Exelon Generation®

10 CFR 50.54(f)

RS-12-172

November 19, 2012

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Limerick Generating Station, Units 1 and 2
Facility Operating License Nos. NPF-39 and NPF-85
NRC Docket Nos. 50-352 and 50-353

Subject: Exelon Generation Company, LLC's 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

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. Exelon Generation Company, LLC's 90-day Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding Recommendations 2.1 and 2.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (Flooding), dated June 11, 2012
3. NRC Letter, Endorsement of Nuclear Energy Institute (NEI) 12-07, "Guidelines For Performing Verification Walkdowns of Plant Flood Protection Features," dated May 31, 2012

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Reference 1 to all power reactor licensees. Enclosure 4 of Reference 1 contains specific Requested Actions, Requested Information, and Required Responses associated with Recommendation 2.3 for Flooding. On June 11, 2012, Exelon Generation Company, LLC (EGC) submitted the 90-day response (Reference 2) requested in Enclosure 4 of Reference 1, confirming that EGC would use the NRC-endorsed flooding walkdown procedure.

For flooding Recommendation 2.3 (walkdowns), Enclosure 4 of Reference 1 states that within 180 days of the NRC's endorsement of the walkdown process (Reference 3), each addressee will submit a final response, including a list of any areas that are unable to be inspected due to inaccessibility and a schedule for when the walkdown will be completed. This letter provides the Limerick Generating Station, Units 1 and 2 (LGS Units 1 and 2) 180-day response to Reference 1 for Flooding Recommendation 2.3.

Conditions identified during the walkdowns were documented and entered into the corrective action program.

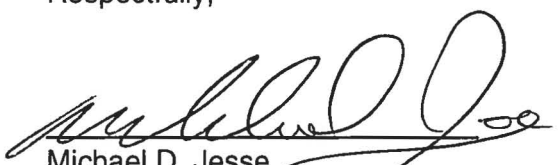
Enclosure 1 to this letter provides the requested information for LGS Units 1 and 2.

This letter contains new regulatory commitments, which are identified in Enclosure 2.

Should you have any questions concerning the content of this letter, please contact Ron Gaston at (630) 657-3359.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 19th day of November 2012.

Respectfully,



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

Enclosures:

1. Flooding Walkdown Report In Response To The 50.54(f) Information Request Regarding Near-Term Task Force Recommendation 2.3: Flooding for the Limerick Generating Station, Units 1 and 2

2. Summary of Regulatory Commitments

cc: Director, Office of Nuclear Reactor Regulation
Regional Administrator - NRC Region I
NRC Senior Resident Inspector – LGS Units 1 and 2
NRC Project Manager, NRR – LGS Units 1 and 2
Director, Bureau of Radiation Protection – Pennsylvania Department of Environmental Resources
R. R. Janati, Chief, Division of Nuclear Safety, Pennsylvania Department of Environmental Protection, Bureau of Radiation Protection

Enclosure 1

Flooding Walkdown Report In Response To The 50.54(f) Information Request Regarding Near-Term Task Force Recommendation 2.3: Flooding for the Limerick Generating Station, Units 1 and 2

(34 pages)

FLOODING WALKDOWN REPORT

IN RESPONSE TO THE 50.54(f) INFORMATION REQUEST REGARDING NEAR-TERM TASK FORCE RECOMMENDATION 2.3: FLOODING

For the

LIMERICK GENERATING STATION
3146 Sanatoga Road
Pottstown, PA 19464
Facility Operating License No. NPF-39 and NPF-85
NRC Docket No. 50-352 and 50-353

Exelon Generation Company, LLC

Prepared by:
ENERCON SERVICES
400 VALLEY ROAD
MT. ARLINGTON N.J.

November 2, 2012

	Printed Name	Signature	Date
EOC Preparer:	Paul N. Hansen/Engineering Manager	Paul N Hansen	11/2/2012
EOC Reviewer:	Charles Thom/Mechanical Design	Charles T. Thom	11/2/2012
EOC Approver:	Ray Sacramo/Project Manager	Paul N Hansen For Ray Sacramo	11/2/2012
Lead Responsible Engineer:	Brian Wehrman		11/8/12
Branch Manager:	Gregory A Wallace		11/8/12
Senior Manager Design Engineering:	Wayne Lewis		11/8/12
Corporate Acceptance:	Joseph V. Bellini		11/08/12

Contents

1. EXECUTIVE SUMMARY

The purpose of this report is to document the approach and results of the flooding walk downs at the Limerick Generating Station (LGS) required by the NRC following the accident at the Fukushima-Dai-ichi power plant. The method used for the walk down is based on guidance developed by NEI and documented in NEI 12-07. The scope is to review the site's current licensing basis flood. An understanding of the flood event is established and evaluated against the site's existing flood boundary drawings. The flood boundary drawings form the basis for establishing the list of flood protection features.

A list of flood protection features was developed and presented to the site's lead engineer and the flooding subject matter expert (SME). Once agreement was reached the flood walk down forms were developed and the walk downs were planned. Using the flood walk down forms the teams performed the walk downs and documented the findings.

During the walk down it was determined that a number of the flood barrier doors had worn seals that need to be repaired. These seals could not be immediately judged as acceptable so the observations were entered into the Corrective Action Program (CAP). The table presented in this summary lists the IR's issued along with brief description of the issue, the evaluation of the issue, and the plan for ultimate resolution.

IR Number	Observation Description	IR Disposition
01398543	Door 242 Stairway to Exterior Door Bottom Skirt damaged	• Door 242 is functional • Replace bottom skirt of door 242.
01397696	Door 284 Condensate Pump Room Seal attachment to the bottom sill damaged	• Door 284 is functional • Repair seal at the sill of Door 284
01399294	Door 205 23-Line Double Door. Seal is detached in one corner.	• Door 205 is functional • Repair the detached seal of Door 205
01398500	Doors 204N and 288N seals are degraded.	• Both Doors are functional • Replace Seals of both doors
01398114	Doors 146, 150, and 151 seals are degraded.	• Doors are functional • Repair three Door seals

The LGS site includes a number of manholes that deliver electrical conduits to the power block. Two of these manholes were resolved by inspection of the power block side of the associated conduits and did not require entry (MH085 and MH086). Several others could not be completely resolved so that a visual inspection would be required. Of these manholes, three (MH077, MH001 and MH002) were inspected using video camera on a pole lowered into the manhole. The video evidence did not capture every conduit in the manhole; however those that were captured were either capped or provided with a seal. Although not a complete inspection it provides reasonable assurance that the conduits contain internal seals that will prevent water flowing into the power block.

The manholes listed below in the yard area were declared as inaccessible access features because of electrical hazard. Based on video inspections of the three manholes it is reasonable to conclude that the conduits associated with all of these manholes will not provide a path for water to enter the power block.

Description	Reason for Inaccessible Access Determination
MH001	High Voltage cables (13kV) represent hazard for entry.
MH002	High Voltage cables (13kV) represent hazard for entry.
MH077	High Voltage cables (13kV) represent hazard for entry.
MH095	High Voltage lines overhead from main transformers considered a hazard.
MH101	High Voltage cables (13kV) represent hazard for entry.
MH102	High Voltage cables (13kV) represent hazard for entry.

Two remaining manholes in the yard (MH214 and MH215, the ESW valve pits) were declared as restricted access and were not entered. Per the UFSAR Section 3.4.1.1, the ESW valve pits may be covered during a flood event. These valve pits are reinforced concrete boxes and are equipped with solid steel manhole covers with gaskets. These manholes, including the cover and gasket, are inspected every two years per recurring work order A1602006. The previous inspections, performed in 2011, showed no issues with the valve pits, including the cover and gasket. Since these items are on a recurring PM every two years and since no issues were found during the previous inspection, these pits do not need to be inspected at this time.

The final restricted access feature is the weir wall for Unit 2. This feature could not be inspected because it was in a high radiation area. This feature is an important feature in that it provides an immediate barrier between the flood waters moving across the site and the power block. The weir wall needs to be inspected to ensure it is per design and in good condition. The weir wall inspection has been deferred until Li2R12 beginning in March 2013. The deferral is considered to be acceptable since the weir wall inspection of the feature for Unit 1 showed that it was in good condition as per design.

2. PURPOSE

a. Background

In response to the nuclear fuel damage at the Fukushima-Dai-ichi power plant due to the March 11, 2011 earthquake and subsequent tsunami, the United States Nuclear Regulatory Commission (NRC) established the Near Term Task Force (NTTF) to conduct a systematic review of NRC processes and regulations, and to make recommendations to the Commission for its policy direction. The NTTF reported a set of recommendations that were intended to clarify and strengthen the regulatory framework for protection against natural phenomena.

On March 12, 2012, the NRC issued an information request pursuant to Title 10 of the Code of Federal Regulations, Section 50.54 (f) (10 CFR 50.54(f) or 50.54(f)) (Reference 3) which included six (6) enclosures:

- NTTF Recommendation 2.1: Seismic

- NTTF Recommendation 2.1: Flooding
- NTTF Recommendation 2.3: Seismic
- NTTF Recommendation 2.3: Flooding
- NTTF Recommendation 9.3: EP
- Licensees and Holders of Construction Permits

In Enclosure 4 of Reference 3, the NRC requested that licensees "perform flood protection walk-downs to identify and address plant-specific degraded, nonconforming, or unanalyzed conditions and cliff-edge effects (through the corrective action program) and verify the adequacy of monitoring and maintenance procedures," (See note below regarding "cliff-edge effects").

Structures, systems, and components (SSCs) important to safety are designed either in accordance with, or meet the intent of, Appendix A to 10 CFR Part 50, General Design Criteria (GDC) 2. GDC 2 states that SSCs important to safety at nuclear power plants must be designed to withstand the effects of natural phenomena, including floods, without loss of capability to perform their intended safety functions. For flooding walk-downs, identifying/addressing plant-specific degraded, nonconforming, or unanalyzed conditions (through the corrective action program) and verifying the adequacy of monitoring and maintenance procedures associated with flood protection and mitigation features credited in the current design/licensing basis. New flood hazard information will be considered in response to Enclosure 2 of Reference 3.

On behalf of Exelon Generation Company, LLC (Exelon), this report provides the information requested in the March 12, 50.54(f) letter; specifically, the information listed under the "Requested Information" section of Enclosure 4, paragraph 2 ("a" through "h"). The 'Requested Information' section of Enclosure 4, paragraph 1 ("a" through "j"), regarding flooding walk-down procedures, was addressed via Exelon's June 11, 2012, acceptance (Reference 1) of the industry walk-down guidance (Reference 2).

Note Regarding Cliff-Edge Effects

Cliff-edge effects were defined by the NTTF Report (Reference 5), which noted that "the safety consequences of a flooding event may increase sharply with a small increase in the flooding level." While the NRC used the same term as the NTTF Report in the March 12 50.54(f) information request (Reference 3), the information the NRC expects utilities to obtain during the Recommendation 2.3: Flooding Walk-downs is different. To clarify, the NRC is now differentiating between cliff-edge effects (which are dealt with under Enclosure 2 of Reference 3) and a new term, Available Physical Margin (APM). APM information will be collected during the walk-downs, but will not be reported in the response to Enclosure 4 of Reference 3. The collected APM information will be available for use in developing the response to Enclosure 2 of Reference 3.

b. Site Description

Limerick Generating Station (LGS) is located in southeastern Pennsylvania on the Schuylkill River about 1.7 miles southeast of the limits of the Borough of Pottstown and about 20.7 miles northwest of the Philadelphia city limits. The Schuylkill River passes through the site and separates the western portion, which is located in East Coventry Township, Chester County, from the eastern portion, which is partly in Limerick Township and partly in Lower Pottsgrove Township, both in Montgomery County, Pennsylvania.

The site is divided into three main functional areas including the turbine-reactor complex area (elevation 217'), the cooling tower area (elevations 257' to 265') and the spray pond area. Typically run-off from the three main functional areas drains toward several low points, which in turn drain away from the site. Numerous local drains and small surface ditches are included in the site drainage system to facilitate the drainage of normal storm run-off. However, none of these drainage facilities is assumed to function in the design basis site drainage evaluation, except for the open-channel portion of a ditch draining the cooling tower area. Otherwise, all flow is assumed to be surface flow, over land or over roadway. All drain pipes and culverts are assumed plugged.

The main flow path around the power block is divided into four drainage areas (DA-3, DA-4, DA-5 and DA-6). All of these areas were included as a feature in the walk-downs, and were evaluated in terms of how they are controlled relative to the assumed flood analysis. The finished floor elevation of relevant safety-related structures at the power plant complex area (power block) is elevation 217'. Drainage is generally away from the structures. The present site drainage condition was determined from the Limerick Site Master Plan and subsequent walk downs.

Calculations LM-0615 and NPB-117 (References 21 and 31) document assessments of flood waters entering the turbine building through a number of doors (241, 247, 278 and 280) that are not water tight. The analysis assumes that doors (280N & 280S) are closed to control the water leakage below that assumed in the design basis analysis, so walk-downs were performed to validate that these doors are closed and sealed properly as is directed by procedure SE-4-3 (Reference 28). There are also a number of water tight doors (Doors 204, 205 and 288) that prevent water entering the control enclosure and they (documented in Reference 28) were inspected during walk-down's to ensure that they provide a water tight seal. Doors on the 200' elevation were also included within the walk-down activities (Door 146, 150 and 151). The doors were inspected to ensure that water could not flow further into the Control Enclosure. As such, additional internal doors within the complex beyond these doors (listed in Reference 28 as internal doors) were not inspected.

Concrete blocks/barriers have been placed along sections of the perimeter fence for security reasons. In the safety evaluation, the concrete blocks/barriers are assumed to block the drainage flow, and thus forming boundaries for the drainage areas. Some potential flow outlets along the south-west boundary of the site have been blocked, or partially blocked, by the concrete blocks/barriers. In addition, a concrete barrier placed between the Technical Support Center and the Warehouse form a portion of the boundary separating the drainage areas DA-5 and DA-6. This was analyzed in calculation LM-0654 (Reference 23).

Within drainage area DA-5, the important features are the yard and roads, the power plant structures, the refueling water tank dike, and various buildings (especially the ones erected along the security fence right-of –way on the southwest side of DA-5). The yard and road elevations encompassed by the security fence vary from about EL. 212' to EL. 217'. The roads entering the power plant structures have crowns set at EL. 217' or lower. They are sloped to drain away from the structures.

c. Requested Actions

Per Enclosure 4 of Reference 3, the NRC requests that each licensee confirm use of the industry-developed, NRC-endorsed, flood walk-down procedures or provide a description of plant-specific walk-down procedures.

Other NRC requested actions include:

(1) Perform flood protection walkdowns using an NRC-endorsed walkdown methodology;

(2) Identify and address plant-specific degraded, nonconforming, or unanalyzed conditions, as well as, cliff-edge effects through the corrective action program, and consider these findings in the Recommendation 2.1 hazard evaluations, as appropriate;

(3) Identify any other actions taken or planned to further enhance the site flood protection;

(4) Verify the adequacy of programs, monitoring and maintenance for protection features; and

(5) Report to the NRC the results of the walkdowns and corrective actions taken or planned.

Enclosure 4 of Reference 3 also states, 'If any condition identified during the walkdown activities represents a degraded, nonconforming, or unanalyzed condition (i.e., noncompliance with the current licensing basis) for an SSC, describe actions that were taken or are planned to address the condition using the guidance in Reference 6, including entering the condition in the corrective action program. Reporting requirements pursuant to 10 CFR 50.72 should also be considered'.

d. Requested Information

Per Enclosure 4 of Reference 3,

1. The NRC requests that each licensee confirm that it will use the industry-developed, NRC endorsed, flooding walk-down procedures or provide a description of plant-specific walk-down procedures. As indicated previously, Exelon's letter dated June 11, 2012 (Reference 1), confirmed that the flooding walk-down procedure (Reference 2), endorsed by the NRC on May 31, 2012, will be used as the basis for the flooding walk-downs.
2. The NRC requests that each licensee conduct the walk-down and submit a final report which includes the following:
    a. Describe the design basis flood hazard level(s) for all flood-causing mechanisms, including groundwater ingress.
    b. Describe protection and mitigation features that are considered in the licensing basis evaluation to protect against external ingress of water into SSCs important to safety.
    c. Describe any warning systems to detect the presence of water in rooms important to safety.
    d. Discuss the effectiveness of flood protection systems and exterior, incorporated, and temporary flood barriers. Discuss how these systems and barriers were evaluated using the acceptance criteria developed as part of Requested Information item 1.h.
    e. Present information related to the implementation of the walkdown process (e.g., details of selection of the walkdown team and procedures,) using the documentation template discussed in Requested Information item 1.j, including actions taken in response to the peer review.
    f. Results of the walkdown including key findings and identified degraded, nonconforming, or unanalyzed conditions. Include a detailed description of the actions taken or planned to address these conditions using the guidance in Regulatory Issues Summary 2005-20, Revision 1, Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Conditions Adverse to Quality or Safety," including entering the condition in the corrective action program.

g. Document any cliff-edge effects identified and the associated basis. Indicate those that were entered into the corrective action program. Also include a detailed description of the actions taken or planned to address these effects. See note in Section 1a regarding the NRC's change in position on cliff-edge effects.

h. Describe any other planned or newly installed flood protection systems or flood mitigation measures including flood barriers that further enhance the flood protection. Identify results and any subsequent actions taken in response to the peer review.

3. METHODOLOGY

a. Overview of NEI 12-07 (Walkdown Guidance)

In a collaborative effort with NRC staff, NEI developed and issued report 12-07 [Rev 0-A], *Guidelines for Performing Verification Walkdowns of Plant Protection Features*, dated May 2012 (Reference 2). The NRC endorsed NEI 12-07 on May 31, 2012 with amendments. NEI 12-07 was updated to incorporate the amendments and re-issued on June 18, 2012. On June 11, 2012, Exelon issued a letter to the NRC (Reference 1) stating that the endorsed flooding walk down procedure (Reference 2) will be used as the basis for the flooding walkdowns. NEI 12-07 provides guidance on the following items:

- Definitions
  - Incorporated Barrier/Feature
  - Temporary Barrier/Feature
  - Exterior Barrier/Feature
  - Current Licensing Basis (CLB)
  - Design Bases
  - Inaccessible
  - Restricted Access
  - Deficiency
  - Flood Protection Features
  - Reasonable Simulation
  - Visual Inspection
  - Cliff-Edge Effects
  - Available Physical Margin
  - Variety Of Site Conditions
  - Flood Duration
- Scope
  - Basis for Establishing Walkdown Scope
  - Identify Flood Protection Features (Walkdown List)
- Methodology
  - Develop Walkdown Scope
  - Prepare Walkdown Packages
  - Walkdown Team Selection and Training
  - Perform Pre-Job Briefs
  - Inspection of Flood Protection And Mitigation Features
    - General
    - Incorporated or Exterior Passive Flood Protection Features

    - Incorporated or Exterior Active Flood Protection Features
    - Temporary Passive Flood Protection Features
    - Temporary Active Flood Protection Features
    - Procedure Walk-through and Reasonable Simulation
  - Review of The Maintenance and Monitoring of Flood Protection Features
  - Review of Operating Procedures
  - Documentation of Available Physical Margins
  - Documenting Possible Deficiencies
  - Restricted Access, or Inaccessible
- Acceptance Criteria
- Evaluation and Reporting Results of The Walkdown
- Related Information Sources
- Examples
- Walkdown Record Form
- Sample Training Content
- Walk-down Report

b. Application of NEI 12-07

Exelon's approach to the flooding walk-downs included three phases:

Phase 1 – Preparation, Training, Data Gathering, and Scoping

The walkdown list was developed using the guidance provided in Section 4.2 of NEI 12-07. The existing design and licensing documents such as the UFSAR, plant drawings, and flood response procedures were reviewed to identify the plant features credited for protection and mitigation against external flooding events. Plant specific documents used to develop the walkdown list are identified in Section 6. The critical attributes of each feature are documented in Part A of the NEI 12-07 Walkdown Record Form. Topics and items reviewed to develop the walkdown list included the following:

- The barriers important to resisting the effects of external flooding (e.g., curbs, dikes, walls, floors, doors, etc.).
- Doors that could provide a path for flood water to enter buildings. Doors at the site include both water tight doors and doors that are not water tight. For all doors the inspection will confirm that the doors are in good condition including all hardware. For the water tight doors the inspection was expanded to include the door seals. For doors on the southern side of the plant (diesel generator side) the walkdown is to confirm that the ground slopes away from the diesel generator access doors.
- Manholes that provide pathways via conduits into the power block were reviewed. Manholes may flood and the conduits that deliver cables from the manholes to the power block are to be provided with internal seal. These seals are identified by the documentation to be within the manholes. To inspect these seals manhole entry is required. There are a number of logistical issues associated with entering the manholes for inspection of the seals including: draining of flooded manhole, entering a confined space and proximity to high voltage cables. To reduce the need for manhole entry to confirm internal conduit seals the team performed walkdowns of the associated conduits within the

power block. For example, if the conduit enters the building and rises above the flood height prior to any fitting or opening the conduit internal seal did need to be inspected as any water that enters the conduit would not enter the building.

- Yard features and pathways credited for flood water relief (e.g., surface drainage). The Limerick site has a number of drainage areas that channel flow from either a failure of the cooling tower basin or precipitation across the site. The walkdown included an assessment of changes to this flow path with regards to storage of equipment, introduction of a new structures or other changes that would block flow. Additionally, the walkdown included a visual review of the terrain compared to what was used in the design basis site drainage evaluation.
- Dikes around large tanks containing water and oil were inspected. These dikes were identified as flood protection features and are included in the walkdown. The dikes were reviewed by the walkdown team following the guidance documented in NEI 12-07 (Reference 16). The site includes large storage tanks (Unit 1 and 2 Condensate Storage Tanks, Refueling Water Storage Tank, and Fuel Oil Storage Tank). These are located in the yard area on the west and south sides of the power plant complex.
- Plant response procedures for external floods to identify any incorporated or exterior equipment that is credited for flood protection or mitigation were reviewed as part of the effort. This review indicated that actions in response to conditions that lead to site flooding were not required.
- The site has a procedure (Reverence 28) to install sandbags in front of doors to provide protection of assets not credited in the licensing basis. There are no actions required to install sandbags to protect any equipment credited as part of the current licensing basis. Therefore, although there is reference to sandbags within the procedures it is not required and is only performed if time allows. As a result, reasonable simulations for Limerick were not required.

Walkdown packages were developed to provide relevant information, efficient and thorough walkdowns and forms to be completed in the field. When practical, in preparation for the actual walkdowns preliminary walkthroughs of the different areas were conducted to support the scoping effort.

Each team member was trained to NEI 12-07 and took and passed the NANTEL Generic Verification Walkdowns of Plant Flood Protection Features test. Confined space and fall protection training was obtained to prepare for the need to enter confined spaces such as manholes, and to access features via ladders and scaffolding.

Phase 2 – Inspections and Reasonable Simulations

A total of 109 features were identified for inspection with no simulations. Walkdowns were conducted for each of the features with the exception of the 8 manholes and one 24" Weir wall. Manholes MH001, MH002 and MH077 were inspected using a pole camera to determine if the conduits connecting to the power block did have internal seals. These manholes as well as three others (MH095, MH101 and MH102) were designated as inaccessible and not inspected further.

Two manholes associated with the ESW Valve pits (MH214 and MH215) were declared as restricted access. It was determined that these two manholes did not need to be inspected at this time since they are on a recurring PM (A1602006) every two years and there were no issues found during the previous inspection.

The condition of each feature as observed on the walkdowns was compared to the acceptance criteria developed for the Exelon fleet.

Limerick site did not have any simulations required to demonstrate protection from external floods.

Phase 3 – Final Reporting

The Walkdown Record Forms were completed and assembled into a package that included a summary and a cover page to document a management review of the entire package. Completion of the Walkdown Record Forms was performed in accordance with the guidance provided in Section 7 of NEI 12-07. This Flooding Walkdown Report was prepared to address the items outlined in the "Requested Information" section of the "Recommendation 2.3: Flooding" enclosure from the 10CFR50.54 (f) letter.

c. Reasonable Simulations

A procedure walk-through, or "Reasonable Simulation," is required for temporary and/or active features involving manual/operator actions to perform their intended flood protection function. The purpose of the reasonable simulations is to verify the procedure or activity can be executed as specified/written. Per NEI 12-07 (Reference 2), reasonable simulation includes the following:

- Verify that any credited time dependent activities can be completed in the time required. Time-dependent activities include detection (some signal that the event will occur, has occurred, or is occurring), recognition (by someone who will notify the plant), communication (to the control room), and action (by plant staff).
- Verify that specified equipment/tools are properly staged and in good working condition.
- Verify that connection/installation points are accessible.
- Verify that the execution of the activity will not be impeded by the event it is intended to mitigate or prevent. For example, movement of equipment across unpaved areas on the site could be impeded by soft soil conditions created by excessive water.
- Review the reliance on the station staff to execute required flood protection features. If during the review several activities are identified to rely on station staff, then perform and document an evaluation of the aggregate effect on the station staff to demonstrate all actions can be completed as required.
- Verify that all resources needed to complete the actions will be available. (Note that staffing assumptions must be consistent with site access assumptions in emergency planning procedures.)
- Show that the execution of the activity will not be impeded by other adverse conditions that could reasonably be expected to simultaneously occur (for example, winds, lightning, and extreme air temperatures).

- Personnel/departments that have responsibility for supporting or implementing the procedure should participate in the simulation effort.
- The simulation should demonstrate that the personnel assigned to the procedure do not have other duties that could keep them from completing their flood protection activities during an actual event. Actions that would be performed in parallel during an event should be simulated in parallel; not checked individually and the results combined.
- Reasonable simulation need not require the actual performance of the necessary activities if they have been previously performed and documented or it is periodically demonstrated and documented that the activities can be completed in the credited time.

As discussed previously, the LGS does not require the use of features and/or procedures involving manual/operator actions for the credited flood protection system. Therefore, no simulations were required for LGS.

d. Walkdown Inspection Guidance

A "Walk down Inspection Guidance" was developed by Exelon to supplement NEI 12-07 (Reference 2), based largely on Appendix A of NEI 12-07 (Examples). The guidance was intended to supplement, not supersede, NEI 12-07 and provide inspection guidance for specific features, listed below.

- Incorporated or Exterior Passive Features:
  - Site Elevations and Topography
  - Earthen Features (i.e., Flood Protection Berm, Dike, Levee)
  - Concrete and Steel Structures
  - Wall, Ceiling, and Floor Seals (e.g. Penetration Seals, Cork Seals)
  - Passive Flood Barriers or Water Diversion Structures
  - Drains and Catch Basins
  - Plugs and Manhole Covers
  - Drainage Pathways (Swales, Subsurface Drainage System, etc.)
  - Piping and Cable Vaults and Tunnels, Electrical Cable Conduit
  - Floor Hatches
  - Flap Gate/Backwater Valve/Duckbill Valve
  - Flood Wall
- Incorporated or Exterior Active Features:
  - Credited Water Tight Doors
  - Credited Non-Watertight Doors
  - Pumps
  - Water Level Indication
  - Gate Valves
- Temporary Passive Features:
  - Portable Flood Barriers and Inflatable Rubber Seals
  - Flood Gate
- Temporary Active Feature
  - Pump

4. RESULTS

The information requested in Reference 3, Enclosure 4, under paragraph 2 of the "Requested Information" section, is provided below. The contents of each item were developed in accordance with Reference 2, Appendix D.

a. Requested Information Item 2(a) – Design Basis Flood Hazards

Describe the design basis flood hazard level(s) for all flood-causing mechanisms, including groundwater ingress.

As part of the LGS current licensing basis, flooding that results from river water rising caused by dam failures, site flooding associated with a local intense precipitation (LIP) event, site flooding associated with tank failures and site flooding associated with cooling tower basin failure were reviewed.

The river water rise caused by precipitation with upstream dam failure is calculated with wind-driven wave action to reach an elevation of 207' MSL (Mean Sea Level). This level is ten feet below the elevation of plant features that require protection from flood waters. These elevated river flood conditions were also evaluated to assess their impact on ground water conditions. Specifically, percolation calculations (Section 2.4.2.2 Reference 15) were performed to demonstrate that the ground water changes do not reach the levels of below grade features that require protection. Therefore there is no issue associated with subterranean features that need investigation as part of this walkdown effort.

The site flooding associated with LIP was evaluated in the current licensing basis (References 23 and 32). The LIP flood is divided into three paths: the West Flow Path, the East Flow Path (including an outlet 18 feet wide between the Warehouse & Procurement Building and the 8.5 foot high concrete barrier), and the outlet created by the removal of the previous barrier between the TSC and the guard house.

The LIP analysis conservatively did not take into account the full flood plain available and its effect on attenuating peak outflow. In addition, the site storm drainage system was assumed to be completely blocked.

The site is divided into three main functional areas including the turbine-reactor complex area (elevation 217'), the cooling tower area (elevations 257' to 265') and the spray pond area. Runoff from the three main functional areas drains toward several low points, which in turn drain away from the site. Numerous local drains and small surface ditches are available to facilitate the drainage of normal storm runoff. However, these drainage facilities were assumed to blocked and non-functional, except for the open-channel portion of a ditch draining the cooling tower area. Otherwise, all flow is assumed to be surface flow, overland or over roadway. All storm drain pipes and culverts are assumed plugged. The results of the design basis LIP evaluation indicate that the maximum flood elevation is 218.6 feet which is above the turbine-reactor complex floor elevation (217 feet).

The failure of the cooling tower basin wall as discussed in the UFSAR has been shown to not adversely affect safety-related structures, systems, and components. The runoff pattern of water from the cooling tower basin wall failure would be similar to that caused by a LIP event however; the event duration will be much shorter. Most of the flood water from the cooling tower basin would run away from the power plant complex. The worst case flood conditions for the power plant complex would be

created by a failure of the south side of the Unit 1 cooling tower basin wall. For this case, a portion of the cooling tower basin water would flow towards the turbine enclosure. Although some limited turbine enclosure flooding may occur, there would be no impact on safety-related components. The seismic Category I electrical cable and duct banks and valve pits located in the flow path of the water from the failed cooling tower basin are adequately protected. The peak flood level for the cooling tower basin failure is 218.8 ft which exceeds that of the LIP. Although the peak is higher, this is for only a brief period of time and the overall duration of the flood is only 35 minutes (Reference 31). As a result of the relatively short duration the bounding event is the LIP.

SITE PLAN FLOODING CONTROL AREAS
Drawing Number SK-C-378

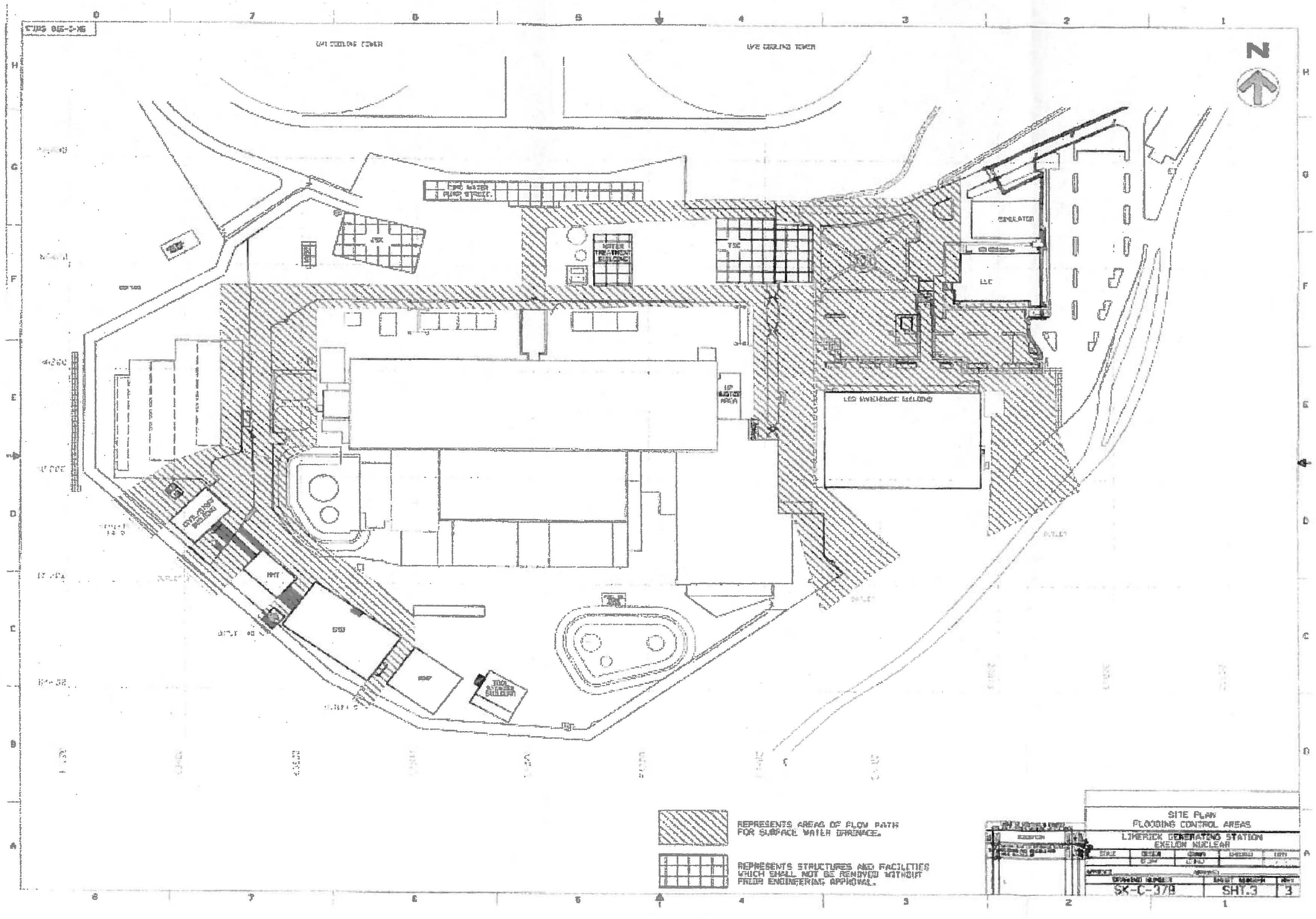


Figure 1

b. Requested Information Item 2(b) – CLB Protection and Mitigation Features

Describe protection and mitigation features that are consider in the licensing basis evaluation to protect against external ingress of water into SSCs important to safety.

For the LIP event, the main flow path around the power block is divided into four drainage areas (DA-3, DA-4, DA-5 and DA-6). The drainage areas were addressed as features in the walkdown effort. Specifically, the walkdown effort confirms that the drainage areas are clear of any obstructions that would impact the flood analysis. The finished floor elevation of relevant safety-related structures at the power plant complex area (power block) is elevation 217'. Drainage is generally away from the structures but the peak flood level for the LIP event is (218.6', 1.6') above plant grade.

The calculation NPB-117 (Reference 31) includes an assessment of flood waters entering the turbine building through a number of doors (241, 247, 278 and 280) that are not water tight. However, the analysis assumes that doors 280N and 280S are closed to control the water leakage below that assumed in the design basis analysis, so the walk-downs were performed to validate that these doors are closed and seal properly as is directed by procedure SE-4-3 (Reference 28). There are also a number of water tight doors (Doors 204, 205 and 288) that prevent water entering the Control Enclosure and these (documented in Reference 28) were inspected during the walk down. Doors on the 200' elevation were also included within the walk-down activities (Door 146, 150 and 151). The doors were inspected to ensure that water could not flow further into the Control Enclosure. As such, additional internal doors within the complex beyond these doors (listed in Reference 28 as internal doors) were not inspected.

Concrete blocks/barriers have been placed along sections of the perimeter fence for security reasons. In the safety evaluation for the modification that installed the barriers, they are assumed to block the drainage flow, and thus forming boundaries for the drainage areas. Some potential flow outlets along the south-west boundary of the site have been blocked, or partially blocked, by the concrete block/barriers. In addition, a concrete barrier placed between the Technical Support Center and the Warehouse form a portion of the boundary separating the drainage areas DA-5 and DA-6. This was analyzed in calculation LM-0654 (Reference 23).

Within drainage area DA-5, the important features are the yard and roads, the power plant structures, the refueling water tank dike, and various buildings (especially the ones erected along the security fence right-of–way on the southwest side of DA-5). The yard and road elevations encompassed by the security fence vary from about elevation 212' to 217'. The roads entering the power plant structures have crowns set at elevation 217' or lower. These are sloped to drain away from the structures.

The flood level on the site is established in part by the ability of the drainage areas (DA-5 and DA-6) to channel the flow off the site. The resulting depth of the water on the site could impact the structures located within and near the power block. Specifically, the Turbine Building, Control Building, Reactor Building, Valve pits for RHRSW and ESW piping, Valve pits for diesel generator fuel oil storage tanks, electrical manholes and their associated electrical conduits and the Diesel generator buildings could be impacted. Each of these structures has features that prevent the flood waters from causing a concern. In some cases the feature is the topography near the structure. In other cases, the flood protection features

include doors, walls and dikes internal to the turbine building. These different features form the principal features to be investigated.

The procedure SE-4-3 (Reference 28) was reviewed to determine if any simulations were required. This procedure references Schuylkill River Flooding and discusses actions to be taken in response to Pump-house flooding. The actions taken were discussed with site staff and it was determined that these actions were not required to ensure the site can be placed and maintained in a safe shutdown condition following a flood. Therefore, a simulation of section 2.1 of Reference 28 is not required as part of this effort.

Section 2.2 of the same procedure discusses action required to address External Flooding. The action is taken if the potential exists for water to enter the power block. Under those conditions the staff is to ensure all exterior power block doors identified in the procedure are closed. These doors were included in the list of flooding walkdown list. However, closure of the doors was considered a routine activity so simulation of this activity was considered unnecessary. The procedure also discusses the installation of sandbags if time permits. The installation of sandbags is done to protect assets against water damage that are not related to maintaining the plant in a safe condition. Discussions with the site staff and the wording of the procedure suggest that this is not required. Therefore, a simulation was considered unnecessary. Also, although procedure has doors being verified closed, the site design only requires certain doors to be closed and having all doors closed is not a necessity.

The yard area contains a number of electrical manholes. While the UFSAR indicates that these manholes can be flooded without impacting the cables contained within them, they are included in the walkdown activities since the conduits from these manholes enter into the power block. The UFSAR states that these conduits are sealed, so the walkdown included verification that the conduits and associated wall penetrations (into the power block) are sealed.

The site includes large storage tanks (Unit 1 and 2 Condensate Storage Tanks, Refueling Water Storage Tank, and Fuel Oil Storage Tank). These are located in the yard area on the west and south sides of the power plant complex. Failure of these tanks (refer to Reference 24) will not cause flooding of safety-related structures, systems, and components. Flooding due to a failure of these tanks will be contained within seismic Category IIA earth dikes, which will remain stable under both static and dynamic conditions.

These dikes are identified as flood protection features and are included in the walkdown. The dikes will be reviewed by the walkdown team following the guidance documented in ST-1-008-900-1 (Reference 30).

The tanks on the north side of the power plant complex do not have seismically designed containments around them. Failure of these tanks could cause local flooding. This flooding would not adversely affect safety-related facilities for the following reasons:

a. Surface drainage in this area will drain water towards the Schuylkill River and Possum Hollow Run before it can reach the power plant complex.

b. Seismic Category I electrical cable and duct banks located in the vicinity of these tanks are adequate, as discussed below. Even if the above dikes were to fail, there would be no impact on other safety-related structures, systems, or components due to site drainage.

For these northern side tank failures the walkdown of the flood flow path channeling the water off the site is critical in confirming that the site features can accommodate such a failure. The electrical cables are designed to operate under water. All electrical conduits that travel to electrical manholes outside the structures are sealed to prevent water from entering the structures through the electrical duct banks. The manholes are included in the list of features. These will be included in the walkdown to determine that they are either water tight preventing the flood waters from entering or the conduits that enter the manholes and connect to the structures are properly sealed. The walkdown of the manholes was previously discussed.

The failure of the cooling tower basin wall as discussed in the UFSAR would not adversely affect safety-related structures, systems, and components. The runoff pattern of water from the cooling tower basin wall failure would be similar to that caused by a LIP event. Most of the flood water from the cooling tower basin would run away from the power plant complex. The worst case flood conditions for the power plant complex would be created by a failure of the south side of the Unit 1 cooling tower basin wall. For this case, a portion of the cooling tower basin water would flow towards the turbine enclosure. Although some limited turbine enclosure flooding may occur, there would be no impact on safety-related components. The seismic Category I electrical cable and duct banks and valve pits located in the flow path of the water from the failed cooling tower basin are adequately protected as discussed below. The walkdowns previously discussed regarding doors and manholes will address the issues associated with this particular event.

As with the northern side tank failures, the walkdown of the flood flow path to assess topography and blockage will be conducted. The walk down activities also addressed the spray pond drainage area (DA-1) depicted in Figure 2. This feature includes the cut slope areas draining toward the pond as well as two small pieces of natural topography that drain toward the cut slope. Drainage is the pond itself, which has a normal operating level of 251' and a 60 foot wide spillway set at elevation 252'. The activities associated with this effort is simply to walkdown the pond and the spillway to assess the condition of the rip rap installed around the pond to handle wind induced wave actions and confirm that the spill way is clear and in good condition.

The walkdown activities did not include anything located in drainage area 2 (DA-2). This area does not include manholes and/or valve pits that provide direct communication to the power block.

As shown in UFSAR Figure 2.4-5 (Figure 2), DA-3 comprises the southwest part of the cooling tower area. It generally drains into the western half of the turbine-reactor complex area, both down the roadway and down the south face of the slopes of the access roadway embankment. DA-3 includes natural ground and the roadway to the 220 kV switchyard, but not the switchyard itself, which is sloped generally south to drain toward the Schuylkill River. A peak flow of 151 cfs is generated from DA-3. The disposition of this discharge is discussed in FSAR Section 2.4.2.3.3 with the turbine-reactor complex area.

DA-4 drains directly to the turbine-reactor complex area on the eastern side of the plant centerline. However, it includes a relatively larger proportion of natural catchment, most of which is on the east of the cooling tower excavation area. The handling of the peak discharge from this area, 550 cfs, is discussed in UFSAR Section 2.4.2.3.3.

The plant flood boundary features are composed of doors and incorporated passive features. There is no distinction made in the current licensing basis with regards to the operating mode of the plant. The duration of the LIP is documented in Reference 20 and 32 to be approximately six hours. The peak water level on the site occurs approximately three hours into the event.

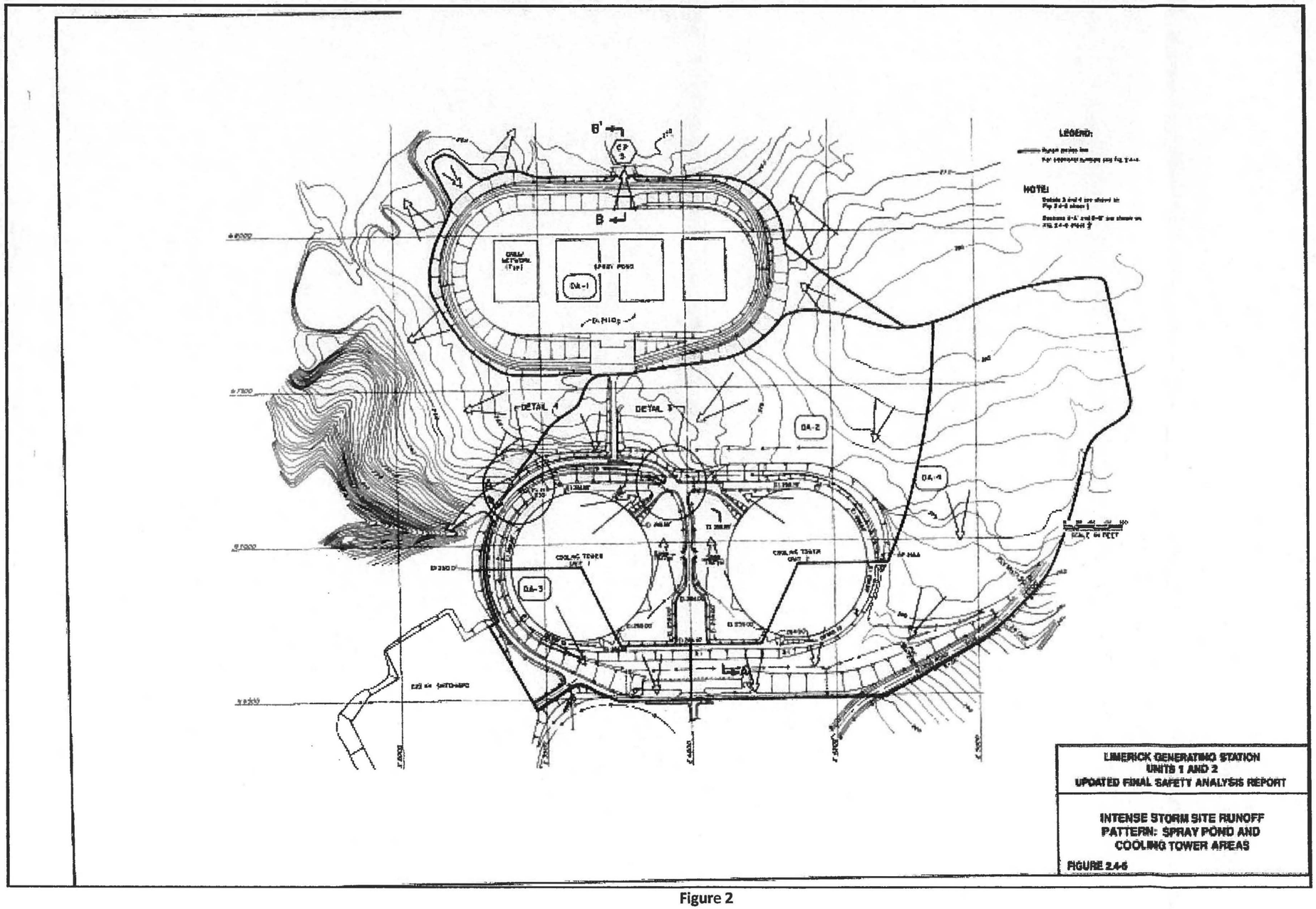

LEGEND:
NOTE:
DETAIL 4
DETAIL 5
DA-1
DA-2
DA-3
DA-4
B'
B
A
LIMERICK GENERATING STATION
UNITS 1 AND 2
UPDATED FINAL SAFETY ANALYSIS REPORT
INTENSE STORM SITE RUNOFF
PATTERN: SPRAY POND AND
COOLING TOWER AREAS
FIGURE 2.4-6

Figure 2

c. Requested Information Item 2(c) – Flood Warning Systems

Describe any warning systems to detect the presence of water in rooms important to safety.

There are no warning systems relied upon to address the current licensing basis external flood events.

d. Requested Information Item 2(d) – Flood Protection System/Barrier Effectiveness

Discuss the effectiveness of flood protection systems and exterior, incorporated, and temporary flood barriers. Discuss how these systems and barriers were evaluated using the acceptance criteria developed as part of Requested Information Item 1.h [in Enclosure 4 of the March 12, 2012, 50.54(f) letter]

Section 6 of NEI 12-07 defines 'acceptance' as:

> *"Flood protection features are considered acceptable if no conditions adverse to quality were identified during walkdowns, verification activities, or program reviews as determined by the licensee's Corrective Action Program. Conditions adverse to quality are those that prevent the flood protection feature from performing its credited function during a design basis external flooding event and are 'deficiencies'. Deficiencies must be reported to the NRC in the response to the 50.54(f) letter."*

As indicated in Section 3d, inspection guidance was developed, supplementing NEI 12-07, to provide more specific criteria for judging acceptance. All observations that cannot be immediately judged as acceptable were entered into the site's Corrective Action Program (CAP) where an evaluation of the observation can be made. The following summarizes the effectiveness of the flood protection features:

- The flood protection features associated with the Limerick site are composed of doors and passive features. The barrier types require only visual inspection to ensure that they are in proper condition and located as defined in the current licensing basis. The conclusion of the walkdown is that the barriers are in generally acceptable condition and able to perform their intended function.
- Visual inspection did not identify material degradation of dikes or berms; topography has not changed; barriers added as parts of the security changes have been evaluated to demonstrate that they will not adversely impact the sites drainage.
- Several IR's were issued against flood doors as their seals were damaged. While the seals need to be repaired in a timely manner, they do not represent a significant degradation to the barrier system.
- The site includes a number of manholes that contain banks of conduits which enter into the power block. These conduits are designed to have interior seals on the manhole side to prevent water from flowing into the power block from a flooded manhole. Access to these manholes was very limited and judged to be dangerous. The approach used was to try to disposition the condition without manhole inspections. Specifically, the walkdown teams first did walkdowns of the conduits where they enter the power block. During the walkdown the teams were looking to see if the conduits were capped, sealed, had no indicated water leaking into the building from a flooded

manhole, or terminated at an elevation above the flood height. Many of the conduits met the aforementioned criteria. However, there were a number of conduits that could not be immediately judged as acceptable and prevent water ingress. As a result, a number of manholes were opened, drained and inspected via video camera to determine if internal seals were provided. These video inspections provided reasonable assurance that the conduits that connect the manhole to the power block are either capped or sealed, ensuring no water will flow to the power block during a flood.

- The key features are dikes, doors, barriers and topography. Of these features only the doors offer some opportunity to change state during different plant operations. Discussions with the site staff indicates that the doors that are intended to prevent water entry are kept closed under all modes of plant operations. Therefore, the Limerick flood boundary system remains effective under all modes of plant operations.

e. Requested Information Item 2(e) – Implementation of Walkdown Process

Present information related to the implementation of the walkdown process (e.g., details of selection of the walkdown team and procedures) using the documentation template discussed in Requested Information Item 1.j [in Enclosure 4 of the March 12, 2012, 50.54(f) letter], including actions taken in response to the peer review.

Each team member was trained to NEI 12-07 and passed the NANTEL Generic Verification Walkdowns of Plant Flood Protection Features test. Confined space and fall protection training was obtained to prepare for the need to enter confined spaces such as manholes, and access features via ladders and scaffolding. The walkdown teams followed the necessary human performance briefs and procedures provided by Exelon to ensure a properly conducted walkdown. Prior to each walkdown safety briefs were conducted as part of the prejob brief. Protected equipment and restricted access areas were part of the effort to prepare for the day's walkdown activities.

The teams documented the effort using the forms developed in the NEI 12-07 Rev. 0A. These forms were prepared prior to the walkdown with background information. The forms were brought into the field and further information was added as part of the effort in the field documenting the observations required by the forms. In addition the teams took photographs of the features to document the efforts findings.

The walkdown team was organized with two members. A representative from the civil discipline was complemented with a representative from the mechanical discipline. A design manager, also trained to NANTEL course, participated in several, but not all the walkdown. This was strictly to observe the teams in their initial walkdowns. The teams were also supported by staff from the maintenance organization to facilitate entry into areas.

The team members were sufficiently experienced to properly perform this effort. They have significant walkdown experience in the nuclear industry. The mechanical representative has been involved in a number of modifications at the Limerick site. The team actively participated in assembling the licensing basis information to be used in the effort. As part of that effort they presented this information to the site SME for discussion and clarification. This later activity ensured a strong knowledge of the licensing basis prior to developing the walkdown features list and beginning the walkdowns.

All walk downs were done in accordance with NEI 12-07 and supplemental walk down inspection guidance Revision 1 Dated 08/17/12.

f. Requested Information Item 2(f) – Findings and Corrective Actions Taken/Planned

Results of the walkdown including key findings and identified degraded, non-conforming, or unanalyzed conditions. Include a detailed description of the actions taken or planned to address these conditions using the guidance in Regulatory Issues Summary 2005-20, Rev 1, Revision to NRC Inspection Manual Part 9900 Technical Guidance, "Operability Conditions Adverse to Quality or Safety," including entering the condition in the corrective action program.

Observations Not Immediately Judged as Acceptable

Several observations were made of the flood barrier door seals. It was determined that these observations did not constitute a challenge to the flood barrier systems ability to provide its required function. However, the seal observations were entered into CAP for disposition and repair. The following IR's were initiated as a result.

IR Number	Observation Description	IR Disposition
01398543	Door 242 Stairway to Exterior Door Bottom Skirt damaged	• Door 242 is functional • Replace bottom skirt of door 242.
01397696	Door 284 Condensate Pump Room Seal attachment to the bottom sill damaged	• Door 284 is functional • Repair seal at the sill of Door 284
01399294	Door 205 23-Line Double Door. Seal is detached in one corner.	• Door 205 is functional • Repair the detached seal of Door 205
01398500	Doors 204N and 288N seals are degraded.	• Both Doors are functional • Replace Seals of both doors
01398114	Doors 146, 150, and 151 seals are degraded.	• Doors are functional • Repair three Door seals

Observations Designated through CAP as Deficient

None

Observations Awaiting Final Disposition in CAP

None

Restricted Access Areas

One of the weir walls located in the Unit 2 Turbine Enclosure water release panel area was not inspected along with the manholes. The dike could not be inspected because of high radiation fields in the area and, therefore, was designated as "restricted access." The feature will be inspected at a future date (Li2R12, March 2013) when the radiation levels are safe to enter the area.

Inaccessible Areas

The manholes were designated as "inaccessible" and not inspected due to significant electrical hazard. There is reasonable assurance that the conduits between the manholes and the power block will not become a pathway for water to enter the plant. A number of investigations were conducted around the manholes. The conduits were inspected within the power block and it was found that many of them would not allow water entry. This conclusion was determined based upon their orientation, elevation or if they were capped within the power block. Specifically, open conduits terminate above the flood height or they were capped off. The remainder could not be inspected within the power block because of obstructions from plant equipment (cabinets, etc.). No indication of water in the area of the conduits was observed. Finally, the video inspections of the manholes did not indicate that conduits leading to the power block were without seals. The combination of these observations provided reasonable assurance that the conduits would not become a pathway for water to enter the plant.

g. Requested Information Item 2(g) – Cliff –Edge Effects and Available Physical Margin

Document any cliff-edge effects identified and the associated basis. Indicate those that were entered into the corrective action program. Also include a detailed description of the actions taken or planned to address these effects.

Cliff-edge effects are defined in the NTTF Report (Reference 5) as "the safety consequences of a flooding event may increase sharply with a small increase in the flooding level". As indicated in Sections 3.12 of NEI 12-07 (Reference 2), the NRC is no longer expecting the Recommendation 2.3: Flooding Walkdowns to include an evaluation of cliff-edge effects. The NRC is now differentiating between cliff-edge effects, which are addressed in Enclosure 2 of Reference 3, and Available Physical Margin (APM).

As indicated in Sections 3.13 of NEI 12-07 (Reference 2), APM describes the flood margin available for applicable flood protection features at a site (not all flood protection features have APMs). The APM for each applicable flood protection feature is the difference between licensing basis flood height and the flood height at which water could affect an SSC important to safety.

APM information was collected during the walkdowns in accordance with guidance provided in NEI 12-07 and the final resolution to FAQ-006. APM was collected to primarily support the response to Enclosure 2 of Reference 3 and, as such, is not included in this report. APM determinations did not involve calculating cliff-edge effects (i.e. the safety consequences). During the Integrated Assessment (see Enclosure 2 of Reference 3), the cliff-edge effects and the associated safety risks will be evaluated using the APMs and other information, such as the specific SSCs that are subjected to flooding and the potential availability of other systems to mitigate the risk.

h. Requested Information Item 2(h) – Planned/Newly-Installed Flood Protection Enhancements

Describe any other planned or newly installed flood protection systems or flood mitigation measures including flood barriers that further enhance the flood protection. Identify results and any subsequent actions taken in response to the peer review.

- There are no changes identified by the walkdown effort.

5. CONCLUSIONS

Table # 1: Summary – Features Included in the Walkdown Scope

Feature Type	Total Number
Passive – Incorporated	63
Passive – Temporary	0
Active – Incorporated	46
Active – Temporary	0

Table # 2: Reasonable Simulations

#	Description	Purpose
0	There are no simulation for LGS	

Table # 3: List of Features Immediately Judged as Acceptable:

#	Feature ID #	Description	Passive/Active Incorporated/Temporary
1	10A081 (Room 327/328)	In Power Block Room 327/328 From ESW Valve Pit MH214	Incorporated/Passive
2	21" Curb (Room 330)	Wall	Incorporated/Passive
3	21" Curb (Room 358)	Wall	Incorporated/Passive
4	24" Weir (Room 332)	Wall (Behind water release panels)	Incorporated/Passive
5	409-P040 (Room 263)	Penetration	Incorporated/Passive
6	409-Z073 (Room 263)	Penetration	Incorporated/Passive
7	409-Z074 (Room 263)	Penetration	Incorporated/Passive
8	409-Z075 (Room 263)	Penetration	Incorporated/Passive
9	42" Curb (Room 330)	Wall	Incorporated/Passive

#	Feature ID #	Description	Passive/Active Incorporated/Temporary
10	42" Curb (Room 358)	Wall	Incorporated/Passive
11	Conduit Bank From ESW Valve Pit (Room 311A)	Conduit From Valve Pit U1 MH214	Incorporated/Passive
12	Conduit Bank From ESW Valve Pit (Room 311D)	Conduit From Valve Pit U2 MH215	Incorporated/Passive
13	Conduit Bank From MH001 (Room 335)	Electrical Conduit MH001	Incorporated/Passive
14	Conduit Bank From MH001 (Room 336)	Electrical Conduit MH001	Incorporated/Passive
15	Conduit Bank From MH001 (Room 258)	Electrical Conduit MH001	Incorporated/Passive
16	Conduit Bank From MH002 (Room 336)	Electrical Conduit MH002	Incorporated/Passive
17	Conduit Bank From MH002 (Room 259)	Electrical Conduit MH002	Incorporated/Passive
18	Conduit Bank From MH002/MH102 (Room 335)	Electrical Conduit MH002/MH102	Incorporated/Passive
19	Conduit Bank From MH002/MH102 (Room 336)	Electrical Conduit MH002/MH102	Incorporated/Passive
20	Conduit Bank From MH085 (Room 328)	Electrical Conduit From MH085	Incorporated/Passive
21	Conduit Bank From MH086 (Room 328)	Electrical Conduit From MH086	Incorporated/Passive
22	Conduit Bank From MH095 (Room 357)	Electrical Conduit MH095	Incorporated/Passive
23	Conduit Bank From MH101 (Room 335)	Electrical Conduit MH101	Incorporated/Passive
24	Conduit Bank From MH101 (Room 336)	Electrical Conduit MH101	Incorporated/Passive
25	Conduit from ESW Valve Pit (311C)	Conduit From Valve Pit U1 MH214	Incorporated/Passive
26	Curb for Diesel Oil Tank Storage Building (Yard)	3" Curb	Incorporated/Passive

#	Feature ID #	Description	Passive/Active Incorporated/Temporary
27	DA3	Drainage Area	Incorporated/Passive
28	DA4	Drainage Area	Incorporated/Passive
29	DA5	Drainage Area	Incorporated/Passive
30	DA6	Drainage Area	Incorporated/Passive
31	00T532 Dike	Dike for Refueling Water Storage Tank	Incorporated/Passive
32	10T522 Dike	Dike for Condensate Storage Tank	Incorporated/Passive
33	20T522 Dike	Dike for Condensate Storage Tank	Incorporated/Passive
34	00T521 Dike	Dike for Fuel Oil Storage Tank	Incorporated/Passive
35	Door 146	Double Doors, Water Tight	Incorporated/Active
36	Door 150	Water Tight Door	Incorporated/Active
37	Door 151	Water Tight Door	Incorporated/Active
38	Door 194	Door w/ threshold	Incorporated/Active
39	Door 195	Door w/ threshold	Incorporated/Active
40	Door 196	Personnel Airlock to Exterior	Incorporated/Active
41	Door 204 N/S	Water Tight Door	Incorporated/Active
42	Door 205	Water Tight Door	Incorporated/Active
43	Door 211	Door w/ threshold	Incorporated/Active
44	Door 213	Door w/ threshold	Incorporated/Active
45	Door 215	Door w/ threshold	Incorporated/Active
46	Door 217	Door w/ threshold	Incorporated/Active
47	Door 219	Door w/ threshold	Incorporated/Active
48	Door 221	Door w/ threshold	Incorporated/Active
49	Door 223	Door w/ threshold	Incorporated/Active
50	Door 225	Door w/ threshold	Incorporated/Active
51	Door 241	Double Door, Always open, Exterior doors leading to it are always closed	Incorporated/Active
52	Door 242	Water Tight Door	Incorporated/Active

#	Feature ID #	Description	Passive/Active Incorporated/Temporary
53	Door 247	Door w/ threshold and sweep & 3" Curb	Incorporated/Active
54	Door 249	Door w/ threshold	Incorporated/Active
55	Door 251	Door w/ threshold, 1/8" undercut gap	Incorporated/Active
56	Door 252	Door w/ threshold and 1/4" undercut gap	Incorporated/Active
57	Door 253	Door w/ threshold and 1/4" undercut gap	Incorporated/Active
58	Door 257	Rolling Door, Not watertight, but no gaps when closed	Incorporated/Active
59	Door 258	Door, no threshold and 5/8" undercut gap	Incorporated/Active
60	Door 259	Rolling Door	Incorporated/Active
61	Door 259N	23 Line Extension	Incorporated/Active
62	Door 264	Door, no threshold, 7/16" undercut gap	Incorporated/Active
63	Door 267	Door, no threshold w/ 7/16" undercut gap	Incorporated/Active
64	Door 268	Door w/ threshold and 1/16" undercut gap	Incorporated/Active
65	Door 269	Door w/ threshold and 1/16" undercut gap	Incorporated/Active
66	Door 273	Water Tight Door	Incorporated/Active
67	Door 278	Door with 3" Curb and threshold	Incorporated/Active
68	Door 279	Door w/ 9" curb, no gaps	Incorporated/Active
69	Door 280 N/S	Double Doors	Incorporated/Active
70	Door 284	Roll up Door w/ threshold	Incorporated/Active
71	Door 288 N/S	Water Tight Doors	Incorporated/Active
72	Door 293	Door w/ threshold	Incorporated/Active
73	Door 294	Door w/ threshold	Incorporated/Active
74	Door 296	Door w/ threshold	Incorporated/Active

#	Feature ID #	Description	Passive/Active Incorporated/Temporary
75	Door 336	Radwaste Corridor to Exterior	Incorporated/Active
76	Door 337	Radwaste Corridor to Exterior	Incorporated/Active
77	Door 338	Cask Loading Area to Exterior	Incorporated/Active
78	Door 339	Stairwell #RW1 to Exterior	Incorporated/Active
79	Door 396	Door w/ threshold	Incorporated/Active
80	Door 399	Door w/ threshold	Incorporated/Active
81	East Wall Area 3	Water Tight Wall	Incorporated/Passive
82	East Wall Area 5 & 10	Water Tight Wall	Incorporated/Passive
83	East Wall Area 8	Water Tight Wall	Incorporated/Passive
84	ESW Valve Pit Unit 2 East	ESW Valve Pit MH215	Incorporated/Passive
85	North Wall Area 1 & 2	Water Tight Wall	Incorporated/Passive
86	North Wall Area 3	Water Tight Wall	Incorporated/Passive
87	North Wall Area 4 & 5	Water Tight Wall	Incorporated/Passive
88	South Wall Area 3 in Room 335	Water Tight Wall	Incorporated/Passive
89	South Wall Area 6	Water Tight Wall	Incorporated/Passive
90	Spray Pond	Condition of Spray Pond berm	Incorporated/Passive
91	Walls Room 330	Water Tight Walls	Incorporated/Passive
92	Walls Room 358	Water Tight Walls	Incorporated/Passive
93	West Wall Area 1 & 6	Water Tight Wall	Incorporated/Passive
94	West Wall Area 3	Water Tight Wall	Incorporated/Passive
95	West Wall Area 8	Water Tight Wall	Incorporated/Passive
96	409-Z076 (Room 263)	Penetration	Incorporated/Passive

Table # 4: List of Features Not Immediately Judged as Acceptable

#	Feature ID #	Description	Observation	Component Functionality	Resolution
1	20A592 (Room 354)	Electrical Conduit ESW Valve Pit MH215	Could not confirm the conduit would not allow water into the power block.	Functional	Inspection of MH215 required to confirm conduit has a seal.
2	Conduit Bank From MH077 (Room 327)	Electrical Conduit From MH077	Could not confirm all of the conduits were capped or higher than flood elevation in the power block. The walkdown team was able to see the full count of conduits however; labels could only be seen on half. Therefore, it is conservatively assumed that half are indeterminate.	Functional	Evaluation of MH077 is required to further confirm boundary feature.
3	Conduit Bank in MH085 (Yard)	MH085	NA	Functional	This manhole is not directly inspected. Feature 20 inspections demonstrate that even if the conduits in MH085 do not have seals water will not enter the power block.

#	Feature ID #	Description	Observation	Component Functionality	Resolution
4	Conduit Bank in MH086 (Yard)	MH086	NA	Functional	This manhole is not directly inspected. Feature 21 inspections demonstrate that even if the conduits in MH086 do not have seals water will not enter the power block.

Table # 5: List of Features in Restricted Access Areas

#	Feature ID #	Description	Reason	Resolution
1	24" Weir Room 355	Wall (Behind blow out panels)	High Radiation Area	Future inspection is scheduled as documented in this report. (Li2R12 April 2013)
2	MH214 (Yard)	ESW Valve Pit	Restriction on support to open.	This item is on a recurring PM (A1602006) every two years and since no issues were found during the previous inspection, the pit does not need to be inspected at this time.

#	Feature ID #	Description	Reason	Resolution
3	MH215 (Yard)	ESW Valve Pit	Restriction on support to open.	This item is on a recurring PM (A1602006) every two years and since no issues were found during the previous inspection, the pit does not need to be inspected at this time.

Table # 6: List of Features in Inaccessible Areas

#	Feature ID #	Description	Reason	Resolution
1	Conduit Bank In MH001 (Yard)	MH001	High Voltage cables (13kV) represent hazard for entry.	Video Inspections conducted that showed the visible conduits had seal material. Additionally, many of the conduits from MH001 on the power block side had features that prevent water from traveling into the power block.
2	Conduit Bank in MH002 (Yard)	MH002	High Voltage cables (13kV) represent hazard for entry.	Video Inspections conducted that showed the visible conduits had seal material. Additionally, many of the conduits from MH002 on the power block side had features that prevent water from traveling into the power block.

#	Feature ID #	Description	Reason	Resolution
3	Conduit Bank in MH077 (Yard)	MH077	High Voltage cables (13kV) represent hazard for entry.	Video Inspections conducted that showed the visible conduits had seal material. Additionally, many of the conduits from MH077 on the power block side had features that prevent water from traveling into the power block.
4	Conduit Bank in MH095 (Yard)	MH095	High Voltage lines overhead from main transformers considered a hazard.	Based on video inspection of other manholes it is considered reasonable to conclude that the conduit seals in this manhole are acceptable.
5	Conduit Bank in MH101 (Yard)	MH101	High Voltage cables (13kV) represent hazard for entry.	Based on video inspection of other manholes it is considered reasonable to conclude that the conduit seals in this manhole are acceptable.
6	Conduit Bank in MH102 (Yard)	MH102	High Voltage cables (13kV) represent hazard for entry.	Based on video inspection of other manholes it is considered reasonable to conclude that the conduit seals in this manhole are acceptable.

6. REFERENCES

1. Exelon Letter to U.S. Nuclear Regulatory Commission. *Exelon Generation Company, LLC's 90-Day Response to March 12, 2012 Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1 and 2.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (Flooding).* June 11, 2012.
2. Nuclear Energy Institute (NEI), Report 12-07 [Rev 0-A]. *Guidelines for Performing Verification Walkdowns of Plant Protection Features.* May 2012 [NRC endorsed May 31, 2012; updated and re-issued June 18, 2012].
3. U.S. Nuclear Regulatory Commission. Letter to Licensees. *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.* March 12, 2012.
4. U.S. Nuclear Regulatory Commission. *Demonstrating the Feasibility and Reliability of Operator Manual Actions in Response to Fire.* NUREG-1852. October 2007.
5. U.S. Nuclear Regulatory Commission. *Recommendations for Enhancing Reactor Safety in the 21st Century, The Near Term Task Force Review of Insights from the Fukushima Dai-ichi Accident.* July 12, 2011.
6. U.S. Nuclear Regulatory Commission. *Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety.* NRC Inspection Manual. Part 9900: Technical Guidance. Regulatory Issues Summary 2005-20, Revisions 1. September 26, 2005.
7. Institute of Nuclear Power Operations. *Fukushima Dai-ichi Nuclear Station Fuel Damage Caused by Earthquake and Tsunami.* INPO Event Report 11-1. March 15, 2011.
8. U.S. Nuclear Regulatory Commission. *Follow-up to the Fukushima Dai-ichi Nuclear Station Fuel Damage Event.* Inspection Manual. Temporary Instruction 2515/183. ML113220407. November 2011.
9. U.S. Nuclear Regulatory Commission. *Inspection of Structures, Passive Components, and Civil Engineering Features at Nuclear Power Plants.* Inspection Manual. Inspection Procedure 62002. Section 03.01(h), Dams, Embankments and Canals.
10. U.S. Nuclear Regulatory Commission. *Evaluate Readiness to Cope with External Flooding.* Inspection Procedures. Attachment 71111.01. *Adverse Weather Protection.* Section 02.04.
11. U.S. Nuclear Regulatory Commission. *NRC Inspector Field Observation Best Practices.* NUREG/BR-0326, Rev. 1. August 2009.
12. U.S. Nuclear Regulatory Commission. *Flood Protection for Nuclear Power Plants.* Regulatory Guide 1.102.
13. Exelon Nuclear NTTF Recommendation 2.3 – Flood Walkdown Request for Proposal, Addendum 2, Dated March 20, 2012
14. ENERCON Proposal EXCRP-G12-1004
15. Limerick UFSAR, Rev. 16.
16. NEI 12-07 Rev 0-A guidelines document

17. LG 99-00136-000 Rev. 0 Flooding Documentation For LGS IPEEE ARI Response to NRC
18. Specification 8031-C-115 Rev. 6 Specification For Civil Structural Design Criteria For The Limerick Generating Station Units 1 & 2
19. LM-0589 Rev. 01A Site Flood Eval. Due to installation of Turbine Bldg. 23-Line Extension
20. LM-0614 Rev. 00A Site Flooding Analysis – Revised PMP
21. LM-0615 Rev. 0 Assessment of Safety Related Equipment for Potential Flooding Due to the Revised PMP in response to NRC RAI on LGS IPEEE
22. LM-0616 Rev. 0 IPEEE – External Flooding of Outdoor tanks due to 0.3g earthquake – Effects on Safety Related Equipment.
23. LM-0654 Rev. 0 Limerick Station PMP Analysis – Update for the installation of security barriers east of the Turbine Building.
24. LS-0214 Rev. 0 IPEEE – HCLPF For the NSR outdoor tanks (Refueling Water, Condensate Storage and Fuel Oil)
25. M-200-047 Rev. 5 Specification A-11 Special Doors Examination and Maintenance
26. MA-LG-716-026-1001 Rev. 15 "Additional Guidance For In-Plant/Yard Storage and Housekeeping At Limerick"
27. SE-4, Rev. 6 Flood
28. SE-4-3 Rev. 5 Flooding External To Power Block
29. SE-9 Rev. 30 Preparation For Severe Weather
30. ST-1-008-900-1 Rev. 2 CST and RWST Dike Inspection
31. NPB-117 Rev. 6 "Potential flooding of plant areas – PMP; C.T. Dike Failure, C.W. Pipe Break"
32. LM-0664 Rev. 1 "Effects of Local Intense Precipitation 2007 Update"

Enclosure 2

SUMMARY OF REGULATORY COMMITMENTS

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE OR "OUTAGE"	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	PROGRAMMATIC (Yes/No)
1. Exelon Generation Company, LLC (EGC) will complete the inspection of the Unit 2 Weir Wall classified as restricted access.	Li2R12 Spring 2013	Yes	No
2. EGC will complete the inspection of the ESW Valve Pits (MH214 and MH215) classified as restricted access.	December 31, 2013	Yes	No