that the supporting analysis is based on a 2-dimensional model for the LIP flood. Therefore, the calculated flood elevations vary around the plant. The reevaluated LIP flood exceeds the door threshold elevation at only one location, Door DR-814-011 of the Reactor Building (RB) (Door 9 in Enclosure 1). See Table 5, and Figure 4 of Enclosure 1. Table 1 (below) addresses other associated effects and flood event duration parameters.

2. Combinations in Section H.3.2 of Reference 3 (Floods along the Shores of Open and Semi-Enclosed Bodies of Water, Streamside Location)

   Section H.3.2, Reference 3, presents four alternatives (streamside location) for flooding along shores of open or semi-enclosed bodies of water that considers the combined-effects of precipitation-induced flooding, surge/seiche, and wind-wave runup. Alternative 4 (which is the combination of the riverine Probable Maximum Flood (PMF)), upstream dam failure, Probable Maximum Storm Surge (PMSS) from the Probable Maximum Hurricane (PMH), wind-wave activity, and 10% exceedance high tide) bounds Alternatives 1, 2, and 3. The reevaluated stillwater elevations (ranging between 22.68 feet MSL and 23.18 feet MSL) for the prevailing alternative (Alternative 4) is not bounded by the design basis stillwater elevation (22.0 feet MSL). Also, the reevaluated wind-wave runup elevations (ranging between 23.08 feet MSL and 26.58 feet MSL at the Emergency Diesel Generator Building and Site Emergency Building, respectively) for the prevailing alternative is not bounded by the design basis wind-wave runup elevation (23.0 feet MSL). Table 2 (below) addresses other associated effects and flood event duration parameters.

Table 1- Local Intense Precipitation

	Flood Scenario Parameter	Current Design Basis Flood Hazard	Reevaluated Flood Hazard	Bounded (B) or Not Bounded (NB)
Flood Level & Associated Effects	1. Max Stillwater Elevation (ft. MSL)	23.50	23.94	NB
	2. Max Wave Run-up Elevation (ft. MSL)	N/A	N/A	N/A
	3. Max Hydrodynamic/Debris Loading (lb/ft)	See Notes	6.67	B
	4. Effects of Sediment Deposition/Erosion	N/A	N/A	N/A
	5. Concurrent Site Conditions	See Notes	See Notes	B
	6. Effects on Groundwater	N/A	N/A	N/A
Flood Event Duration	7. Warning Time (hours)	N/A	See Notes	NB
	8. Period of Site Preparation (hours)	N/A	See Notes	NB
	9. Period of Inundation (hours)	N/A	1.26	NB
	10. Period of Recession (hours)	N/A	N/A	N/A
Other	11. Plant Mode of Operations	Modes 1-5 or Defueled	Modes 1-5 or Defueled	B
	12. Other Factors	N/A	N/A	N/A

Additional notes, 'N/A' justifications (why a particular parameter is judged not to affect the site), and explanations regarding the bounded/non-bounded determination.

1. None
2. Consideration of wind-wave action for the LIP event is not explicitly required by NUREG/CR-7046 and is judged to be a negligible associated effect because of limited fetch lengths and flow depths.
3. 2-dimensional modeling indicates that the maximum hydrodynamic force per linear foot of structure is 6.67 lbs/ft. The maximum hydrostatic force is 166.83 lbs/ft. This force is bounded by other design basis criteria for protection from external forces, (ECR OC 12-00578, Rev 01, Attachment 1).The debris load for the LIP event is negligible due to flow velocities being too low to produce a significant debris load.
4. Because of generally low velocities, ranging between 0.10 and 2.31 fps around the power block area, sediment transport is not expected to be an effect of LIP flooding. The maximum velocity in the power block area (2.31 fps) is well below permissible velocities for both gravel and paved surfaces (U.S. Army Corps of Engineers (USACE), Engineer Manual EM 1110-3-136, Drainage and Erosion Control Mobilization Construction, April 1984) so erosion and localized scour is also not expected to be an effect of LIP flooding.
5. High winds could be generated concurrent to a LIP event. This was considered bounded because implementation of measures used to protect against the reevaluated LIP event are not affected by concurrent high-winds.
6. Due to the compacted soil and impervious cover around the power block buildings, the infiltration of precipitation and groundwater seepage would likely be minimal. Additionally, the event is a short-duration (1-hour precipitation) which limits the amount of soil infiltration. Therefore, groundwater level changes are not expected to occur.
7. As discussed further in letter item (d), Interim Evaluation and Actions Taken or Planned, Procedure OP-OC-108-109-1001 includes provisions to install sand bags at Door DR-156-204 of the RB to protect Door DR-814-011 of the RB (Door 9 in Enclosure 1) and Door DR-814-044, the entry to the 480 V Switchgear Room. The trigger for installing the sand bags is notification of severe weather as defined in the procedure.
8. The sand bags required for implementation of Procedure OP-OC-108-109-1001 are maintained filled in a Seavan located by the Maintenance shop. Upon notification of flooding potential associated with severe weather, Attachment 1 of Procedure OP-OC-108-109-1001 directs the sand bags be pre-staged at specific locations listed in that attachment. The sand bags for LIP protection at Door DR-156-204 of the RB are to be pre-staged in the Drywell Processing Center near that door. Time to pre-stage and install sand bags is expected to be minimal. Sandbagging Door DR-156-204 provides protection for Door DR-814-011 of the RB (Door 9 in Enclosure 1) and Door DR-814-044, the entry to the 480V Switchgear Room in the RB.
9. Period of inundation is the period of time the flood elevation exceeds the door threshold elevation.
10. Period of recession is included in the period of inundation for LIP.
11. Any plant mode of operation can be expected to exist when the LIP event occurs. See Technical Specifications, Section 1.0, Definitions, for definitions of the various modes.
12. There are no plant-specific factors, including waterborne projectiles, applicable to the LIP flood.

Table 2- Combinations in Section H.3.2 of Reference 3

	Flood Scenario Parameter	Current Design Basis Flood Hazard	Reevaluated Flood Hazard	Bounded (B) or Not Bounded (NB)
Flood Level & Associated Effects	1. Max Stillwater Elevation (ft. MSL)	22.0	23.18	NB
	2. Max Wave Run-up Elevation (ft. MSL)	23.0	26.58	NB
	3. Max Hydrodynamic/Debris Loading (lb/ft)	See note	See note	B
	4. Effects of Sediment Deposition/Erosion	See note	See note	B
	5. Concurrent Site Conditions	See Note	See Note	B
	6. Effects on Groundwater	22.0	23.0	NB
Flood Event Duration	7. Warning Time (hours)	See Note	See Note	B
	8. Period of Site Preparation (hours)	See Note	See Note	B
	9. Period of Inundation (hours)	See Note	See Note	NB
	10. Period of Recession (hours)	See Note	See Note	B
Other	11. Plant Mode of Operations	Modes 1-5 or Defueled	Modes 1-5 or Defueled	B
	12. Other Factors	N/A	N/A	N/A

Additional notes, 'N/A' justifications (why a particular parameter is judged not to affect the site), and explanations regarding the bounded/non-bounded determination.

1. None
2. None
3. See ECR OC 12-00578, Rev 01, Attachment 1.
4. Because of generally low velocities, ranging between 0.6 and 3.5 fps around the power block area, sediment transport is not expected to be an effect of flooding from storm surge. The maximum velocity in the power block area (3.5 fps) is well below permissible velocities for both gravel and paved surfaces (U.S. Army Corps of Engineers (USACE), Engineer Manual EM 1110-3-136, Drainage and Erosion Control Mobilization Construction, April 1984) so erosion and localized scour is also not expected to be an effect of flooding from storm surge.
5. High winds could be generated concurrent to a PMH event. This was considered bounded because implementation of measures used to protect against the reevaluated PMH/PMSS event are not affected by concurrent high-winds.
6. Per Section 2.4.11.5 of the UFSAR (Rev. 19, October 2015 (sic, actually October 2014)), the groundwater table is expected to rise with rising surface water levels during the occurrence of a PMH Event. Therefore, the increase in stillwater level is expected to result in a corresponding increase in groundwater level, up to site grade (nominally at elevation 23.0 feet MSL).
7. This flood-causing mechanism is controlled by a PMH event. Procedure OP-OC-108-109-1001 (Attachment 3) contains monitoring and action triggers and procedures for the design basis hurricane event. Since the reevaluated flood is also generated by a hurricane, this procedure for monitoring and action is still applicable.
8. See Note 7. The available preparation time in the current licensing basis remains applicable to the reevaluated flood.
9. Per Section 3 of Enclosure 2, the period of inundation (duration the reevaluated stillwater level remains above site grade) is approximately 0.3 hour. Note that portions of the site will be subject to additional intermittent flooding from wind-generated waves overtopping site grade.
10. The Period of Recession is minimal since the stillwater inundation depth is shallow. Note that portions of the site will be subject to additional intermittent flooding from wind-generated waves overtopping site grade.
11. Any plant mode of operation can be expected to exist when the PMSS event occurs. See Technical Specifications, Section 1.0, Definitions, for definitions of the various modes.
12. There are no plant-specific factors, including waterborne projectiles, applicable to the PMSS flood.

d. Interim evaluation and actions taken or planned to address any higher flooding hazards relative to the design basis, prior to completion of the integrated assessment described below, if necessary.

Response:

Integrated Assessment Trigger

Per Enclosure 2 of Reference 1, an Integrated Assessment is required for plants where the current design basis floods do not bound the reevaluated hazard for all flood causing mechanisms. Reference 4 presents four approaches for performing an Integrated Assessment based on the results of the flood hazard reevaluation.

Scenario 1 - Reevaluated Hazard Bounded by Design Basis
Scenario 2 - Only Local Intense Precipitation
Scenario 3 - All Permanent and Passive Flood Protection
Scenario 4 - Integrated Assessment Required

An Integrated Assessment is not necessary in Scenario 1. Limited evaluations can be conducted and submitted with the Flood Hazard Reevaluation Report under Scenarios 2 and 3 that only address specific sections of the Integrated Assessment Interim Staff Guidance (Reference 5). Licensees in Scenario 4 and those not including limited evaluations in the Flood Hazard Reevaluation Report under Scenarios 2 and 3 are required to perform a full Integrated Assessment.

Per "Part c" above, the design basis flood does not bound the reevaluated hazard for all applicable flood-causing mechanisms and combined-effect floods. Specifically, local intense precipitation and combined-effect flood combinations H.3.2 were not bounded by the design basis flood hazard, which would normally trigger an Integrated Assessment (Scenario 4). Per Enclosure 2 of Reference 1, the Integrated Assessment would be due 2 years from the date of this submittal or March 12, 2017. The current guidance for performing an Integrated Assessment is contained in Reference 5.

In Reference 8, EGC had previously notified the NRC of EGC's plans to permanently shut down Oyster Creek and cease operation no later than December 31, 2019. EGC has evaluated the flood hazard vulnerabilities and concluded that relief from developing the Integrated Assessment is reasonable considering the limited remaining plant operating life at the time of completion of the Integrated Assessment, the additional actions implemented to address the non-bounded flood hazards, and the low probability of occurrence (discussed further below). The existing flood hazard mitigation capabilities along with the implementation of FLEX Order mitigation strategies in the Fall of 2016 provide additional defense-in-depth measures and enhanced plant capability to mitigate the consequences of a beyond-design-basis external flood event. Additional flood hazard actions being taken to further reduce impacts of beyond-design-basis flood hazards, described below, will be maintained for the remainder of the plant operating life. Therefore, the requested relief does not pose a significant increase in plant risk and does not reduce nuclear safety or safe plant

operations. Accordingly, EGC is requesting relief from developing a 2-year Integrated Assessment based on the following justifications and additional actions taken or planned:

- The reevaluated LIP flood exceeds existing incorporated/passive protection at only one door location. Actions have been taken to protect against floodwater ingress at this door as described below.

- The reevaluated PMSS (calculated under the Combinations in Section H.3.2 of Reference 3) peak stillwater elevation is below the existing incorporated/passive protection elevation of 23.50 feet MSL and the annual exceedance probability of this event is well below $1x10^{-6}$.

- A robust set of actions (described below) have been taken or are under development to provide protection of key safety functions based on a thorough assessment of the flood hazard impacts.

- Oyster Creek's FLEX implementation, scheduled to be complete prior to restart from the OC1R26 refuel outage (Fall 2016), will provide defense-in-depth mitigation capability to an already robust set of actions described below. It is anticipated that NEI 12-06 Revision 1 will contain guidance on performing an Integrated Assessment on FLEX implementation to demonstrate its effectiveness with respect to reevaluated flood hazard results. Oyster Creek's FLEX mitigation strategy will not need modifications or upgrades to remain effective during the flood hazards described in this report.

- The PMH that generates the reevaluated PMSS peak level is conservatively estimated to have a very low annual exceedance probability of $1.7x10^{-6}$. When combined with other coincidental events required by Section H.3.2 of Reference 3 Combined-Effects Flood, the annual exceedance probability decreases to well below this level. (See Enclosure 2, Section 3.) As the incorporated/passive protection is not challenged by the PMSS peak stillwater level, the risk to the station from storm surge is estimated to be extremely low.

Interim Evaluation and Actions Taken or Planned

Cases where the design basis floods do not bound the reevaluated hazard for all applicable flood-causing mechanisms require an interim evaluation and description of actions taken or planned to address any higher flooding hazards. The following summarizes the assessment of impacts on the plant and interim evaluations and actions taken or planned. As stated above, additional actions being taken will be maintained for the remainder of the plant operating life, and provide additional compensatory measures in lieu of performing the Integrated Assessment.

1. Impact Assessment for Local Intense Precipitation

   - The results show that the predicted maximum LIP flooding water surface elevations at the main doors and bays of the site buildings range between 22.48

feet and 23.94 feet MSL, which is 1.02 feet lower to 0.44 feet higher than the plant grade elevation (23.5 feet MSL). The results show that the approximate water surface elevation near the MAC facility and on the north side of the RB could be above the first floor elevation for approximately 1.26 hours. The water level would exceed grade at the RB Door DR-814-011 (Door 9 in Enclosure 1), which is referenced in the evaluation. The approximate water surface elevations at the other doors evaluated in the study are below the plant grade elevation.

- Information regarding the licensing bases LIP flooding evaluation is discussed in Reference 9. The results of the analysis showed that a water surface elevation of 23.6 feet MSL could occur in areas adjacent to the north, east, and south sides of the RB. The analysis concluded that water intrusion in other buildings would not lead to severe accidents, since the turbine building or diesel generator building would not be affected by the flooding. The only potential water entry would be the RB; however, the entrances are kept closed during normal operation. The analysis states that the forces exerted on the airlock doors by approximately one inch of water along the base is negligible compared to the pressure of 0.25 inches of water over the entire door surface, and therefore would remain in place minimizing water intrusion into the building.

- Oyster Creek performed flooding walkdowns to verify that plant features credited in the current licensing basis (CLB) for protection and mitigation from external flood events are available, functional, and properly maintained to address Recommendation 2.3 of NRC 10CFR50.54(f) letter (dated March 12, 2012). All features in the high water affected zone in LIP-122 were considered and IR 1442532 considered small Available Physical Margin (APM) in the zone. With water ponding levels 0.44 feet above grade, the core spray fire water supply (V-20-83) reach rod still has 1 foot of margin. With regards to the door used as a reference point (DR-814-11), it is not in direct contact with the exterior of the RB. The IPEEE response (Reference 9) did not take credit for the MAC facility structure, so a similar conclusion can be drawn. If water ponding at the door is at 0.44 feet, 5 inches of water along the base is negligible compared to the pressure of 0.25 inch of water over the entire door surface, and therefore would remain in place minimizing water intrusion into the RB.

- It should be noted that most of the vital power panels are located in the 480V Switchgear Room in the RB. This door (DR-814-044) is located directly across from DR-156-204. The MAC facility is not considered part of the RB, but is in direct contact. The MAC facility acts as a barrier, so the water ponding would have to exceed the building foundation elevation before coming in contact with the doors. As part of a site walkdown, it was noted that the top of the MAC facility foundation is over two feet higher than the new LIP level of 23.94 feet MSL.

2. Impact Assessment for PMSS (Combinations in Section H.3.2 of Reference 3 (Floods along the Shores of Open and Semi-Enclosed Bodies of Water, Streamside Location))

- The wave runup at OCNGS varies by location and ranges from 0.7 feet to 3.7 feet. The PMSS stillwater elevation ranges from 22.68 feet MSL to 23.18 feet MSL.

- An assessment of the impacts from this combined-effect flood (including wind-waves) are as follows:

  - Intake Structure is now at 23.18 feet MSL, which is improved margin compared to 23.5 feet MSL in the CLB.

  - RB is now at 23.48 feet MSL, which is improved margin compared to 23.5 feet MSL in the CLB. However the governing condition is still the LIP elevation which is 23.94 feet MSL on the north side of the RB. This has been evaluated under IR 01563465.

  - Material Warehouse is now at 24.78 feet MSL along east side of the building compared to 23.5 feet MSL in the CLB. There is no safety related equipment in this structure. Also, the B.5.B pump and equipment are on a flatbed, so this flood elevation will not impact these components.

  - Independent Spent Fuel Storage Installation (ISFSI) is now at 25.38 feet MSL compared to 23.5 feet MSL in the CLB. By its massive nature and back-to-back side-by-side configurations, a NUHOMS ISFSI has substantial capacity to resist flowing water, wave actions and flooding due to extreme precipitation runoff or storm-induced tides. Although it is desirable that the ISFSI be located above the probable maximum flood height, the DSC and HSM are well suited for flood heights up to 5'-8" above the basemat (for extended periods) with no effect on thermal, criticality, or structural safety margins. The NUHOMS system is designed to withstand a 50 foot hydrostatic head of water and a maximum flow velocity of 15 feet per second (Reference ISFSI UFSAR, Rev 011, Sections 2.4, 3.2.2 and 8.2.4).

  - Site Emergency Building is now at 26.58 feet MSL along the east side of the building. Compared to 23.5 feet MSL in the CLB, this can produce challenges to the Technical Support Center (TSC). The TSC may, if needed, be evacuated. There is no vital plant equipment in this building.

  - Administration Building (OCAB) is now at 25.38 feet MSL compared to 23.5 feet MSL in the CLB. This is a commercial office building. There is no vital plant equipment in this building.

  - Turbine Building is now at 25.88 feet MSL along east side of the building. Compared to 23.5 feet MSL in the CLB, this could impact the Motor-Generator Set Room, RB Equipment Drain Tank/ Containment Spray pumps.

  - Emergency Diesel Generator Building is now at 23.08 feet MSL, which is improved margin compared to 23.5 ft MSL in the CLB.

3. Interim Evaluation and Actions Taken or Planned

- Based on the results of this reevaluation, the following additional protection and mitigation actions have been completed or are planned:

  LIP

  - OP-OC-108-109-1001, Attachments 1, 4 and 6, contain procedures for flooding due to "heavy rains, snow melt, etc." and the installation of sand bags. Sand bags are maintained filled in a Seavan located by the Maintenance Shop. Upon notification of flooding potential associated with Severe Weather as defined in Procedure OP-OC-108-109-1001, the procedure directs the sand bags be pre-staged at specific locations listed in the procedure. Sand bags for installation at Door DR-156-204 will be pre-staged in the Drywell Processing Center near the door. There is minimal preparation and installation time required. Sandbagging Door DR-156-204 provides protection for Door DR-814-011, RB Northwest Airlock (Door 9 in Enclosure 1), and Door DR-814-044, RB 480 Volt Switchgear Room. (complete)

  PMSS (Combinations in Section H.3.2 of Reference 3)

  - Revised procedure OP-OC-108-109-1001 to have sand bags staged at the entrances to Site Emergency Building and Turbine Building. (complete)

  - Revised procedure OP-OC-108-109-1001 to have additional sand bags staged at the Administration Building and Material Warehouse to protect assets. (complete)

  - An assessment of the impact of hydrodynamic and debris loads was conducted under ECR OC 12-00578, Rev 01, Attachment 1. The assessment indicated that these loads are bounded by current licensing basis impact loads. (complete)

  - A structural analysis was conducted under AR 01539938 to evaluate an additional 1.5 feet of hydrostatic load on the RB, Turbine Building, Emergency Diesel Generator Building, pipe vault, pipe trench between the Turbine Building and Condensate Storage Tank, vault between the Turbine Building and RB, and RB south wall vaults. The results indicate that these structures have sufficient capacity to accommodate the additional hydrostatic load. (complete)

  Both LIP and PMSS

  - The Material Warehouse stores a B.5.B pump for defense-in-depth. It is not needed for FLEX or flood mitigation. (complete)

- Conduct a site walkdown and review of plant records to identify other potential entry points for ingress of external floodwater into protected areas of the plant based on the reevaluated flood levels. Identify additional actions needed to prevent ingress of external floodwater in areas where ingress could compromise safety functions. Confirm sufficient supply and configuration of sand bags at reevaluated flood levels. (planned)

- Ensure the FLEX strategy can be implemented with the reevaluated flood. (planned)

The above actions planned and completed will protect plant equipment needed to maintain safe shutdown.

e. Additional actions beyond Requested Information item 1.d taken or planned to address flooding hazards, if any.

Response:

- None required.

A list of regulatory commitments contained in this letter is provided in Enclosure 4.

If you have any questions regarding this submittal, please contact Ron Gaston at (630) 657-3359.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 12th day of March 2015.

Respectfully submitted,

James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Enclosures:

1. Oyster Creek Nuclear Generating Station, Local Intense Precipitation Evaluation Report, Revision 6
2. Oyster Creek Nuclear Generating Station, Flood Hazard Reevaluation Report, Revision 1
3. CD-R labeled: "Oyster Creek Nuclear Generating Station Flood Hazard Reevaluation Pertinent Site Data"
   Document Components:
   Pertinent Site Data (requires AutoCAD or similar program)
4. Summary of Regulatory Commitments

cc: Director, Office of Nuclear Reactor Regulation (w/o Enclosure 3)
NRC Regional Administrator – NRC Region I (w/o Enclosure 3)
NRC Senior Resident Inspector – Oyster Creek Nuclear Generating Station
NRC Project Manager, NRR – Oyster Creek Nuclear Generating Station
Mr. Robert F. Kuntz, NRR/JLD/JHMB, NRC
Mr. Victor E. Hall, NRR/JLD/JHMB, NRC
Manager, Bureau of Nuclear Engineering – New Jersey Department of Environmental Protection
Mayor of Lacey Township, Forked River, NJ