PSEG
NUCLEAR LLC
Salem Generating Station Units 1 & 2

SGS Flood Walkdown Report

10 CFR 50.54(f) Section 2.3 (Flood) Response

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1) EXECUTIVE SUMMARY

a) Purpose

In response to the NRC Request for Information regarding Near Term Task Force (NTTF) Recommendation 2.3, a flooding protection walkdown was conducted at Salem Generating Station (SGS) Units 1 and 2 to identify and address plant specific degraded, nonconforming, or unanalyzed conditions of the plant's flood protection features. The flooding walkdowns at SGS were conducted between 9/10/2012 and 11/16/2012.

b) Scope

The scope of the flooding walkdown was developed following a detailed review of all relevant licensing documents. Certain safety-related structures, systems and components (SSCs) at SGS are situated below the design basis flood level. The station relies almost entirely on passive features incorporated in the design to keep water out of the plant. The flooding walkdown scope consisted of five main parts:

- An outdoor walkdown was conducted to ensure no topography changes, added structures or security barriers affect site drainage as described in the Current Licensing Basis (CLB).
- The Service Water Intake Structure (SWIS) above-grade and below grade passive flood protection structures (i.e., walls, floors, and ceilings and penetrations through those walls, floors and ceilings) were inspected.
- The powerblock above-grade and below-grade passive flood protection structures (i.e., walls, floors, and ceilings and penetrations through those walls, floors and ceilings) were inspected.
- The SWIS and powerblock active flood protection features such as sump pumps, associated check valves and flood protection doors were inspected.
- A review of procedures that implement active flood protection features was performed to confirm that the procedures are effective in ensuring their flood protection function.

These areas are credited in the CLB to keep flood water from the bounding flooding event (a hurricane surge) out of the safety related buildings.

c) Methodology

The methodology and acceptance criteria for the evaluation of flood protection features was developed based on NEI Report 12-07 [Rev 0-A], "Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features" [Ref. 2]. Visual inspections of walls, floors, ceilings and penetrations through the walls, floors, and ceilings were conducted to verify there are no observable structural deficiencies that may impact the structure's ability to remain watertight. Visual inspection of active plant flood protection features was similarly performed to verify there are no observable structural defects or leakage. Implementing procedures for flood protection features were reviewed to verify, including the following: that the procedures can be executed as specified/written, that credited time-dependent activities can be completed

in the time required, that resources required to complete the actions are available and are in good working order, and adequate staffing is available to implement the credited actions.

d) Results and Conclusions

Inspections of the SGS Flood Protection Features were performed in accordance with the NEI 12-07 Rev. 0A [Ref. 2]. With the exception of potential deficiencies noted in Attachments A and D for SGS Units 1 and 2, respectively, the SGS Flood Protection Feature Inspections found that the SGS flood protection active and passive features, e.g., walls, floors, roofs, penetration seals, doors, sump pumps, check valves, etc., were confirmed to be installed per design, functional, in general good material condition, and appropriately controlled procedurally to ensure continued functionality. Attachments A and D of this Report for SGS Units 1 and 2, respectively, identify and provide a summary of the potential deficiencies identified during the SGS Flood Protection Walkdowns that have not yet been dispositioned.

A small portion of the building surfaces (floors and walls) and some penetrations within the scope of the flood protection feature walkdown scope were deemed to be inaccessible and were not inspected. Reasonable assurance that these portions of the buildings surfaces and the penetrations in these buildings are acceptable is based on the visual inspection of other similar walls, floors, and penetrations in similar elevations in these buildings that revealed no deficiencies or degradation that would prevent performance of flood protection features. No visible signs of leakage were observed in the vicinity of those inaccessible flood protection features located below grade. Attachments B and E of this Report for SGS Unit 1 and 2, respectively, identify and provide a justification for the features that have been determined to be inaccessible.

Performance of the walkdowns provided confirmation that flood protection features are in place, are in good condition and will perform as credited in the current licensing basis (CLB). Minor issues were identified and entered into the PSEG corrective action program (CAP). No operability concerns were identified.

Attachments C and F of this Report for SGS Units 1 and 2, respectively, identify and provide a summary of the features that have been determined to have restricted access. Planning to perform the required flood protection feature walkdown / assessments is addressed within the PSEG CAP.

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 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)) [Ref. 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 Ref. 3, the NRC requested that licensees perform flood protection walkdowns 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. [1]

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. Flooding walkdowns identify/address plant-specific degraded, nonconforming, or unanalyzed conditions (through the corrective action program) and verify the adequacy of monitoring and maintenance procedures associated with flood protection and mitigation

[1] Cliff-edge effects were defined by the NTTF Report [Ref. 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 (Ref. 3), the information the NRC expects utilities to obtain during the Recommendation 2.3: Flooding Walkdowns is different. To clarify, the NRC is now differentiating between cliff-edge effects (which are dealt with under Enclosure 2 of Ref. 3) and a new term, Available Physical Margin (APM). APM information will be collected during the walkdowns, but will not be reported in the response to Enclosure 4 of Ref. 3. The collected APM information will be available for use in developing the response to Enclosure 2 of Ref. 3.

features credited in the current design/licensing basis. New flood hazard information will be considered in response to Enclosure 2 of Ref. 3.

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 walkdown procedures, was addressed via the PSEG Nuclear (PSEG) June 07, 2012, acceptance [Ref. 1] of the industry walkdown guidance [Ref. 2].

b) Site Description

The SGS is located in the southern region of the Delaware River Valley, which is defined as the area immediately adjacent to the Delaware River and extending from Trenton to Cape May Point, New Jersey on the eastern side, and from Morrisville, Pennsylvania, to Lewes, Delaware, on the western side. This region is characterized by extensive tidal marshlands and low-lying meadowlands.

More precisely, the SGS is located on the southern part of Artificial Island on the east bank of the Delaware River in Lower Alloways Creek Township, Salem County, New Jersey. While called Artificial Island, the site is actually connected to the mainland of New Jersey by a strip of tideland formed by hydraulic fill from dredging operations on the Delaware River by the U.S. Army Corps of Engineers. The site is 15 miles south of the Delaware Memorial Bridge, 18 miles south of Wilmington, Delaware, 30 miles southwest of Philadelphia, Pennsylvania, and 7- 1/2 miles southwest of Salem, New Jersey, and approximately 50 river miles upstream of the mouth of Delaware Bay.

The Delaware River Estuary system consists primarily of Delaware Bay, Delaware Estuary, and Delaware River. At the SGS site, tidal flows dominate over fresh water discharge.

The station is located on the east shore of the estuarian zone of the Delaware River - Delaware Bay system. Delaware River flow enters the head of Delaware Bay 2 miles downstream of the site. The largest tributaries of the Delaware River are the Schuylkill River in Pennsylvania; the Christina River in Delaware; the Assunpink, Crosswicks, Rancocas, and Salem Rivers; and Big Timbers, Hope, and Alloways Creeks in New Jersey.

The head of the Delaware Estuary is at Trenton, New Jersey, about 83 miles upstream of the site. The Chesapeake and Delaware Canal, which connects the Delaware River with Chesapeake Bay, is located about 7 miles north of the Salem site.

The water body to the west of the SGS is considered to be a tidally affected estuary by the U. S. Geologic Survey. As such, water levels are recorded by tidal gauges and no "flood record" is kept. The tidal flow in the site area is estimated to be more than an order of magnitude greater than the average fresh water flow in the site vicinity. Thus, maximum and minimum water levels that may be of concern to plant safety were derived through considerations of coastal environmental conditions rather than riverine conditions.

The site area is generally flat with natural drainage flowing toward the Delaware River and into the marsh areas toward the north and east, previously having an average elevation of about 9

feet above sea level. This was raised slightly in the plant area, to Elevation +10.5 Mean Sea Level (MSL) or 99.5 Public Service Datum (PSD). Herein, Mean Sea Level (MSL) refers to the National Geodetic Vertical Datum (NGVD) datum, which at 0 feet is equal to the Public Service Electric and Gas Company datum (PSD) of + 89 feet. The SGS Turbine and Auxiliary Building ground floor levels are at Elevation 11.0 feet MSL (100 feet PSD). Herein, the MSL and MLW levels reported in the SGS UFSAR are converted to PSD for simplicity.

The main access to the plant is from a road constructed by PSEG. This road connects with Alloways Creek Neck Road about 2-1/2 miles east of the site. Access to the plant site and all activities thereon is under the control of PSEG.

c) Requested Actions

Per Enclosure 4 of Ref. 3, the NRC requests that each licensee confirm use of the industry-developed, NRC-endorsed, flood walkdown procedures or provide a description of plant-specific walkdown procedures. In a letter dated June 07, 2012 [Ref. 1], PSEG confirmed that the flooding walkdown procedure [Ref. 2], endorsed by the NRC on May 31, 2012, will be used as the basis for the flooding walkdowns.

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 Ref. 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' Ref. 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 Ref. 3,

1. *The NRC requests that each licensee confirm that it will use the industry-developed, NRC endorsed, flooding walkdown procedures or provide a description of plant-specific walkdown procedures. As indicated previously, PSEG's letter dated June 07, 2012 [Ref. 1], confirmed that the flooding walkdown procedure [Ref. 2], endorsed by the NRC on May 31, 2012, will be used as the basis for the flooding walkdowns.*

2. *The NRC requests that each licensee conduct the walkdown 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 paragraph 2a (of this Report) 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 [Ref. 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 7, 2012, PSEG issued a letter to the NRC [Ref. 1] stating that the endorsed flooding walkdown procedure [Ref. 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
- Walkdown Report

b) Application of NEI 12-07

PSEG's approach to the flooding walkdowns included three phases:

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

All walkdown team members completed the applicable NANTeL training and testing. Data gathering began with identification of station-specific licensing commitments and station design basis relative to external flooding events. This included review of the SGS UFSAR [Ref.13], identification of drawings showing flood protection features and review of station procedures and calculations relative external flooding events. A walkdown scope was developed to ensure station features credited as performing a flood protection function in the current licensing basis would be inspected. Based on the walkdown scope, a walkdown list per building was prepared identifying the specific features to be inspected. Walkdown packages per building room / floor were prepared for the specific features contained within those areas for use by the walkdown team in performing and documenting the walkdown.

The scope developed for the walkdowns at SGS included the following:

- The Service Water Intake Structure (SWIS) flood barrier surfaces, e.g., walls, floors, and ceilings. The scope included the inspection of all exterior surface penetrations, as well as any active flood protection feature within the SWIS, e.g., sump pumps, check valves, doors and hatches.
- Powerblock (SGS Auxiliary Building, Main Steam / Feedwater Penetration Areas, and Fuel Handling Building) flood barrier surfaces, e.g. walls, floors, and ceilings up to Elevation 130 feet PSD. The SGS Containment portion of the reactor building was not included in the inspection scope because its exterior walls and the floor are credited with leak tightness based on the periodic Integrated Leak Rate Testing.
- The potential for conduits from manholes or cable vaults to provide a path for ground water or rain water to enter safety related buildings was considered relative to the walkdown scope. For penetrations located within flood barrier surfaces, the plant information database SAP was reviewed to determine and include those

penetrating commodities which originate within the flood barrier and terminate exterior to the flood barrier.

- An outdoor walkdown was conducted to ensure no topography changes, added structures or security barriers affected site drainage as described in the CLB.

Phase 2 – Inspections and Reasonable Simulations

Inspections of credited walkdown features were performed by the walkdown team following the guidance provided in NEI 12-07. Where potential deficiencies or other conditions were identified, these findings were documented and entered into the station CAP. The performance of a reasonable simulation was performed for the implementation procedure SC.OP-AB.ZZ-0001(Q), "Adverse Environmental Conditions" [Ref. 18]).

Phase 3 – Final Reporting

This Report has been developed to document the implementation of the program and to respond to the 50.54(f) information request regarding NTTF Recommendation 2.3: Flooding.

c) Reasonable Simulations

The purpose of reasonable simulations is to verify required flood protection procedures or activities can be executed as specified/written. SGS relies on active incorporated watertight doors to function in a flooding event. To ensure that these active incorporated flood protection features are functional (closed / sealed) for an imminent flooding event, SGS Procedures: OP-AA-108-111-1001 "Severe Weather and Natural Disaster Guidelines" [Ref. 17] and SC.OP-AB.ZZ-0001(Q) "Adverse Environmental Conditions" [Ref. 18] identify the performance of manual / operator actions intended to mitigate or protect against external flooding.

Per NEI 12-07 [Ref. 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.

d) Walkdown Inspection Guidance

The "Walkdown Inspection Guidance" as provided in NEI 12-07 [Ref. 2] was used to provide inspection guidance for specific features that are applicable to SGS. These applicable features are listed below.

- Incorporated or Exterior Passive Features:
  - Earthen Features (i.e., Flood Protection Dike)
  - Concrete and Steel Structures / Surfaces
  - Wall, Ceiling, and Floor Seals (e.g. Penetration Seals)
  - Floor Hatches
- Incorporated or Exterior Active Features:
  - Credited Water Tight Doors
  - Pumps
  - Water Level Indication
  - Check Valves
- Temporary Passive Features:
  - N/A
- Temporary Active Feature
  - Pumps

4) REQUESTED CONTENT

a) Design Basis Flood Hazard Level(s)

i) NRC Request

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

- *Identify all flood hazards that were evaluated in the site's design basis and the flood level resulting from each. Identify hazards that were screened out.*
- *Note that some flood hazards may be limiting for flood level and some for other considerations such as warning time and dynamic loading.*
- *Describe any key assumptions (e.g., all culverts were assumed blocked).*
- *Include information on the methodology used in developing the design basis flooding hazard.*
- *If differences or contradictions in flood hazard levels were found in design or licensing basis documentation, include a description of the basis for flood level used [Ref. 1].*

ii) SGS Response

The bounding site flood event is based on hurricane induced surge and wave flooding. No other possible sources of flooding exceed the hurricane flood level; hence, station design is predicated upon the worst possible Probable Maximum Hurricane (PMH) meteorological event.

The maximum stillwater level associated with the PMH surge at the safety related structures and equipment is Elevation 113.8 feet PSD. The wave runup elevations on safety-related structures inside the sea wall are calculated to be a maximum of 120.4 feet PSD. The maximum wave run up elevation on the service water intake structure is calculated to be 127.3 feet PSD.

Structure	Max. Stillwater Level PSD [feet]	Max. Wave Runup Elevation PSD [feet]
• Powerblock Structures	113.8	120.4
• Intake Structure	113.8	127.3

Descriptions of the design basis flood hazard level(s) for all flood-producing mechanisms, including groundwater ingress, as described in the SGS UFSAR Section 2.4, are summarized below.

(1) Probable Maximum Flood

For SGS, the probable maximum flood due to river flooding is bounded by the hurricane flood level and is not applicable, per SGS UFSAR Sections 2.4.2 and 2.4.5 [Ref. 13].

(2) Probable Maximum Precipitation

The maximum probable rainfall is of consideration only in design of yard drainage facilities and as a possible loading on critical structures, not as it may pertain to river flooding. The Yard Drainage System is designed to pass the drainage associated with a rainfall rate of 4 inches per hour for a period of 20 minutes (based on 90 percent runoff from paved areas and 50 percent runoff from graded areas). This rainfall intensity has a return frequency of 15 years (see SGS UFSAR Figure 2.4-5 [Ref. 13]) and therefore, an unusually severe storm producing a rainfall rate in excess of 4 inches per hour for time periods of less than 20 minutes can be handled by the system.

In the unlikely event that the Yard Drainage System was to be loaded beyond its capacity, the excess water would accumulate and run off (surface run off to the river) as the storm subsided. All doors and penetrations in the Class I (seismic) buildings are watertight up to Elevation 115 feet (PSD). As a point of reference, the flood door threshold elevations are minimum 100 feet PSD, and the site grade adjacent to the Seismic Category I structures is 99.5 feet PSD. The interior drains in the Auxiliary and Fuel Handling Buildings are independently piped to the Liquid Waste Disposal System and are not connected to the Yard Drainage System.

Roof drains are designed to dispose of a maximum rainfall rate of 4 inches per hour for a period of 20 minutes through the Yard Drainage System. Roof slabs are watertight to prevent building interiors from being damaged by severe rainstorms. The slabs are designed to withstand a loading equivalent to a depth of water up to the full height of the building's parapet or roof curb. In the unlikely event that some of the roof drains become plugged, the backed up water will spill down the outside of the building. Wall penetrations above Elevation 115 feet (PSD) on Class I (seismic) buildings are designed to prevent roof spillage or heavy rain from seeping inside the building.

In the event the capacity of the Yard Drainage System were to be exceeded as a result of an unusually severe rainstorm, the excess water would accumulate in puddles in the vicinity of the catch basins and run off. This water would not enter any safety-related structure, since these structures are watertight up to Elevation 115 feet (PSD). Therefore, safety-related equipment would not be adversely affected as a result of a severe rainstorm.

(3) Potential Dam Failures

For SGS, the potential dam failures are not applicable, see SGS UFSAR Sections 2.4.2 and 2.4.4 [Ref. 13].

(4) Probable Maximum Surge and Seiche Flooding (Design Basis Flooding Hazard)

The maximum stillwater elevation at the site is based on a combination of the storm surge and the crosswind setup or drawdown. The Maximum Postulated Storm surge elevations have been calculated for the six fetches chosen and are presented in SGS UFSAR Table 2.4-1 [Ref. 13] with the computed crosswind setup and the maximum stillwater elevation at the site. The associated PMH was located so as to produce maximum waves. In the vicinity of the site, the PMH winds had a maximum sustained wind velocity of 85 miles per hour from the southeast. With the surge level at 113.8 feet PSD, wave runup elevations on safety-related structures inside the sea wall were calculated to be a maximum of 120.4 feet PSD. Maximum wave run up elevation on the service water intake structure was calculated to be 127.3 feet PSD. The following sections summarize the SGS UFSAR discussion of the calculation of the PMH maximum storm surge, the maximum stillwater level, and maximum wave run up elevations.

(a) Probable Maximum Winds and Associated Meteorological Parameters

PMH storm surges have been calculated for the site using the bathystropic storm tide theory described by Marinos and Woodward (1968) (SGS UFSAR Section 2.4 Ref. 1) [Ref. 13]. The hurricane surge was computed at the mouth of Delaware Bay and routed up the bay in accordance with a method described by Bretschneider (1959) (SGS UFSAR Section 2.4 Ref. 2) [Ref. 13].

Components of the stillwater level are:

1. the mean low water depth,
2. the astronomical tide,
3. the rise in water level resulting from the hurricane's atmospheric pressure reduction,
4. the wind stress component perpendicular to the bottom contours (onshore wind components),
5. the wind stress component parallel to the bottom contours which produces a longshore flow that is deflected to the right (in the northern hemisphere) by the Coriolis forces, and
6. the initial surge (a slow general rise in sea level existing before the actual hurricane winds arrive).

The PMH is defined by the U. S. Department of Commerce Report HUR 7-97 (SGS UFSAR Section 2.4.14 Ref. 3) [Ref. 13] as:

"A hypothetical hurricane having that combination of characteristics which will make it the most severe that can probably occur in the particular region involved. The hurricane should approach the point under study along a critical path and at an

optimum rate of movement." Indices used to calculate maximum storm surge are taken in part from HUR 7-97 where values are grouped according to defined coastal zones and by latitude within each zone.

The track of the postulated hurricane is shown on SGS UFSAR Figure 2.4-6 [Ref. 13]. Two different forward speeds of translation were used to determine the effect that the rate of forward movement of the hurricane would have on the surge elevation.

The PMH utilized in the analyses was a large radius, moderate forward speed hurricane which generated the maximum surge on the open coast. The quantitative meteorological parameters describing the PMH are:

1. Central Pressure Index: 27.09 inches Hg
2. Peripheral Pressure: 30.72 inches Hg
3. Radius of Maximum Winds: 39 nautical miles
4. Maximum Wind Speed: 132 miles per hour
5. Forward Speed: 27 knots

A computer program was developed by Dames and Moore using previous work by the Galveston District Corps of Engineers.

Input data to the computer program describing the storm and the bathymetric conditions included the basic parameters of the hurricane, an initial surge of 1 foot, wind friction factor, bottom friction factor (0.008), wind speed at various radial distances and angles of wind direction relative to the translational velocity vector of the hurricane, bathymetric traverse data and astronomical tide (5.6 feet).

Winds which approach the site from a direction off the axis of the bay produce a component which is perpendicular to the axis of the bay. This cross-wind component causes the water surface to be raised on the upwind side of the bay and depressed an equal amount on the downwind side of the bay.

As the PMH is moved along its postulated track, wind speed and direction at the site change because of the effects of friction and filling over land and also because of the position of the storm center with respect to the site. The cross-wind effects were calculated for the six wind directions chosen for analysis. The six wind directions or fetches radiate downbay from the site at 15-degree intervals from the east bank of Delaware Bay.

The calculations consist of determining the corrected wind speed along the fetch, the cross-wind component of the wind speed, and the resulting cross-wind setup or drawdown. A summary of the calculations for each of the fetches is presented in SGS UFSAR Table 2.4-1 [Ref. 13].

The wind speed was corrected to include the effect of the fetch distance from the storm center and also for friction and filling overland.

The computed maximum surge elevation at the mouth of Delaware Bay was 21.9 feet above mean low water. This surge included the effects of the astronomical high spring tide.

The maximum surge of 21.9 feet above mean low water at the mouth of Delaware Bay was routed to the site using the procedure of Bretschneider. The model surge hydrographs for Delaware Bay computed by Bretschneider were then used to determine hurricane surge values at the Salem site as a function of time.

The maximum stillwater elevation at the site is a combination of the storm surge and the crosswind setup or drawdown. Storm surge elevations have been calculated for the six fetches chosen and are presented in SGS UFSAR Table 2.4-1 [Ref. 13] with the computed crosswind setup and the maximum stillwater elevation at the site. The six wind fetches radiate downbay from the site at 15-degree intervals from the east bank of the Delaware Bay. Subsequently, site hydrologic design parameters were developed using a maximum surge elevation of 113.8 feet PSD, as recommended by the Nuclear Regulatory Commission consultants.

(b) Wave Action

The primary factors influencing the generation of waves will be the maximum wind speed over the water, the effective fetch length, and the average depth of water along the fetch. The values of these parameters used in the computations of wave heights and periods were determined for the fetches analyzed by:

1. Determining the location of the center of the storm required to produce winds along the fetch,
2. Calculating corrected wind speeds to account for friction and filling over the land and distance from the storm center to the fetch center,
3. Calculating the still water elevation at the center of the fetch due to storm surge at the time the storm center is located to produce the maximum wind speed along the pre-selected fetch,
4. Computing the average depth along the fetch.

The basic assumptions used in the analyses were:

1. Storm generated waves from the open sea are dissipated at the mouth of Delaware Bay.
2. Steady state waves are generated along each fetch (these waves are independent of time).
3. Only the area northwest of Ben Davis Point generates significant wave energy at the site.

The PMH was located so as to produce maximum waves. In the vicinity of the site, the PMH winds had a maximum sustained wind velocity of 85 miles per hour from

the southeast. With the surge level at 113.8 feet PSD, wave runup elevations on safety-related structures inside the sea wall were calculated to be a maximum of 120.4 feet PSD. Maximum wave run up elevation on the service water intake structure was calculated to be 127.3 feet PSD.

(c) Resonance

As a result of the nature of the estuary upon which the site is located, resonance was not a necessary consideration.

(d) Runup

The maximum wave runup elevation was calculated to be +120.4 feet PSD on critical structures inside the sea wall and 127.3 feet PSD on the service water intake structure. The Sainflou method was used, assuming a minimum sea wall height of Elevation 108 feet PSD in the most critical area.

(5) Probable Maximum Tsunami Flooding

The occurrence of tsunamis is infrequent in the Atlantic Ocean. Other than the tidal fluctuation recorded on the New Jersey Coast during the Grand Banks earthquake of 1929, there has been no record of tsunamis on the northeastern United States coast.

The earthquake of November 18, 1929, on the Grand Banks about 170 miles south of Newfoundland, resulted in a tsunami which struck the south end of Newfoundland about 750 miles northeast of the Massachusetts coast. The tsunami occurred at a time of abnormally high tide and resulted in some loss of life and destruction of property. The effect of this tsunami was recorded on tide gages along the United States east coast, as far south as Charleston, South Carolina. A tidal fluctuation of approximately nine-tenths of one foot was noted at Atlantic City, New Jersey and Ocean City, Maryland.

The Lisbon earthquake of November 1, 1755, produced great waves, which contributed heavily to the destruction on the coast of Portugal. These waves were noticeable in the West Indies. It had been reported that the Cape Ann, Massachusetts, earthquake of November 18, 1755, caused a tsunami in Saint Martin's Harbor in the West Indies; however, there is no record of a tsunami occurrence along the east coast of the United States at this time and it has since been determined that the Saint Martin's Harbor report actually refers to the tsunami caused by the Lisbon earthquake, which occurred within three weeks of the Cape Ann shock. Some tsunami activity has occasionally followed earthquakes in the Caribbean, but none of these was reported in the United States.

There is no evidence of surface rupture in East Coast earthquakes and no history of significant tsunami activity in the region. Hence, we do not believe that the plant site would be subjected to any significant tsunami effect. The maximum expected tsunami would result in only minor wave action, and the maximum expected storm wave effect is the critical factor in design.

(6) Ice Flooding

The SGS CLB does not address flooding potential for ice-induced flooding.

(7) Groundwater Table

Normal ground water table for the site is at Elevation 96 feet PSD.

(8) Differences or Contradictions in Flood Hazard Levels

No differences or contradictions were identified.

b) Protection Mitigation Features Considered in the Licensing Basis

i) NRC Request

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.

- *Describe the flooding licensing basis including what plant configurations (modes of operation; for example, full power operations, startup, shutdown, and refueling) were considered. This description should be consistent with the scope of the flooding walkdowns.*
- *Document the flood duration assumed in the CLB. If the CLB does not provide information on the flood duration, this lack of information should be documented in the walkdown report.*
- *Describe the flood protection features that are credited in the CLB, such as incorporated, exterior and temporary barriers, time required for credited actions under flood conditions, active flood protection features, procedures, warnings credited for external floods, site drainage plan, etc.*
- *Describe weather conditions or flood levels that trigger procedures and associated actions for providing flood protection and mitigation.*
- *Describe the adverse weather conditions that were assumed concurrent with flood protection features and associated actions.*

ii) SGS Response

(1) Flooding Licensing Basis

The design-basis flooding event is applicable to all modes of operation (e.g., full power operations, reduced power operations, startup, hot shutdown, cold shutdown, and refueling). The design-basis flood is the result of the PMH surge with wave runup. The PMH was located so as to produce maximum waves. In the vicinity of the site, the PMH winds had a maximum sustained wind velocity of 85 miles per hour from the southeast. With the surge level at 113.8 feet PSD, wave runup elevations on safety-related

structures inside the sea wall were calculated to be a maximum of 120.4 feet PSD. Maximum wave run up elevation on the service water intake structure was calculated to be 127.3 feet PSD.

(2) Flood Duration Assumed in the CLB

The expected duration of the site flooding associated with the PMH event is not identified in the SGS UFSAR / CLB.

The SGS flood protection features are however designed to be permanent and are therefore not dependent on the flood duration.

(3) Flood Protection Features that are Credited in the CLB

(a) Incorporated or Exterior Passive Flood Protection Features

Safety-related equipment required for cold shutdown is located inside the containment, service water intake, Auxiliary Building, and main steam and feedwater pipe penetration areas. The containment is watertight and can withstand the static and dynamic loads associated with a storm producing stillwater level of 113.8 feet PSD and the corresponding wave runup to 120.4 feet PSD.

The portion of the service water intake enclosing the pumps, motors, and vital switchgear is watertight up to Elevation 126.0 feet PSD with wave runup protection to Elevation 128.0 feet PSD. The service water intake can also withstand the static and dynamic effects of the storm. Each vertical, turbine type service water pump column bowl and suction bell is installed in an individual chamber which is open to the river. The chamber is isolated from the watertight compartments where the pump discharge heads and motors are located. The pump discharge heads are bolted down to pads to Elevation 92.5 feet PSD. The joint between the pump discharge head and the pad at Elevation 92.5 feet PSD is watertight to prevent leakage of water into the compartments. Provisions have also been made to prevent leakage from the discharge head glands and leakoff connections into the watertight compartments. A sump pump is provided in each compartment to remove any accumulated water in the event a minor leak should occur.

The Auxiliary Building is watertight up to Elevation 115 feet PSD. All doors in the outer Auxiliary Building walls below Elevation 120.4 feet PSD are watertight. All watertight doors and structural walls can withstand the static and dynamic effects associated with a storm that produces a stillwater level of Elevation 113.8 feet PSD with wave runup to Elevation 120.4 feet PSD. Conduit penetrations above Elevation 115 feet PSD and below Elevation 120.4 feet PSD are packed to eliminate gross inleakage during the storm.

The main steam and feedwater pipe penetration area is watertight below Elevation 120.4 feet PSD. The structural walls and watertight doors are also capable of

withstanding the static and dynamic effects of the storm which produces a stillwater level of Elevation 113.8 feet PSD and wave runup to Elevation 120.4 feet PSD.

All flood barrier penetrations in the Class I (seismic) buildings are watertight up to Elevation 115 feet (PSD).

The buoyancy effect of ground water has been included in the assessment of the sliding and overturning potential of the Category I structures. Hydrostatic loadings from the hurricane condition were applied to the structures to check their stability.

The design and placement of the protective rockfill dike located along the portion of the Delaware estuary is such that it is subjected to maximum wind wave forces, thereby limiting the wave runup levels at the safety related structures and equipment to Elevation 120.4 feet PSD.

The protective dikes are south of the power block between the Salem barge slip and the Salem circulating water intake structure, between the Salem circulating water and service water intake structures, and North of the Salem service water intake structure.

The shoreline protection and dike system is inspected by station operating personnel prior to storms and hurricanes and following the passage of such storms and hurricanes. Additionally, a more complete annual inspection is conducted both by boat and from the dike itself. The station security forces also make regular patrols of these areas as part of their surveillance duties, and are instructed to report any abnormalities observed in the structure.

Waterproofing

The underground portion of the containment structure is waterproofed in order to avoid seepage of ground water through cracks in the concrete. The waterproofing consists of an impervious membrane which is placed under the mat and on the outside of the walls and extends vertically up to six (6) inches below yard grade. The Ethylene Propylene Diene Monomers (by Uniroyal, Inc.) membrane will not tear in handling or placing of backfill against it.

(b) Incorporated or Exterior Active Flood Protection Features

Watertight Doors

In the event of rising water levels, all watertight doors will be closed to maintain watertight integrity. SGS Technical Specifications specify the flood levels at which (1) watertight integrity will be established (at which time flood protection procedures will be initiated on a site-wide basis to protect the plant from flood waters) and (2) plant shutdown will be initiated.

All flood barrier doors in the Class I (seismic) buildings are watertight up to Elevation 115 feet (PSD).

Closure of the Technical Specification Protective Doors is controlled administratively when the River Water Level exceeds Elevation 97.5 feet PSD per SC.OP-AB.ZZ-0001(Q) "Adverse Environmental Conditions" [Ref. 18]. The list of Technical Specification Protective Doors is provided in SC.OP-AB.ZZ-0001 Attachment 1.

(c) Temporary Passive Flood Protection Features

Temporary Passive Flood Protection Features are not credited in the SGS CLB.

(d) Temporary Active Flood Protection Features

In the event of a major storm, which may be expected to cause flooding of the site, a number of temporary sump pumps will be available to remove any water which may enter the SGS Auxiliary Building. The minimum total capacity of these temporary pumps will be 2000 gpm and each pump will be capable of pumping from the lowest building elevation to above Elevation 121 feet PSD.

(4) Weather Conditions or Flood Levels that Trigger Procedures and Associated Actions for Providing Flood Protection and Mitigation

Specific plant actions in response to potential flooding conditions are addressed in three procedures:

- OP-AA-108-111-1001, "Severe Weather and Natural Disaster Guidelines" [Ref. 17]
- SC.OP-AB.ZZ-0001(Q), "Adverse Environmental Conditions [Ref. 18]
- SGS Technical Specifications [Ref. 20]

OP-AA-108-111-1001 [Ref. 17] provides guidelines for actions to be taken in preparation for potential flooding events. Specific actions /preparations identified within OP-AA-108-111-1101 [Ref. 17] for potential flooding are summarized below; the timing refers to hours prior to the expected arrival time of a severe weather event.

Phase / time	Action(s)
I / Once a Year (May)	• Review out of service equipment logs focusing on SBO equipment and sump pumps to determine where redundancy may be needed. Ensure work is prioritized to promptly restore such equipment to an operable status. • Ensure Material Center has adequate sump pumps totaling 2000 gpm to supply additional sump pumps staged in the material center. • Ensure that adequate water removal pumps, hoses, drain plugs... are available and prestaged in the material center. •

Phase / time	Action(s)
II / 48 hrs	• Verify any/all intake structure sump pumps operable. • Review plant work activities having breaches that could cause flooding in the plant due to flood tides; (any high risk system manways or pipe openings). Direct Maintenance to provide water tight closings for these areas. • Consider implementation of SC.OP-AB.ZZ-0001(Q) [Ref. 18]. • Initiate Notification to Mechanical / Civil Design to perform a shoreline protection and dike system inspection prior to and following a hurricane and to document the inspection in a notification. • Verify all watertight doors are secured. • Consider maximizing room in the Waste Holdup tanks (WHUTs) to support potential water intrusion into the Aux. building
III / 24 hrs	• Close Watertight doors listed in SC.OP-AB.ZZ-0001(Q) [Ref. 18]
IV / present	• Consider implementation of SC.OP-AB.ZZ-0001(Q) [Ref. 18]

The specific actions identified within SC.OP-AB.ZZ-0001(Q) [Ref. 18] along with their associated River Water level have been reiterated below:

River Level	Action(s)
≥ 95.5 ft [2]	• Evaluate the need to move sump pumps as required by OP-AA-108-111-1001 [Ref. 17] to a flood protected area. • Close 1WD74 Seismic Gap Drain Isolation Valve • Close 2WD74 Seismic Gap Drain Isolation Valve • Send Operators to inspect the following areas for seal or excessive crack leakage which could cause flooding in rooms containing safety related equipment: o Auxiliary Building o Fuel Handling Building o Service Water Intake Structure o Outer Penetration Area o Inner Penetration Area
≥ 97.5 ft [2]	• Notify SM/CRS to refer to Event Classification Guide • Record river level in Control Room Narrative Log, at least every 2 hours, until river has stabilized at < 97.5 ft. • Close all doors listed in Attachment 1, Technical Specification Protective Doors, within 2 hours. • Post signs on all Attachment 1 listed Protective Doors, to maintain closed. • If Containment Equipment Hatch is open then o Remove obstructions from inner Containment Equipment Hatch and install inner Containment Hatch with all bolts to eliminate air gaps o Or install Outage Equipment Hatch and ensure all penetrations are closed or blind flanged to eliminate air gaps. • Send Maintenance Service Department to close and seal all access hatches and manway covers listed on Attachment 2, Protective Doors. • Send Operators to close all doors listed in Attachment 2, Protective Doors and post signs on all watertight doors indicating following passage, door closure is required IAW SC.OP-AB.ZZ-0001(Q), Adverse Environmental Conditions. [Ref. 18]

[2] SC.OP-AB.ZZ-0001(Q) states in paragraph 2.5.9 of the therein attached Technical Basis Document, "Engineering Evaluation SC-SW004-01 determined loop uncertainties could affect the control room indications by as much as 2 feet. Therefore, action levels are adjusted to account for this uncertainty".

River Level	Action(s)
≥ 98.5 ft [2]	• Initiate actions to place the Unit in Mode 3 within 6 hours and Mode 5 within the next 30 hours.

SGS Technical Specification 3.7.5.1 initiates actions based on river water level measured at the Service Water Intake Structure exceeding a predetermined Elevation 10.5 ft Mean Sea Level, which is equal to 99.5 ft PSD, as follows:

> "Flood protection shall be provided for all safety related systems, components and structures when the water level of the Delaware River exceeds 10.5' Mean Sea Level USGS datum, at the service water intake structure."
>
> "a. With the water level at the service water intake structure above elevation 10.5' Mean Sea Level USGS datum, close all watertight doors within 2 hours.
>
> b. With the water level at the service water intake structure above elevation 11.5' Mean Sea Level USGS datum, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours. "

*(5) **Adverse Weather Conditions that were Assumed Concurrent with Flood Protection Features and Associated Actions***

The design-basis flood for SGS is the result of the PMH surge with wave runup. Per SGS UFSAR 2.4.5.1, the PMH utilized in the analyses was a large radius, moderate forward speed hurricane which generated the maximum surge on the open coast. In the vicinity of the site, the PMH winds have a maximum sustained wind velocity of 85 miles per hour from the southeast. See paragraph 4 a)ii)(4)(a) for further discussion on the Probable Maximum Winds and associated meteorological parameters. With the surge level at 113.8 feet PSD, wave runup elevations on safety-related structures inside the sea wall are calculated to be a maximum of 120.4 feet PSD. Maximum wave run up elevation on the service water intake structure is calculated to be 127.3 feet PSD. The associated actions are addressed above in Paragraph (4).

c) Warning Systems to Detect the Presence of Water

i) NRC Request

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

- Describe the room water level warning systems credited for their flood protection function in the plant's external flooding licensing basis.
- Note that systems that detect internal flooding sources are not part of the scope of the walkdown.

ii) SGS Response

(1) Floor Drains / Level Alarms

No temporary or installed permanent plant warning system is credited with a flood protection function in the SGS external flooding licensing basis. During adverse weather conditions, Operators, per paragraph 3.9.2 of SC.OP-AB.ZZ-0001(Q) "Adverse Environmental Conditions" [Ref. 18], are instructed to monitor plant areas (rooms containing safety related equipment) for water ingress (seal or excessive crack leakage).

Flood alarms installed and credited for internal flooding sources are available for detecting the accumulation of water resulting from ingress; however they are not credited for their flood protection function in the plants external flooding licensing basis. Such flooding alarms (sump level) are located in the Service Water Intake Structure bays as well in the Auxiliary Building.

- The design of the watertight pump compartments in the intake structure include a high sump level alarm in the event that a pipe rupture occurs which is larger than the capacity of the sump pump (125 gpm). The high sump level for the affected compartment is alarmed in the control room.
- Each residual heat removal pump room, the lowest point in the Auxiliary Building, contains two sump pumps, each adequate to provide the minimum capacity of 50 gpm (nominal 100 gpm each), which discharge to the Waste Disposal System. The design operating leakage rate of the RHR System is 50 gpm due to a pump seal failure. In the event of a major storm, which may be expected to cause flooding of the site, a number of temporary sump pumps are made available to remove any excess water which may enter the building. The minimum total capacity of these temporary pumps is 2000 gpm and each pump is capable of pumping from the lowest building elevation to above Elevation 121 feet.
- In the Auxiliary Building the floor drains at Elevations 84 feet, 100 feet and 122 feet are piped to the waste holdup tanks. Elevation 64 foot drains are piped to the waste holdup tanks via the Auxiliary Building sump tanks and sump tank pumps. All drains below the elevation of the Auxiliary Building sump tank drain ultimately to the waste holdup tank. In addition, stairwells descending to elevation 55 feet PSD will also facilitate distribution of ground / flood water due to ingress to the RHR sumps.

(2) Procedural

Plant procedures provide direction for all plant personnel to report observed leakage in order to facilitate appropriate corrective action. Plant procedures (OP-AA-111-101-1001, "Use and Development of Operating Logs", S1(2).OP-DL.ZZ-0006(Q), "Primary Plant Log" and S1(2).OP-DL.ZZ-0005(Q), "Secondary Plant Log") provide direction for

Operators on their routine inspections during their watch to report observed leakage, to facilitate appropriate corrective action.

d) Effectiveness of Flood Protection Features

i) NRC Request

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.

- *The purpose of the 2.3 walkdowns is to verify the conformance with the CLB; the adequacy of the CLB will be addressed as part of the 2.1 flood reevaluations if an integrated assessment is required.*
- *The acceptance criteria for the walkdowns are described in section 6 of the guideline. This approach is consistent with requested information item 1.h of the 50.54(f) letter. Discuss how the plant implemented this approach.*
- *This discussion should include an evaluation of the overall effectiveness of the plant's flood protection features to perform their credited functions during a variety of site conditions (as defined previously), as determined by the results of the walkdowns (the features are available, functional, and implementable). The CAP [corrective action program] process will determine which of the walkdown observations are deficiencies and what actions were taken or planned to address them. Questions such as the following should be evaluated for a variety of site conditions:*
  - *Is the barrier system functional?*
  - *Are operator actions feasible?*
- *Describe how other existing plant equipment, structures, and procedures might mitigate the effects of an external flood under a variety of plant configurations.*
- *Clearly describe what additional existing, if any, plant structures, systems, components, and procedures that are not part of the flooding CLB and that could be used to mitigate an external flood. Note that the Walkdown Report should include a description of existing plant capability, not an assessment of plant vulnerabilities to flooding that might exist under all susceptible plant configurations. The assessment of plant vulnerabilities to all susceptible plant configurations will be completed, if applicable, as part of an Integrated Assessment performed in response to Enclosure 2 of Ref. 1.*
- *Note: NUMARC 93-01, Rev 4A provides guidance on implementation of the maintenance rule. Section 11.3.4.2 of that document recommends an assessment of maintenance activities that expose SSCs to flood hazards in a manner that degrades their capability to perform key safety functions. Credit for this activity could be included in this discussion.*

ii) SGS Response

(1) Purpose of the Walkdowns

The purpose of the flood protection feature walkdown was to verify the conformance of exterior and incorporated flood protection features with the CLB.

In addition to the visual component of the flood protection feature walkdown, a review of the preventative maintenance and surveillance programs was performed. The purpose of the review was to validate that the credited features were contained in a program that would ensure their continued conformance with the CLB.

The results of the flood protection feature walkdown investigation will be reviewed against the hazard reevaluation, as required, after the reassessment of flooding levels. If determined by the flood hazard reevaluation that an integrated assessment is warranted, a further evaluation of the adequacy of the CLB will be performed as result of the integrated assessment.

(2) Acceptance Criteria

The acceptance criteria for visual inspections performed during the SGS flood protection feature walkdowns were taken from the general acceptance criteria provided within the NEI 12-07 Section 6 and Appendix A [Ref. 1] guidance. These criteria were used, as applicable, for each type of SGS flood protection feature listed in Section 4) b) of this report. This approach is consistent with the Requested Information Item 1.h from Enclosure 4 of the 50.54(f) letter.

(3) Evaluation of the Overall Effectiveness of the Plant's Flood Protection Features

(a) Procedures

The review of the flood protection features design and licensing documentation, and subsequent field inspection of the applicable physical flood protection features was implemented per the guidance provided within NEI 12-07. PSEG Nuclear has implemented ER-AA-310-1009 "Condition Monitoring of Structures" [Ref. 15] for condition monitoring of Maintenance Rule structures, such as with regard to the monitoring of flood control features: concrete walls and slabs, water-control structure elements, penetration seals, etc. Specific instructions regarding the inspection of SGS Penetration seals are addressed in SC.FP-SV.FBR-0026(Q) "Flood and Fire Barrier Penetration Seal Inspection." Instruction regarding the inspection and maintenance of the SGS plant bulkhead doors is addressed in: SC.MD-PM.ZZ-0036(Q) "Watertight Door Inspection and Repair" [Ref. 19]. Therein, SC.MD-PM.ZZ-0036(Q) adequately identifies the Technical Specification related doors, requires a review to initiate a Plant Barrier Impairment (evaluation of taking the barrier out of service), and provides adequate notification / coordination with the Plant Operators.

SGS includes active flood protection features (Watertight Perimeter Doors) that require the implementation of procedures to initiate the performance of manual/operator actions (closing of the doors) in order for the feature to perform its intended flood protection function and the staging of temporary sump pumps in a flood protected area.

A reasonable simulation was performed at SGS which confirmed that the actions described within the implementing procedure SC.OP-AB.ZZ-0001(Q), "Adverse Environmental Conditions" [Ref. 18] can be performed within the required period of time, and sufficient resources are allocated and staged to perform those actions.

The SGS UFSAR Section 3.4.3.1 states: "In the event of a major storm, which may be expected to cause flooding of the site, a number of temporary sump pumps are available to remove any water which may enter the building. The minimum total capacity of these temporary pumps is 2000 gpm and each pump is capable of pumping from the lowest building elevation to above Elevation 121 feet." OP-AA-108-111-1001 [Ref. 17] and SC.OP-AB.ZZ-0001(Q) [Ref. 18] require confirmation that the pumps are available and to evaluate the need to relocate the pumps to a flood protected area in the event of a hurricane or flood. During preparations for Hurricane Sandy (October 28 through 30, 2012), availability of the temporary sump pumps was confirmed, thereby satisfying the UFSAR Section 3.4.3.1 commitment. A notification has been issued to suggest enhancements to OP-AA-108-111-1001 (20584969) and SC.OP-AB.ZZ-0001 (20584978). It is suggested that the procedures be supplemented with instructions as required to facilitate the implementation of the temporary sump pumps.

(b) Accessibility

The flood protection features that could be accessed were evaluated against the NEI 12-07 acceptance criteria. Those features that were found to be restricted or partially accessible were entered into the PSEG CAP, i.e., a Notification was entered in SAP. Attachments C and F of this Report provide a list of the restricted-access features. as well as the associated Notification number. The plan to perform the inspection of the restricted access flood protection features is provided in the PSEG CAP. Flood protection features classified as inaccessible are identified in Attachments B and E and are discussed in paragraph 4) f) of this Report.

(c) Effectiveness

The SGS Flood Protection Features were found to be in conformance with that described within the CLB. Based on inspection of the installed passive and installed active SGS Flood Protection Features, and the review of the applicable SGS flood protection feature procedures (Abnormal Weather Warning procedure, Abnormal Weather Implementing procedure, preventative maintenance and surveillance procedures) the SGS flood protection features are considered functional, and the cited operator actions are considered appropriate for maintaining flood protection

for SGS. The design of the SGS flood protection features consider protection of safety related SSCs under all plant operating and abnormal conditions considered within the CLB. Discrepancies found between the plant physical configuration and that described in the design / licensing documentation were noted and entered into the PSEG CAP for evaluation and disposition, as identified in Attachments A and D.

Paragraph 4) f) of this Report provides a detailed discussion of the results from the flood protection feature walkdown program.

(4) Other Existing Plant Equipment, Structures, and Procedures that Might Mitigate the Effects of an External Flood under a Variety of Plant Configurations

The current basis for protection and mitigation of an external flooding event, including plant equipment, structures, and procedures, is discussed in paragraph 4) b) of this Report.

No other existing plant equipment, structures, or procedures were identified as being able to mitigate external flooding events that are not already credited in the CLB.

(5) Assessment of Maintenance Activities that Expose SSCs to Flood Hazards

No maintenance activities were identified that would degrade any of the identified flood protection features from performing their credited function. The associated preventative maintenance and surveillance programs were evaluated for each feature, with no negative findings. The implementation procedure, SC.MD-PM.ZZ-0036(Q) [Ref. 19], that closes the SGS watertight doors references CC-AA-201 [Ref. 21], which provides controls for plant barrier impairment.

e) Implementation of the Walkdown Processes

i) NRC Request

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.

- *Confirm that guidance was followed (and options selected when available within the guidance) and any exceptions taken to the guidance. See Sections 5.3, 7, Appendix B.*
- *Describe how the walkdown teams were organized (e.g., number of members, general background, etc.). See Sections 5.3 and 7.*
- *Describe the approach used to comply with Section 5.3 guidance on walkdown team selection and training.*

ii) SGS Response

SGS Flood Protection Features walkdowns were implemented in accordance with the guidelines provided in NEI 12-07 [Ref. 2]. The SGS Flooding walkdown teams included a

minimum of two (2) qualified individuals (Civil / Mechanical discipline) per team. See Attachment G for Team organization and member qualifications. All team members are familiar with the station design / licensing basis relative to external flooding, and completed the training developed by the NEI Fukushima Flooding Task Force as provided by INPO's NANTeL training regarding NEI 12-07 guidelines.

Each team member performed a visual inspection of each feature within the scope of the applicable walkdown package. Walkdown data / results were documented consistent with the guidelines provided within NEI 12-07. Features that were found to be questionable / degraded or inaccessible / partially accessible were identified and were entered into the PSEG CAP for further action.

f) Results of the Flood Protection Feature Walkdown

i) NRC Request

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.

- *Include the following items*
  - *Description of all deficiencies as determined by the CAP. Observations that are entered into the CAP and not dispositioned as deficiencies do not need to be reported.*
  - *Description of any observations reported in the CAP that were not dispositioned at the time of the report.*
  - *Describe actions that were taken or are planned to address the deficiencies using the guidance in Regulatory Issues Summary 2005-20 Revision 1.*
  - *Flood protection features that could not be inspected, including:*
- *Features affected by restricted access (see Section 5.1):*
  - *Justification for delay*
  - *Schedule*
  - *Any necessary special procedures*
- *Inaccessible features (see Section 5.1):*
  - *Basis for reasonable assurance that the feature is available and will perform its credited function or an assessment of the impact of non-performance of the function.*

- *If more than one "inaccessible" flood protection feature with potential loss of function is reported, then an evaluation of the aggregate effect flood protection features must be provided.*
- *Walkdown record forms are not submitted to the NRC, but as discussed in Section 7 are retained onsite for NRC inspection.*

ii) SGS Response

Summary of Findings

The plant flood protection features were found to be as described in the CLB (available, functional, and maintained), with the exception of issues that are evaluated as a potential deficiency. These issues are listed and described in Attachments A and D of this report. In general, the inspection of the flood protection features, confirmed that the SGS credited flood protection features / barriers were found to be in place, in good condition, and capable of performing their design function as credited in the CLB. For the applicable flood protection features which were identified as potential deficiencies during the flood protection feature walkdowns, detailed observations, photographs, and qualitative dispositions were presented for consideration and input into the PSEG CAP process.

Those flood protection features listed in Attachments B and E are "Inaccessible" in accordance with the guidelines provided within NEI 12-07 Rev. 0-A [Ref. 2]. A brief evaluation is provided below to provide reasonable assurance that the inaccessible flood protection feature can perform its design function.

Those flood protection features listed In Attachments C and F have "Restricted Access" in accordance with the guidelines provided within NEI 12-07 Rev. 0-A. Access to perform the walkdown / inspection is currently prevented due to, typically, plant operating conditions preventing / limiting access or full or partial disassembly of plant structures is required to facilitate the inspection. Flood protection features identified as being restricted access are entered in the PSEG CAP to schedule the performance of a future walkdown and evaluation.

Flood Protection Feature Walkdown Results	***Number of Features***
Total Flood Protection Features	2,790 [3]
Inaccessible Flood Protection Features	9
Restricted Access Flood Protection Features	252
Flood Protection Features Walked-Down	2,526
Total Potential/Actual Deficiencies	512 [4]

[3] Includes 1 Yard Walkdown Structure, and 2 Guideline / Abnormal Weather Procedures
[4] Includes Materiel Condition issues identified in Att. A and D. This total also include features with apparent negative margin. One notification is included in Att. A to investigate actual margin for these additional features.

Flood Protection Feature Types	***Number of Features***
Installed Passive	2,691
Installed Active	96
Temporary Passive	0
Temporary Active	1
Procedures	2

(1) Deficiencies

For those SGS flood protection features which were identified as having potential deficiency during the flood protection feature walkdowns, detailed observations, photographs, and qualitative dispositions were presented for consideration and input into the PSEG CAP process. A review of the potential deficiencies is performed, as part of the PSEG CAP process, to determine if the potential deficiency is a deficiency. Potential deficiencies are identified and described in Attachments A and D of this Report for SGS Units 1 and 2, respectively.

Additional reviews to evaluate potential deficiencies and implement corrective actions to rectify the identified discrepancy are addressed within the PSEG CAP process.

(2) ***Description of any Observations Reported in the CAP that were not Dispositioned***

Attachments A and D of this Report for SGS Units 1 and 2, respectively, include a listing and description of SGS flood protection feature walkdown observations (potential deficiencies) to be entered into the PSEG CAP.

(3) ***Flood Protection Features that could not be Inspected***

(a) ***Restricted Access Features***

Those SGS flood protection features that were found to have restricted access are identified and described in Attachments C and F of this Report for SGS Units 1 and 2, respectively. Additionally, Attachments C and F provide the justification for a delay in performing the flood protection feature walkdown / inspection and assessment. The associated plan and schedule for performing the flood protection feature walkdown / inspection and assessment for those SGS flood protection features identified as having restricted access are addressed within the PSEG CAP. It is anticipated that no special procedures will be required to perform the flood protection feature walkdown inspection / assessment for those features considered

as having restricted access. Identification of the required instructions and criteria will be addressed within the PSEG CAP for the applicable flood protection feature.

(b) Inaccessible Features

Those SGS flood protection features that were found to be inaccessible are waterproofing, waterstops and items identified in Attachments B and E of this Report for SGS Units 1 and 2, respectively. These inaccessible features are summarized below,

(i) Waterproofing (Common to Unit 1 and Unit 2)

The underground portion of the containment structure, auxiliary building and fuel handling buildings are waterproofed in order to avoid seepage of ground water through cracks in the concrete. The waterproofing consists of an impervious membrane which is placed under the mat and on the outside of the walls. The membrane will not tear in handling or placing of backfill against it. To waterproof the subgrade exterior walls and foundations, a rubber waterproof membrane was installed under all foundations and was extended vertically up to 6 inches below yard grade. The horizontal waterproofing membrane was 1/16-inch thick Ethylene Propylene Diene Monomers (EPDM rubber). The waterproofing membrane used on vertical surfaces was 3/64-inch thick nylon reinforced Ethylene Propylene Diene Monomers (Nylon Fabric Inserted EPDM).

Reason Inaccessible

The waterproofing is located below grade and as such, ground adjacent to the plant structures would need to be extensively excavated to accommodate an inspection.

Functional Requirement

Waterproofing and rubber waterstops prevent or limit water intrusion at the concrete construction joints and seismic gap joints so that safety-related equipment is not impacted by groundwater ingress.

Basis for Reasonable Assurance that Feature is Available and Functional

As the ground water level is only a few feet below site grade, the waterproofing is subjected to a continuous hydraulic gradient. The Control Room Alarms are provided on sump level reaching pre-established sump level setpoints.

The ability of the existing waterproofing systems at SGS to perform their design basis function of protecting safety-related equipment from the effects of water ingress is confirmed by the fact that the plant drain system s are not challenged by the ingress of groundwater.

(i) Waterstops (common to Unit 1 and Unit 2)

A waterstop is installed at the vertical and horizontal seismic joints between the reactor building to auxiliary building, reactor building to fuel handling building, and auxiliary building to fuel handling building to prevent groundwater and floodwaters from entering safety related structures through the seismic joints. The waterstop consists of a combination of lead coated copper metal flashing, a fabric reinforced silicone rubber gasket / seal, and stainless steel clamping bars secured with anchor bolts and/or keyed in to the concrete structure in reglets with a sealant as applicable.

Reason Inaccessible

The waterstop construction is partially visible and a fire barrier would need to be partially disassembled in some areas to accommodate an inspection.

Functional Requirement

Waterstops prevent or limit water intrusion past the seismic joints so that safety-related equipment is not impacted by the flood level.

Basis for Reasonable Assurance that Feature is Available and Functional

Control Room Alarms are provided on sump level reaching pre-established sump level setpoints.

The ability of the existing waterproofing systems at SGS to perform their design basis function of protecting safety-related equipment from the effects of water ingress is confirmed by the fact that the plant drain systems are not challenged by the ingress of groundwater.

(ii) Elevator Shaft – Projection Bevel Plates (Common for Unit 1 and Unit 2)

(Applicable to Features E-15333-EL 84, E-15333-EL 100, E-15333-EL 122)

Two (2) auxiliary building elevator shaft walls have installed steel plate structures that preclude inspection of approximately 20% of one wall per elevator shaft. These plate structures are installed per Safety Code requirements to eliminate a personnel shear hazard at several elevations within the elevator shaft. The plates are installed in locations that are below grade as well locations that are above grade.

Reason Inaccessible

The plate structures obscure / prevent the observation of approximately 20% of the below grade wall surface. To inspect the wall behind the steel plate structures, the plates would have to be removed. The other sides of the elevator shaft walls are either below grade or are within the seismic gap between the auxiliary building and the containment building; so direct visual inspection is not feasible.

Functional Requirement

The wall behind the steel plate structures is part of the auxiliary building flood boundary. The auxiliary building flood boundary is designed to preclude ground / flood water intrusion so that safety-related equipment is not impacted by the flood level.

Basis for Reasonable Assurance that Feature is Available and Functional

The remainder of the wall surfaces were inspected and found to be without visible defects, and no signs of previous water marks on the wall surfaces below the steel structures. Control Room Alarms are provided on sump level reaching pre-established sump level setpoints.

(iii) Pipe Chase.

(Applicable to S-15206, W-25206)

The exterior walls of the East Pipe Chase are below grade. The East Pipe Chase communicates with the pipe alley on Elevation 84 feet and with the RHR pump room sumps at Elevation 55 feet.

Reason Inaccessible

The east pipe shafts are accessible from the pipe alley at El. 84, but access is dose restricted.

Functional Requirement

The exterior pipe chase walls are below grade and are part of the auxiliary building flood boundary. The auxiliary building flood boundary is designed to preclude ground / flood water intrusion so that safety-related equipment is not affected.

Basis for Reasonable Assurance that Feature is Available and Functional

Drainage in the east Pipe Chase is designed for Moderate Energy Line (MEL) Breaks (internal flooding). MEL Flooding in the RHR pump rooms can occur as a result of MEL fluid from breaks in the pipe alley on Elevation 84 feet which in turn communicates with Elevation 55 feet via a pipe chase. High RHR Sump sump level Alarms in the control room resulting from the ingress and accumulation of ground / external flood water will alert the control room operator to take compensatory action to limit the increase in sump level via the installation of temporary sump pumps.

(iv) Penetration Seals Located Inside Concrete

(Applicable to E-25504-001, E-25504-002, E-25504-249, E-25504-250)

Reason Inaccessible

The penetration seals are physically located/ embedded in concrete.

Functional Requirement

Preclude water ingress of water into safety-related areas / structures.

Basis for Reasonable Assurance that Feature is Available and Functional

The additional embedment of the penetrating commodities in concrete provides additional length that seeping ground water would have to travel to reach the inside of the room.

Control Room Alarms are provided on sump level reaching pre-established sump level setpoints.

(c) ***Inaccessible Feature Aggregate Effects***

The construction of the seismic category I structures includes several flood protection features configured in series that function to prevent / limit ingress of ground / flood water into the plant. In order for ground water to ingress into the plant several layers of the flood protection features would have to have been compromised / failed. Condition Monitoring of Structures via ER-AA-310-1009 [Ref. 15] provides assurance that concrete structural elements (e.g., walls, slabs, etc.) remain capable of performing their design function. As such, there is reasonable assurance that the failure of multiple in-series flood protection features is not likely.

Control room alarms are provided on sump level reaching pre-established sump level setpoints. As such, operator response would limit flood effects and prevent impact to safety-related equipment from groundwater ingress. In addition, the CLB identifies the availability of temporary sump pumps, having a total capacity of 2,000 gpm, for use in removing ground / flood water from areas containing safety related equipment.

g) Cliff Edge Effects

i) NRC Request

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 and physical margins do not need to be reported to the NRC as part of the Walkdown Report. However, the Appendix B walkdown records, which include the collected APM information, need to be retained and available for NRC audits and inspections.*
- *While the NRC used the same term as the NTTF Report [Ref. 5] in its 50.54(f) information request [Ref. 3] related to Flooding Recommendation 2.3, the information that the NRC expects utilities to obtain during the Recommendation 2.3 walkdowns is different. To*

clarify, the NRC is now differentiating between cliff-edge effects (which are dealt with in Recommendation 2.1) and a new term, Available Physical Margin (APM). APM information will be collected during the walkdowns, but will not be reported in the response to Ref. 3, Enclosure 4. The APMs determined by the Recommendation 2.3 walkdowns do not involve calculating the cliff-edge effects (i.e., the safety consequences). During the Recommendation 2.1 integrated assessment, the cliff-edge effects and the associated safety risks will be determined using the APMs as well as other information, such as the specific SSCs that are subjected to flooding and the potential availability of other systems to mitigate the risk.

- *Instead of submitting cliff-edge effects, this report documents that Available Physical Margins have been collected and documented in the Walkdown Record form [Ref. 2 Appendix B]. This information will be used in the flood hazard reevaluations performed in response to Item 2.1: Flooding in the 50.54(f) letter.*

ii) SGS Response

(2) Cliff Edge Effects and Physical Margins

As indicated in Section 3.12 of NEI 12-07, the NRC is no longer expecting the response to the Recommendation 2.3: Flooding Walkdowns of the 50.54(f) letter to include an evaluation of cliff-edge effects. The available physical margin (APM) has been estimated and documented, as applicable, in the walkdown record forms. The guidance provided in FAQ-006, Applicable Features for Quantifying APM, was also followed. This information will be used in the flood hazard reevaluations performed in response to Item 2.1: Flooding in the 50.54(f) letter.

h) Other Planned and/or Newly Installed Flood Protection Features or Measures

i) NRC Request

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.

- *Describe changes determined to be necessary by the flood walkdowns and whether they have been completed or their schedule for completion.*
- *For the purposes of the flooding design basis walkdown verification, the peer review is the process described in section 7. The only actions and results that should be reported are those that resulted in a change to the walkdown process or methodology. Corrections and resolution of differences resulting from the normal process of performer / reviewer interaction are not reported.*

ii) SGS Response

No new flood protection systems or flood mitigation measures including flood barriers were found necessary to enhance the SGS flood protection. No changes were found necessary to flood protection or mitigation measures as a result of the SGS Flood Protection Feature Walkdowns. Attachment H provides a review of changes to the walkdown process / methodology.

5) CONCLUSIONS

Inspections of the SGS Flood Protection Features were performed in accordance with the NEI 12-07 Rev. 0A [Ref. 2]. With the exceptions noted in Attachments A and D for SGS Units 1 and 2, respectively, as potential deficiencies, the SGS Flood Protection Feature Inspections found that the SGS flood protection active and passive features, e.g., walls, floors, roofs, penetration seals, doors, sump pumps, check valves, etc., were confirmed to be installed per design, functional, in good material condition, and appropriately controlled procedurally to ensure continued functionality.

A small portion of the building surfaces (floors and walls) and penetrations within the flood protection feature walkdown scope were deemed to be inaccessible and were not inspected. Reasonable assurance that these portions of the buildings surfaces and the penetrations in these buildings are acceptable is based on the visual inspection of other similar surfaces and penetrations in similar elevations within these buildings, which revealed no potential deficiencies or degradation that would prevent performance of flood protection features. No visible signs of leakage were observed in the vicinity of those inaccessible flood protection features located below grade.

Performance of the walkdowns provided confirmation that flood protection features are in place, are in good condition and will perform as credited in the current licensing basis (CLB). Minor issues were identified under the PSEG CAP. No operability concerns were identified.

Attachments A and D of this Report for SGS Units 1 and 2, respectively, identify and provide a summary of the potential deficiencies that have not yet been dispositioned.

Attachments B and E of this Report for SGS Units 1 and 2, respectively, identify and provide a summary of the features that have been determined to be inaccessible.

Attachments C and F of this Report for SGS Units 1 and 2, respectively, identify and provide a summary of the features that have been determined to have restricted access. Planning to perform the required flood protection feature walkdown / assessments is addressed within the PSEG CAP.

6) REFERENCES

1. PSEG Letter to U.S. Nuclear Regulatory Commission, LR-N12-0170. PSEG Nuclear LLC's Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Flooding Aspects of Recommendations 2.1 and 2.3 of the Near Term Task Force Review of Insights From the Fukushima Daiichi Accident, June 07, 2012.
2. Nuclear Energy Institute (NEI), Report 12-07 [Rev 0-A]. *Guidelines for Performing Verification Walkdowns of Plant Flood Protection Features*. May 2012 [NRC endorsed May 31, 2012; updated and reissued 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 1.10.
13. Salem Generating Station (SGS) Updated Final Safety Analysis Report (UFSAR) Rev. 26

14. SGS Structural Design Criteria
15. PSEG Procedure ER-AA-310-1009, Rev. 2, Condition Monitoring of Structures
16. Salem Generating Station - Safety Evaluation Report Rev. 26
17. OP-AA-108-111-1001, Rev. 7, Severe Weather and Natural Disaster Guidelines
18. SC.OP-AB.ZZ-0001(Q) , Rev. 14, Adverse Environmental Conditions
19. SC.MD-PM.ZZ-0036(Q), Rev. 7, Watertight Door Inspection and Repair
20. SGS Technical Specifications, up to Amendment No. 301 (U1), 286 (U2)
21. CC-AA-201, Rev. 4, Plant Barrier Control Program

7) ATTACHMENTS

a) Notification List – SGS Unit 1 Flood Protection Features
b) Inaccessible – SGS Unit 1 Flood Protection Features
c) Restricted Access – SGS Unit 1 Flood Protection Features
d) Notification List – SGS Unit 2 Flood Protection Features
e) Inaccessible – SGS Unit 2 Flood Protection Features
f) Restricted Access – SGS Unit 2 Flood Protection Features
g) Project Organization
h) Changes in Walkdown Process / Methodology

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
1	15615 / 0112203	S-15615-PEN1	none	Unidentified HVAC Penetration through wall	20585526
2	15616 / 0112204 / 0112205 / 0112206 / 0112207	W-15616-	none	calcification, superficial cracking	20585183
3	15101 / 0104505 / 0104506	W-15101-	none	Signs of historical leakage	20584047
4	15101 / 0104505 / 0104506	S-15101-	none	Signs of historical leakage	20584047
5	15101 / 0104505 / 0104506	F-15101-	none	Signs of historical leakage	20584047
6	15202 / 0105505	E-15102-	none	Signs of historical leakage	20584049
7	15102 / 0104501 / 0104502	F-15102-	none	Signs of historical leakage	20584049
8	15103 / 0104507	W-15103-	none	signs of historical leakage	20585185
9	15103 / 0104507	S-15103-	none	signs of historical leakage	20585185
10	15103 / 0104507	F-15103-	none	signs of historical leakage	20585185
11	15103 / 0104507	S-15103-	none	signs of historical leakage	20585185
12	15104 / 0104503	E-15104-	none	signs of historical leakage	20584054
13	15104 / 0104503	S-15104-	none	signs of historical leakage	20584054
14	15104 / 0104503	F-15104-	none	Signs of historical leakage near Residual Heat Exchanger	20584054
15	15104 / 0104503	E-15104-	none	signs of historical leakage	20584054
16	15104 / 0104503	S-15104-	none	signs of historical leakage	20584054
17	15201 / 0105505	W-15201-	none	signs of historical leakage	Pending
18	15202 / 0105505	W-15202-	none	signs of historical leakage	20584056
19	15203 / 0105501	E-15203-	none	signs of historical leakage	20173983
20	15204 / 0105502	E-15204-	none	signs of historical leakage	20584056
21	15205 / 0105502	E-15205-	none	Signs of historical leakage in the screen area near the PC basket and ladder.	20584056
22	15206 / 0105505	W-15206-	none	signs of historical leakage	20585187
23	15206 / 0105505	S-15206-	none	signs of historical leakage	20585187

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
24	15209 / 0105505	W-15209-	none	Signs of historical leakage on next to Fire Door A1-1	20584056
25	15301 / 0106401	S-15301-	none	Cracks and signs of historical leakage	20528770
26	15301 / 0106401	E-15301-	none	Cracks and signs of historical leakage	20528770
27	15301 / 0106401	F-15301-unidentified floor drain	none	East of column line C-C, unidentified feature	20585526
28	15301 / 0106401	F-15301-unidentified floor drain	none	East of column line C-C, unidentified feature	20585526
29	15306 / 0106404 / 0106405	S-15306-	none	Cracks and signs of historical leakage	20584063
30	15306 / 0106404 / 0106405	F-15306-	none	Paint peeling and crack between wall and floor.	20584063
31	15307 / 0106407	F-15307-	none	Superficial cracking on floor.	20584065
32	15307 / 0106407	F-15307-unidentified floor pen	none	Unidentified penetration	20585526
33	15307 / 0106407	F-15307-unidentified floor pen	none	Unidentified penetration	20585526
34	15308 / 0106408	S-15308-	none	Cracking and mineralization, historical leakage	20584066
35	15308 / 0106408	F-15308-unlabelled floor drain	none	Unidentified penetration	20585526
36	15309 / 0106409	S-15309-	none	historical leakage	20584066
37	15310 / 0106410	F-15310-unidentified floor pen	none	Unidentified penetration	20585526
38	15311 / 0106411	S-15311-	none	Mineral Deposits and Historical Leaks	20584066
39	15312 / 0106412	F-15312-unidentified floor penetration	none	Unidentified penetration	20585526
40	15312 / 0106412	F-15312-unidentified floor penetration	none	Unidentified penetration	20585526
41	15314 / 0106414	S-15314-	none	signs of leakage (calcification) on corners of wall.	20584067
42	15314 / 0106414	F-15314-unlabelled floor penetration	none	Unidentified penetration	20585526
43	15315 / 0106415	F-15315-	none	Moisture on floor with signs of historical leakage	20585189
44	15316 / 0106416	S-15316-	none	calcification on wall	20585191
45	15316 / 0106416	F-15316-	none	Moisture on floor with signs of historical leakage	20585191

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
46	15317 / 0106419 / 0106426	W-15317-	none	signs of significant historical leakage - cracking, mineralization.	20584832
47	15319 / 0106420	S-15319-	none	Signs of leakage / mineralization. Cracking observed.	20584831
48	15320 / 0106420	F-15320-unidentified floor penetration	none	Unidentified penetration	20585526
49	15320 / 0106420	F-15320-unidentified floor penetration	none	Unidentified penetration	20585526
50	15321 / 0106421	F-15321-	none	Signs of historical leakage on floor - calcification / mineralization.	20584831
51	15323 / 0106423	E-15323-	none	Signs of leakage / mineralization on wall in vestibule area and in the corner behind the tank.	20584831
52	15323 / 0106423	F-15323-	none	Signs of historical leakage observed.	20584831
53	15324 / 0106424	E-15324	none	Signs of leakage / mineralization	20584831
54	15324 / 0106424	F-15324-	none	Signs of leakage / mineralization with excessive cracking, water on ground.	20584831
55	15325 / 0106428 / 0106429	S-15325-	none	Moisture on floor, calcification	20585193
56	15325 / 0106428 / 0106429	F-15325-	none	signs of historical leakage	20585193
57	15326 / 0106428	F-15326-	none	Small floor cracks	20584834
58	15327 / 0106429	F-15327-	none	Small Cracks	20584833
59	15328 / 0106430	W-15328-	none	Cracks, Mineralization	20584835
60	15328 / 0106430	S-15328-	none	Cracks, Standing water	20584835
61	15328 / 0106430	F-15328-	none	Small Puddle of standing water due to wall crack	20584835
62	15328 / 0106430	F-15328-unidentified floor penetration	none	Floor Drain Unidentified floor penetration	20585526
63	15329 / 0106427	W-15329-	none	Cracks and signs of historical leakage	20584846
64	15329 / 0106427	F-15329-unidentified floor penetration	none	Unidentified penetration	20585526
65	15330 / 0106425	F-15330-unidentified floor penetration	none	Unidentified penetration	20585526

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
66	15330 / 0106425	F-15330-unidentified floor penetration	none	Unidentified penetration	20585526
67	15332 / 0106436	F-15332-	none	debris and loose particulate on floor, oil staining, unable to visualize floor surface	20584828
68	15333 / 0106435	F-15333-	none	Cracking, mineral deposits, and moisture visible	20584829
69	15333 / 0106435	E-15333-EL64	none	Oil staining and corrosion present	20584829
70	15401 / 0108401	E-15401-	none	Cracking and mineralization	20530111
71	15419 / 0108407	S-15419-	none	cracks in surface	20584312
72	15426 / 0108443	W-15426-	none	cracks in surface	20584317
73	15427 / 0108443	W-15427-	none	cracks in surface	20584317
74	15428 / 0210003 / 0210004	E-15428-	none	Cracking	20584824
75	15428 / 0210003 / 0210004	E-15428-136	S1FBR-E-15428-136	concrete chipped away in 3rd quadrant	20584824
76	15428 / 0210003 / 0210004	E-15428-180	S1FBR-E-15428-180	Corrosion of penetration	20584824
77	15428 / 0210003 / 0210004	E-15428-181	S1FBR-E-15428-181	Corrosion of penetration	20584824
78	15428 / 0210003 / 0210004	E-15428-182	S1FBR-E-15428-182	heavy corrosion	20584824
79	15428 / 0210003 / 0210004	E-15428-183	S1FBR-E-15428-183	heavy corrosion	20584824
80	15428 / 0210003 / 0210004	E-15428-188	S1FBR-E-15428-188	heavy corrosion	20584824
81	15428 / 0210003 / 0210004	E-15428-189	S1FBR-E-15428-189	heavy corrosion	20584824
82	15428 / 0210003 / 0210004	E-15428-190	S1FBR-E-15428-190	heavy corrosion	20584824
83	15428 / 0210003 / 0210004	E-15428-191	S1FBR-E-15428-191	seal appears to be peeling near the top	20584824
84	15428 / 0210003 / 0210004	E-15428-192	S1FBR-E-15428-192	heavy corrosion	20584824

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
85	15428 / 0210003 / 0210004	E-15428-193	S1FBR-E-15428-193	heavy corrosion	20584824
86	15428 / 0210003 / 0210004	E-15428-194	S1FBR-E-15428-194	heavy corrosion	20584824
87	15428 / 0210003 / 0210004	E-15428-196	S1FBR-E-15428-196	heavy corrosion	20584824
88	15428 / 0210003 / 0210004	E-15428-197	S1FBR-E-15428-197	heavy corrosion	20584824
89	15428 / 0210003 / 0210004	E-15428-198	S1FBR-E-15428-198	heavy corrosion	20584824
90	15428 / 0210003 / 0210004	E-15428-199	S1FBR-E-15428-199	heavy corrosion	20584824
91	15428 / 0210003 / 0210004	E-15428-201	S1FBR-E-15428-201	heavy corrosion	20584824
92	15428 / 0210003 / 0210004	E-15428-202	S1FBR-E-15428-202	heavy corrosion	20584824
93	15428 / 0210003 / 0210004	E-15428-204	S1FBR-E-15428-204	heavy corrosion	20584824
94	15428 / 0210003 / 0210004	E-15428-205	S1FBR-E-15428-205	heavy corrosion	20584824
95	15428 / 0210003 / 0210004	E-15428-206	S1FBR-E-15428-206	heavy corrosion	20584824
96	15428 / 0210003 / 0210004	E-15428-207	S1FBR-E-15428-207	heavy corrosion	20584824
97	15428 / 0210003 / 0210004	E-15428-208	S1FBR-E-15428-208	heavy corrosion	20584824
98	15428 / 0210003 / 0210004	E-15428-209	S1FBR-E-15428-209	heavy corrosion	20584824
99	15429 / 0108427 / 0108430	S-15429-031	S1FLB-S-15429-031	Signs of historical leakage (calcification)	20584846
100	15432 / 0108429	W-15432-	none	Calcification, signs of historical leakage, cracking observed	20584303
101	15433 / 0108432	S-15433-001	S1FLB-S-15433-001	Leakage observed on wall at rear of diesel oil tank room on south wall.	20584307

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
102	15433 / 0108432	S-15433-002	S1FLB-S-15433-002	Missing foam and rust streaks below penetration	20584307
103	15433 / 0108432	S-15433-003	S1FLB-S-15433-003	Leakage observed on wall at rear of diesel oil tank room on south wall.	20584307
104	15433 / 0108432	S-15433-004	S1FLB-S-15433-004	Missing foam	20584307
105	15434 / 0207801	F-15434-001	S1FBR-F-15434-001	Corrosion product observed on seismic gap near the south wall. Corrosion product and signs of mineralization / calcification observed in various other locations.	20584856
106	15434 / 0207801	E-15434-	none	Cracking observed throughout wall. Signs of mineralization / calcification present along length of wall.	20584856
107	15434 / 0207801	S-15434-UN1	S-15434-UN1	Unidentified duct penetration on south wall	20585526
108	15435 / 0207802	F-15435-UN1	F-15435-UN1	Unidentified penetration on floor	20585526
109	15435 / 0207802	F-15435-UN2	F-15435-UN2	Unidentified penetration on floor	20585526
110	15437 / 0207805 / 0207806	W-15437-	none	Signs of historical leakage, mineralization and calcification present.	20584853
111	15437 / 0207805 / 0207806	S-15437-010	S1FLB-S-15437-010	Signs of rust / corrosion product on bolts.	20584853
112	15437 / 0207805 / 0207806	F-15437-001	S1FLB-F-15437-001	Rust on seismic gap across from Boron Injection tank room. Standing water on seismic gap.	20584853
113	15439 / 0207809	W-15439-	none	Leakage observed on wall, mineralization and calcification present.	20578435
114	15439 / 0207809	F-15439-	none	Standing water throughout floor. Source is unclear.	20584854
115	15444 / 0207813	E-15444-	none	signs of historical leakage	20584857
116	15444 / 0207813	F-15444-	none	signs of historical leakage	20584857
117	15544 / 0110025	W-15544-	none	Mineralization and signs of historical leakage on South edge of wall.	20584857

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
118	15546 / 0110017	S-15546-001	S1FLB-S-15546-001	Cannot see seal. Piping goes thru flood barrier wall and there is an annular gap which appears to have no seal.	20584747
119	15546 / 0110017	S-15546-002	S1FLB-S-15546-002	Cannot see seal. Piping goes thru flood barrier wall and there is an annular gap which appears to have no seal.	20584747
120	15546 / 0110017	W-15546-UN1	W-15546-UN1	Unidentified penetration	20585526
121	15548 / 0110019	W-15548-	none	Cracks along exterior	20584859
122	15548 / 0110019	W-15548-003	S1FLB-W-15548-003	Conduit LB fitting is missing cover	20584859
123	15548 / 0110019	W-15548-005	S1FLB-W-15548-005	Crack on sealant material at 110°	20584859
124	15555 / 1210019	W-15555-	none	Cracking on ext wall	20584862
125	15557 / 0210001	S-15557-UN1	S-15557-UN1	Unidentified penetration	20585526
126	15557 / 0210001	S-15557-UN2	S-15557-UN2	Unidentified penetration	20585526
127	15502 / 0110001 / 1210001	E-15502-008	S1FBR-E-15502-008	foam seal on both sides	20585199
128	15502 / 0110001 / 1210001	E-15502-107	S1FBR-E-15502-107	foam seal on both sides	20585199
129	19401 / 0310001	E-19401-012	S1FLB-E-19401-012	corrosion products visible	20575717
130	19401 / 0310001	W-19401-008	S1FLB-W-19401-008	Evidence of leakage. Large amounts of calcification / mineralization are evident on the concrete around the boot seal and cascading down the wall	20584863
131	16901	C-16901-003	S1FLB-C-16901-003	Underside (ceiling side) of seal is gone. The seal on the roof side appears to be intact.	20585202
132	16901	E-16901-046	S1FLB-E-16901-046	Small amounts of seal material along with corrosion products were observed in the annular space of the penetration. Most of the sealing material was missing.	20574220 / 20575254 / 20576548
133	16901	E-16901-048	S1FLB-E-16901-048	Seal material has partially degraded on the bottom.	20574410
134	16901	E-16901-052	S1FLB-E-16901-052	Seal material is axially displaced. A 2-4 mm gap is visible.	20574413

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
135	16901	E-16901-054	S1FLB-E-16901-054	Corrosion products and brown staining were observed around the seal and continuing down the wall to the floor.	20574412
136	16901	E-16901-055	S1FLB-E-16901-055	Seal material has partially degraded.	20574411
137	16901	F-16901	0.00	Signs of historical leakage	20585203
138	16901	W-16901-001	S1FLB-W-16901-001	Corrosion product observed on pipe going through penetration. No sign of active leakage.	20585207
139	16901	W-16901-002	S1FLB-W-16901-002	Corrosion product observed on pipe going through penetration. No sign of active leakage.	20585207
140	16901	W-16901-003	S1FLB-W-16901-003	Corrosion product observed on pipe going through penetration. No sign of active leakage.	20585207
141	16902	E-16902-011	S1FLB-E-16902-011	Signs of historical leakage	20574855
142	16902	E-16902-012	S1FLB-E-16902-012	Signs of historical leakage	20574855
143	16902	E-16902-013	S1FLB-E-16902-013	Signs of historical leakage	20574855
144	16902	E-16902-014	S1FLB-E-16902-014	Signs of historical leakage	20574855
145	16902	E-16902-015	S1FLB-E-16902-015	Signs of historical leakage	20574855
146	16902	E-16902-016	S1FLB-E-16902-016	Signs of historical leakage	20574855
147	16902	E-16902-017	S1FLB-E-16902-017	Signs of historical leakage	20574855
148	16902	E-16902-018	S1FLB-E-16902-018	Signs of historical leakage	20574855
149	16902	E-16902-019	S1FLB-E-16902-019	Signs of historical leakage	20574855
150	16902	E-16902-020	S1FLB-E-16902-020	Signs of historical leakage	20574855
151	16902	E-16902-021	S1FLB-E-16902-021	Signs of historical leakage	20574855
152	16902	E-16902-022	S1FLB-E-16902-022	Signs of historical leakage	20574855
153	16902	E-16902-023	S1FLB-E-16902-023	Signs of historical leakage	20574855
154	16902	E-16902-024	S1FLB-E-16902-024	Signs of historical leakage	20574855
155	16902	E-16902-025	S1FLB-E-16902-025	Signs of historical leakage	20574855
156	16902	E-16902-026	S1FLB-E-16902-026	Signs of historical leakage	20574855
157	16902	E-16902-027	S1FLB-E-16902-027	Signs of historical leakage	20574855
158	16902	E-16902-028	S1FLB-E-16902-028	Signs of historical leakage	20574855
159	16902	E-16902-029	S1FLB-E-16902-029	Signs of historical leakage	20574855
160	16902	E-16902-030	S1FLB-E-16902-030	Signs of historical leakage	20574855

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
161	16902	E-16902-031	S1FLB-E-16902-031	Signs of historical leakage	20574855
162	16902	E-16902-032	S1FLB-E-16902-032	Signs of historical leakage	20574855
163	16902	E-16902-033	S1FLB-E-16902-033	Signs of historical leakage	20574855
164	16902	E-16902-034	S1FLB-E-16902-034	Signs of historical leakage	20574855
165	16902	E-16902-035	S1FLB-E-16902-035	Signs of historical leakage	20574855
166	16902	W-16902-001	S1FLB-W-16902-001	Rusting was found	20574136
167	16902	W-16902-002	S1FLB-W-16902-002	Extensive rusting was found	20574138
168	16902	W-16902-003	S1FLB-W-16902-003	There was no boot present.	20574016
169	12403	E-12403	NONE	Crack in corner near north wall	20585210
170	12404	W-12404	NONE	Water damage present throughout length of wall.	20585212
171	12404	F-12404	NONE	Water damage, cracking, corrosion products - some appears to be a result of leakage from the west wall, and some appears to be groundwater intrusion.	20585212
172	12501	E-12501	NONE	Unlabeled penetrations	20585526
173	12501	S-12501-010	S1FLB-S-12501-010	Possible separation of the seal from the conduit.	20585215
174	12501	S-12501-013	S1FLB-S-12501-013	Possible separation of the seal from the conduit.	20585215
175	12501	S-12501-014	S1FLB-S-12501-014	Possible separation of the seal from the conduit.	20585215
176	12501	S-12501-015	S1FLB-S-12501-015	Possible separation of the seal from the conduit.	20585215

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
177	Various	Various	Various	There are several penetration seals throughout the plant do not have a hydrostatic rating that is sufficient for the licensing basis flood level. These seals require further investigation to determine if there is an error in the documentation or if the seals are credited external flood boundaries. This issue is common for both Salem units.	20585541
178	Various	Various	Various	There are several penetration seals throughout the plant that do not have sufficient documentation to determine their hydrostatic rating. Further investigation is required to ensure the hydrostatic rating is sufficient to provide protection from an external flood. This issue is common for both Salem units.	20585526
179	Various	Various	Various	Restricted access items - schedule and track the inspection of the features that are restricted. See Attachment C for a list of restricted access features. This issue is common for both Salem units.	20585220

No.	Flood Protection Feature ID	FLOC	Reason Inaccessible	Justification
1	S-15206-	N/A	Pipe chase - cannot access from this elevation.	See Report Section 4)f)ii)3)b)
2	E-15333-EL84	N/A	Wall 90% covered with steel plates	See Report Section 4)f)ii)3)b)
3	E-15333-EL100	N/A	20% of wall inaccessable due to steel plates, balance of wall is acceptable	See Report Section 4)f)ii)3)b)
4	E-15333-EL122	N/A	Wall covered with steel plates. Concrete not visible on >90% of wall.	See Report Section 4)f)ii)3)b)

No.	Flood Protection Feature ID	FLOC	Short Description of Justification
1	E-15606-	none	no signs of leakage, however wall could not be inspected due to drywall
2	E-15605-	none	no signs of leakage, however wall could not be inspected due to drywall
3	E-15605-003	S1FBR-E-15605-003	Could not be inspected due to drywall
4	E-15605-004	S1FBR-E-15605-004	Could not be inspected due to drywall
5	E-15604-	none	Wall could not be inspected due to drywall
6	E-15603-	none	Wall could not be inspected due to tile
7	S-15612-009	S1FBR-S-15612-009	Penetrations inside box, maintenance support required for access.
8	S-15612-010	S1FBR-S-15612-010	Penetrations inside box, maintenance support required for access.
9	S-15612-011	S1FBR-S-15612-011	Penetrations inside box, maintenance support required for access.
10	S-15612-012	S1FBR-S-15612-012	Penetrations inside box, maintenance support required for access.
11	S-15612-013	S1FBR-S-15612-013	Penetrations inside box, maintenance support required for access.
12	13 BLD & EQUIP DRAINS(WD)RESID HEAT REMOVAL SUMP PMP START-STOP SW	S1WD -1LD7756	Located in room 15101, inside the sump pit, cannot access due to dose concerns
13	14 BLD & EQUIP DRAINS(WD)RESID HEAT REMOVAL SUMP PMP START-STOP SW	S1WD -1LD7755	Located in room 15101, inside the sump pit, cannot access due to dose concerns
14	11 BLD & EQUIP DRAINS(WD) RESID HEAT REMOVAL SMP PMP START-STOP SW	S1WD -1LD7753	Located in room 15102, inside the sump pit, cannot access due to dose concerns
15	12 BLD & EQUIP DRAINS(WD) RESID HEAT REMOVAL SMP PMP START-STOP SW	S1WD -1LD7754	Located in room 15102, inside the sump pit, cannot access due to dose concerns
16	F-15331-	none	scaffolding parts are laid on the floor which covers a lot of the area. What is inspectable looks adequate
17	E-15403-105-BS	S1FBR-E-15403-105-BS	Internal conduit seal - maintenance support required for access
18	W-15417-092-BS	S1FLB-W-15417-092-BS	Internal conduit seal - maintenance support required for access
19	W-15417-093-BS	S1FLB-W-15417-093-BS	Internal conduit seal - maintenance support required for access
20	W-15417-096-BS	S1FLB-W-15417-096-BS	Internal conduit seal - maintenance support required for access
21	W-15417-104-BS	S1FLB-W-15417-104-BS	Internal conduit seal - maintenance support required for access
22	W-15417-109-BS	S1FLB-W-15417-109-BS	Internal conduit seal - maintenance support required for access
23	W-15417-110-BS	S1FLB-W-15417-110-BS	Internal conduit seal - maintenance support required for access
24	W-15417-116-BS	S1FLB-W-15417-116-BS	Internal conduit seal - maintenance support required for access
25	W-15417-130-BS	S1FLB-W-15417-130-BS	Internal conduit seal - maintenance support required for access
26	W-15417-131-BS	S1FLB-W-15417-131-BS	Internal conduit seal - maintenance support required for access
27	W-15417-133-BS	S1FLB-W-15417-133-BS	Internal conduit seal - maintenance support required for access
28	W-15417-134-BS	S1FLB-W-15417-134-BS	Internal conduit seal - maintenance support required for access
29	E-15428-151-AS	S1FBR-E-15428-151-AS	Internal conduit seal - maintenance support required for access
30	E-15428-152-AS	S1FBR-E-15428-152-AS	Internal conduit seal - maintenance support required for access
31	E-15428-165-AS	S1FBR-E-15428-165-AS	Internal conduit seal - maintenance support required for access
32	E-15428-167-AS	S1FBR-E-15428-167-AS	Internal conduit seal - maintenance support required for access
33	E-15428-168-AS	S1FBR-E-15428-168-AS	Internal conduit seal - maintenance support required for access
34	E-15428-170-AS	S1FBR-E-15428-170-AS	Internal conduit seal - maintenance support required for access
35	E-15428-171-AS	S1FBR-E-15428-171-AS	Internal conduit seal - maintenance support required for access
36	E-15428-172-AS	S1FBR-E-15428-172-AS	Internal conduit seal - maintenance support required for access
37	E-15428-174-AS	S1FBR-E-15428-174-AS	Internal conduit seal - maintenance support required for access
38	E-15428-175-AS	S1FBR-E-15428-175-AS	Internal conduit seal - maintenance support required for access
39	E-15428-176-AS	S1FBR-E-15428-176-AS	Internal conduit seal - maintenance support required for access

No.	Flood Protection Feature ID	FLOC	Short Description of Justification
40	S-15429-034	S1FLB-S-15429-034	Access restricted due to presence of fire wrap.
41	S-15429-035	S1FLB-S-15429-035	Access restricted due to presence of fire wrap.
42	S-15429-036	S1FLB-S-15429-036	Access restricted due to presence of fire wrap.
43	S-15429-037	S1FLB-S-15429-037	Access restricted due to presence of fire wrap.
44	S-15429-038	S1FLB-S-15429-038	Access restricted due to presence of fire wrap.
45	S-15429-039	S1FLB-S-15429-039	Access restricted due to presence of fire wrap.
46	S-15429-040	S1FLB-S-15429-040	Access restricted due to presence of fire wrap.
47	S-15429-041	S1FLB-S-15429-041	Access restricted due to presence of fire wrap.
48	S-15429-042	S1FLB-S-15429-042	Access restricted due to presence of fire wrap.
49	S-15429-043	S1FLB-S-15429-043	Access restricted due to presence of fire wrap.
50	S-15429-044	S1FLB-S-15429-044	Access restricted due to presence of fire wrap.
51	S-15429-045	S1FLB-S-15429-045	Access restricted due to presence of fire wrap.
52	S-15429-046	S1FLB-S-15429-046	Access restricted due to presence of fire wrap.
53	S-15429-047	S1FLB-S-15429-047	Access restricted due to presence of fire wrap.
54	S-15429-048	S1FLB-S-15429-048	Access restricted due to presence of fire wrap.
55	S-15429-049	S1FLB-S-15429-049	Access restricted due to presence of fire wrap.
56	S-15429-050	S1FLB-S-15429-050	Access restricted due to presence of fire wrap.
57	S-15429-051	S1FLB-S-15429-051	Access restricted due to presence of fire wrap.
58	S-15429-052	S1FLB-S-15429-052	Access restricted due to presence of fire wrap.
59	S-15429-053	S1FLB-S-15429-053	Access restricted due to presence of fire wrap.
60	S-15429-054	S1FLB-S-15429-054	Access restricted due to presence of fire wrap.
61	S-15429-055	S1FLB-S-15429-055	Access restricted due to presence of fire wrap.
62	S-15429-056	S1FLB-S-15429-056	Access restricted due to presence of fire wrap.
63	S-15429-057	S1FLB-S-15429-057	Access restricted due to presence of fire wrap.
64	S-15429-058	S1FLB-S-15429-058	Access restricted due to presence of fire wrap.
65	S-15429-059	S1FLB-S-15429-059	Access restricted due to presence of fire wrap.
66	S-15429-060	S1FLB-S-15429-060	Access restricted due to presence of fire wrap.
67	S-15429-061	S1FLB-S-15429-061	Access restricted due to presence of fire wrap.
68	S-15429-063	S1FLB-S-15429-063	Access restricted due to presence of fire wrap.
69	S-15429-064	S1FLB-S-15429-064	Access restricted due to presence of fire wrap.
70	S-15429-065	S1FLB-S-15429-065	Access restricted due to presence of fire wrap.
71	S-15429-066	S1FLB-S-15429-066	Access restricted due to presence of fire wrap.
72	S-15429-068	S1FLB-S-15429-068	Access restricted due to presence of fire wrap.
73	S-15434-001	S1FLB-S-15434-001	The portion of the vertical riser of the seismic gap above head level can only be examined by entering a contaminated area and looking up.
74	W-15440-001	S1FLB-W-15440-001	Access restricted due to presence of insulation.
75	W-15440-UN1	W-15440-UN1	Unidentified penetration. Access restricted due to presence of insulation.
76	W-15441-001	S1FLB-W-15441-001	Access restricted due to presence of insulation.
77	W-15441-UN1	W-15441-UN1	Unidentified penetration. Access restricted due to presence of insulation.
78	S-15520-010	S1FLB-S-15520-010	Access restricted due to presence of insulation.
79	W-15544-002-AS	S1FLB-W-15544-002-AS	Internal conduit seal (ICS) - maintenance support required for access
80	S-15559-008-AS	S1FLB-S-15559-008-AS	ICS - maintenance support required for access
81	S-15559-009-AS	S1FLB-S-15559-009-AS	ICS - maintenance support required for access
82	S-15559-010-AS	S1FLB-S-15559-010-AS	ICS - maintenance support required for access

No.	Flood Protection Feature ID	FLOC	Short Description of Justification
83	S-15559-026-AS	S1FLB-S-15559-026-AS	ICS - maintenance support required for access
84	S-15559-028-AS	S1FLB-S-15559-028-AS	ICS - maintenance support required for access
85	S-15559-032-AS	S1FLB-S-15559-032-AS	ICS - maintenance support required for access
86	E-19401-009	S1FLB-E-19401-009	ICS - maintenance support required for access
87	E-19401-013	S1FLB-E-19401-013	ICS - maintenance support required for access
88	1SWE-41	S1SW -1SWE41	Bolted Sump pit - Requires Maintenance for Access
89	E-16901-004	S1FLB-E-16901-004	Need scaffold for visual inspection.
90	E-16901-020	S1FLB-E-16901-020	Need scaffold for visual inspection.
91	E-16901-058	S1FLB-E-16901-058	Card Reader, need SMART Team to remove for access to seal.
92	S-16904-002	S1FLB-S-16904-002	Card Reader, need SMART Team to remove for access to seal.
93	S-16904-003	S1FLB-S-16904-003	Card Reader, need SMART Team to remove for access to seal.
94	12BD68	S1BD -12BD68	Bolted sump pit cover. Require maintenance support to open.
95	1LD14900	S1SW -1LD14900	Bolted sump pit cover. Require maintenance support to open.
96	1LD3545	S1SW -1LD3545	Bolted sump pit cover. Require maintenance support to open.
97	1SWE4	S1SW -1SWE4	Bolted sump pit cover. Require maintenance support to open.
98	1SWE40	S1SW -1SWE40	Bolted sump pit cover. Require maintenance support to open.
99	1SWE5	S1SW -1SWE5	Bolted sump pit cover. Require maintenance support to open.
100	1SWE6	S1SW -1SWE6	Bolted sump pit cover. Require maintenance support to open.
101	E-16902-057	S1FLB-E-16902-057	Visual inspection of the penetration seal will require scaffolding.
102	E-16902-058	S1FLB-E-16902-058	Visual inspection of the penetration seal will require scaffolding.
103	E-16902-061	S1FLB-E-16902-061	Card Reader, need SMART Team to remove for access to seal.
104	S-12403-001-AS	S1FLB-S-12403-001-AS	ICS - scaffolding, electrician required to access.
105	E-12501-002-AS	S1FLB-E-12501-002-AS	ICS - scaffolding, electrician required to access.
106	E-12501-003-AS	S1FLB-E-12501-003-AS	ICS - scaffolding, electrician required to access.
107	E-12501-004-AS	S1FLB-E-12501-004-AS	ICS - scaffolding, electrician required to access.
108	E-12501-005-AS	S1FLB-E-12501-005-AS	ICS - scaffolding, electrician required to access.
109	E-12501-008	S1FLB-E-12501-008	Inside junction box - need electrician, scaffold, RP to access.
110	E-12501-015	S1FLB-E-12501-015	Inside junction box - need electrician, scaffold, RP to access.
111	E-12501-023	S1FLB-E-12501-023	Inside junction box - need electrician, scaffold, RP to access.
112	S-12501-001	S1FLB-S-12501-001	ICS - need scaffolding, electrician to access.
113	S-12501-002	S1FLB-S-12501-002	ICS - need scaffolding, electrician to access.
114	S-12501-003	S1FLB-S-12501-003	ICS - need scaffolding, electrician to access.
115	S-12501-016	S1FLB-S-12501-016	ICS - need scaffolding, electrician to access.
116	S-12501-017	S1FLB-S-12501-017	ICS - need scaffolding, electrician to access.
117	S-12501-018	S1FLB-S-12501-018	ICS - need scaffolding, electrician to access.
118	S-12501-019	S1FLB-S-12501-019	ICS - need scaffolding, electrician to access.
119	S-12501-020	S1FLB-S-12501-020	ICS - need scaffolding, electrician to access.
120	W-12505-025	S1FLB-W-12505-025	ICS - scaffolding, electrician required to access.
121	W-12505-026	S1FLB-W-12505-026	ICS - scaffolding, electrician required to access.

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
1	22403	E-22403	NONE	Cracking in coating on wall.	20585282
2	22403	N-22403-001	S2FLB-N-22403-001	Separation on 90° from vertical.	20585283
3	22404	W-22404	NONE	Cracking, leaking water onto floor.	20585285
4	22501	N-22501 (at EL. 100)	NONE	Cracks present on wall.	20585286
5	22501	N-22501 (at EL. 113)	NONE	Cracks present on wall.	20585286
6	22501	E-22501	NONE	Unlabeled penetration, left of E-22501-001	20585624
7	22501	N-22501-XXX	S2FLB-N-22501-XXX	Unlabeled penetration on room 22501 North wall	20585624
8	26901	C-26901-010	S2FLB-C-26901-010	Surface crack and missing sealant at joint on south side of penetration.	20585901
9	26901	E-26901	NONE	Wall shows peeling paint, mineral staining, and evidence of past water intrusion on surfaces within 3 ft of floor	20585287
10	26901	W-26901-001	S2FLB-W-26901-001	rust stain in on boot, boot seal does not match ref drawing.	20585291
11	26901	W-26901-002	S2FLB-W-26901-002	rust stain in on boot and pipe, boot seal does not match ref drawing.	20585291
12	26901	W-26901-003	S2FLB-W-26901-003	rust stain in on boot and pipe, tear in boot with stains showing at tear, boot seal does not match ref drawing.	20585291
13	26901	W-26901-006	S2FLB-W-26901-006	CORRSION PRODCS AND STAINS VISIBLE ON CABLE AT SEAL INTERFACE	20585291
14	26901	W-26901-025	S2FLB-W-26901-025	CORRSION PRODCS AND STAINS VISIBLE ON CABLE AT SEAL INTERFACE	20574851
15	26902	F-26902	None	Concrete slab was wet near operating equipment. Additionally, seepage was occuring at EL 90'-0" at the south wall. This seems to be due to groundwater.	20585293
16	25202	2 WD NO.23 RHR SUMP PUMP CHECK VLV	S2WD -2WD13	valve flange separated below valve In room 25101	Order 30166480
17	25301	F-25301-	none	Cracking and mineralization, evidence of historical leakage observed throughout	20529375, 20529419, 20529480, 20529481, 20529558, 20529560, 20529561, 20529632 , 20530065, 20530187, 20530188, 20530189,
18	25444	F-25444-	none	CALCIFICATION LARGE AMOUNTS AND CRACKING ON FLOOR	20585294

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
19	25444	E-25444-	none	LARGE AMOUNTS OF CALCIFICATION ON WALL AND CRACKING ON WALL AS WELL.	20585294
20	25104	C-25104-	none	large amounts of calcification	20577074
21	25103	C-25103-	none	large amounts of calcification	20577084 / 20577091
22	0	2DOOR-AUX134-2	S2AUX-2DOOR-AUX134-2	surface corrosion present, sealing dogs also lightly corroded. Seal and sealing surface appear to be intact.	20585295 / 20552967
23	25204	?	none	Unidentified Penetration: floor drain not on drawing	20585624
24	25311	N-25311-	none	water damage, cracking	20584766
25	25309	N-25309-	none	water damage, cracking	20584766
26	25436	F-25436-	none	cracking in the coating & unidentified floor drain	20585120
27	25434	F-25434-	none	Floor has significant water damage and cracking.	20584792
28	25332	F-25332-	none	water damage and cracks visible in wall	20584783
29	25326	F-25326-	none	crack on floor under tank aligned along tank axis between 4th and 5th supports from the S wall	20584779
30	25310	F-25310-	none	Unidentified floor drain next to No. 2 Waste Monitor Hold-up Tank Pump Unidentified cover for pit Unidentified floor drain next to U2 Liquid Waste Filter	20585624
31	25306	F-25306-	none	Signs of active leakage on the floor near the entrance. Also, two unidentified floor penetrations - one to the right of each CVCS Tank Manway	20584764
32	25304	F-25304-	none	Water damage, active leakage	20584762
33	25104	F-25104-	none	Large amounts of calcification	20577074
34	25103	F-25103-	none	Large amounts of calcification	20577084
35	25102	F-25102-	none	Large amounts of calcification	20577069 / 20577072
36	25101	F-25101-	none	Large amounts of calcification	20577075
37	29401	W-29401-005	S2FLB-W-29401-005	Seal appears damaged	20584793
38	25551	W-25551-001	S2FLB-W-25551-001	Ssigns of historical leakage	20585299
39	25616	N-25616-005	S2FBR-N-25616-005	Two unidentified penetrations in wall - el. 130.08 and 129.3. Aux building air intake at elevation 123.7	20585624
40	25547	N-25547-002	S2FLB-N-25547-002	Minor corrosion products present.	20585300
41	25433	N-25433-004	S2FLB-N-25433-004	Cotton only visible (below grade)	20584790
42	25433	N-25433-003	S2FLB-N-25433-003	Cotton & rust streaks	20584790
43	25433	N-25433-002	S2FLB-N-25433-002	Rust streaks	20584790
44	25433	N-25433-001	S2FLB-N-25433-001	Cotton only visible (below grade)	20584790
45	25435	F-25435-001	S2FLB-F-25435-001	Active water on floor near seismic gap, corrosion product observed	20584794

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
46	29401	W-29401-007	S2FLB-W-29401-007	Rusted	20584793
47	25551	N-25551-033	S2FLB-N-25551-033	Signs of historical leakage	20585299
48	25623	W-25623-	none	Signs of minimal water damage on north side	20585301
49	25433	W-25433-	none	Calcification	20584790
50	25432	W-25432-	none	water damage and cracks visible in wall	20584789
51	25427	W-25427-	none	Calcification and cracking	20584788
52	25417	W-25417-	none	Calcification	20575536
53	25329	W-25329-	none	Water damage	20584781
54	25328	W-25328-	none	Water damage, cracks	20584780
55	25317	W-25317-	none	Water damage, active leakage	20584778
56	25209	W-25209-	none	Cracking and signs of historical leakage visible on the wall	20585302
57	25202	W-25202-	none	Large amounts of calcification	20584761
58	25103	W-25103-	none	Large amounts of calcification	20577084
59	25101	W-25101-	none	Large amounts of calcification	20577075
60	25623	N-25623-	none	Unidentified ductwork penetration at el. 7.7.	20585624
61	25419	N-25419-	none	Wall covered in calcification	20584787
62	25328	N-25328-	none	Mineralization	20584780
63	25325	N-25325-	none	Water damage	20585303
64	25316	N-25316-	none	Water damage, cracking	20584769
65	25314	N-25314-	none	Water damage, cracking	20584769
66	25308	N-25308-	none	Water damage, cracking	20584766
67	25306	N-25306-	none	Significant water damage along entire north wall, evidence of past repairs.	20584764
68	25301	N-25301-	none	North wall has numerous cracks and mineralization throughout. Documented by EMIS tags - 20530189, 20497755, 20143874	20529375, 20529419, 20529480, 20529481, 20529558, 20529560, 20529561, 20529632 , 20530065, 20530187, 20530188, 20530189,20497755,20143874
69	25104	N-25104-	none	Penetrations thru wall / rust streaks	20577074 / 20577089
70	25103	N-25103-	none	Large amounts of calcification	20577084 / 20577091
71	25101	N-25101-	none	Large amounts of calcification	20577075
72	25434	E-25434-	none	Calcification on wall	20584792
73	25332	E-25332-	none	Water damage and cracking visible on wall	20584783
74	25324	E-25324-	none	Water damage	20584777
75	25323	E-25323-	none	Water damage	20584777
76	25322	E-25322-	none	Water damage	20584777
77	25301	E-25301-	none	Cracking and mineralization, evidence of historical leakage observed throughout	20529375, 20529419, 20529480, 20529481, 20529558, 20529560, 20529561, 20529632 , 20530065, 20530187, 20530188, 20530189, 20575396
78	25204	E-25204-	none	Large amounts of calcification	20577087
79	25203	E-25203-	none	Large amounts of calcification	20577085
80	25104	E-25104-	none	Large amounts of calcification	20577074
81	25102	E-25102-	none	Large amounts of calcification	20577069 / 20577072

No.	Room	Flood Protection Feature ID	FLOC	Description of Condition	Notification #
82	Various	Various	Various	There are several penetration seals throughout the plant do not have a hydrostatic rating that is sufficient for the licensing basis flood level. These seals require further investigation to determine if there is an error in the documentation or if the seals are credited external flood boundaries. This issue is common for both Salem units.	20585542
83	Various	Various	Various	There are several penetration seals throughout the plant that do not have sufficient documentation to determine their hydrostatic rating. Further investigation is required to ensure the hydrostatic rating is sufficient to provide protection from an external flood. This issue is common for both Salem units.	20585624
84	Various	Various	Various	Restricted access items - schedule and track the inspection of the features that are restricted. See Attachment F for a list of restricted access features. This issue is common for both Salem units.	20585522

No.	Flood Protection Feature ID	FLOC	Reason Inaccessible	Justification
1	E-25504-250	S2FBR-E-25504-250	Located inside a concrete block - cannot be seen.	See Report Section 4)f)ii)3)b)
2	E-25504-249	S2FBR-E-25504-249	Located inside a concrete block - cannot be seen.	See Report Section 4)f)ii)3)b)
3	E-25504-002	S2FBR-E-25504-002	Located inside a concrete block - cannot be seen.	See Report Section 4)f)ii)3)b)
4	E-25504-001	S2FBR-E-25504-001	Located inside a concrete block - cannot be seen.	See Report Section 4)f)ii)3)b)
5	W-25206-	none	Located inside the pipe chute. Inaccessible due to high dose rates not reasonably expected to be reduced in the near future.	See Report Section 4)f)ii)3)b)

No.	Flood Protection Feature ID	FLOC	Short Description of Justification
1	N-22403-001AS	S2FLB-N-22403-001AS	Pullbox - labelled. Need scaffold / electrician to access.
2	E-22501-002-AS	S2FLB-E-22501-002-AS	Internal Conduit Seal - scaffold / electrician, RP support required.
3	E-22501-004-AS	S2FLB-E-22501-004-AS	Internal Conduit Seal - scaffold / electrician, RP support required.
4	E-22501-006-AS	S2FLB-E-22501-006-AS	Internal Conduit Seal - scaffold / electrician, RP support required.
5	E-22501-011	S2FLB-E-22501-011	Internal Conduit Seal - scaffold / electrician, RP support required.
6	E-22501-013-AS	S2FLB-E-22501-013-AS	Internal Conduit Seal - scaffold / electrician, RP support required.
7	E-22501-014-AS	S2FLB-E-22501-014-AS	Internal Conduit Seal - scaffold / electrician, RP support required.
8	E-22501-024	S2FLB-E-22501-024	Electrician, RP support required for access.
9	E-22501-025	S2FLB-E-22501-025	Electrician, RP support required for access.
10	N-22501-001	S2FLB-N-22501-001	Internal conduit seal - scaffolding, electrician required to inspect.
11	N-22501-002	S2FLB-N-22501-002	Internal conduit seal - scaffolding, electrician required to inspect.
12	N-22501-003	S2FLB-N-22501-003	Internal conduit seal - scaffolding, electrician required to inspect.
13	N-22501-004	S2FLB-N-22501-004	Internal conduit seal - scaffolding, electrician required to inspect.
14	N-22501-005	S2FLB-N-22501-005	Internal conduit seal - scaffolding, electrician required to inspect.
15	N-22501-006	S2FLB-N-22501-006	Internal conduit seal - scaffolding, electrician required to inspect.
16	N-22501-010	S2FLB-N-22501-010	Internal conduit seal - scaffolding, electrician required to inspect.
17	N-22501-011	S2FLB-N-22501-011	Internal conduit seal - scaffolding, electrician required to inspect.
18	N-22501-012	S2FLB-N-22501-012	Internal conduit seal - scaffolding, electrician required to inspect.
19	N-22501-013	S2FLB-N-22501-013	Internal conduit seal - scaffolding, electrician required to inspect.
20	N-22501-015	S2FLB-N-22501-015	Internal conduit seal - scaffolding, electrician required to inspect.
21	N-22501-016	S2FLB-N-22501-016	Internal conduit seal - scaffolding, electrician required to inspect.
22	N-22501-018	S2FLB-N-22501-018	Internal conduit seal - scaffolding, electrician required to inspect.
23	N-22501-019	S2FLB-N-22501-019	Internal conduit seal - scaffolding, electrician required to inspect.
24	N-22501-020	S2FLB-N-22501-020	Internal conduit seal - scaffolding, electrician required to inspect.
25	W-22505-008-AS	S2FLB-W-22505-008-AS	Internal conduit seal - scaffolding, electrician required to inspect.
26	W-22505-009-AS	S2FLB-W-22505-009-AS	Internal conduit seal - scaffolding, electrician required to inspect.
27	W-22505-021-AS	S2FLB-W-22505-021-AS	Internal conduit seal - scaffolding, electrician required to inspect.
28	W-22505-024-AS	S2FLB-W-22505-024-AS	Internal conduit seal - scaffolding, electrician required to inspect.
29	W-22505-025-AS	S2FLB-W-22505-025-AS	Internal conduit seal - scaffolding, electrician required to inspect.
30	12D3544	S2SW -2LD3544	Can not be inspected due to bolted sump pit cover, need maintenance support to open.
31	21BD68	S2BD -21BD68	Can not be inspected due to bolted sump pit cover, need maintenance support to open.
32	2LD14899	S2SW -2LD14899	Can not be inspected due to bolted sump pit cover, need maintenance support to open.

No.	Flood Protection Feature ID	FLOC	Short Description of Justification
33	2SWE-40	S2SW -2SWE40	Can not be inspected due to bolted sump pit cover, need maintenance support to open.
34	E-26901-054	S2FLB-E-26901-054	Need Scaffold to inspect.
35	E-26901-055	S2FLB-E-26901-055	Need Scaffold to inspect.
36	E-26901-058	S2FLB-E-26901-058	Need SMART Team to remove card reader for visual access to seal.
37	22BD68	S2BD -22BD68	Sump pump 2SWE41 is not currently operational and being worked on per Work Order 30191149.
38	2LD14900	S2SW -2LD14900	Sump pump 2SWE41 is not currently operational and being worked on per Work Order 30191149.
39	2LD3545	S2SW -2LD3545	Sump pump 2SWE41 is not currently operational and being worked on per Work Order 30191149.
40	2SWE4	S2SW -2SWE4	Sump pump 2SWE41 is not currently operational and being worked on per Work Order 30191149.
41	2SWE41	S2SW -2SWE41	Sump pump 2SWE41 is not currently operational and being worked on per Work Order 30191149.
42	2SWE5	S2SW -2SWE5	Sump pump 2SWE41 is not currently operational and being worked on per Work Order 30191149.
43	2SWE6	S2SW -2SWE6	Sump pump 2SWE41 is not currently operational and being worked on per Work Order 30191149.
44	W-26902-025	S2FLB-W-26902-025	Scaffolding required for a more accurate measurement reading.
45	W-26902-026	S2FLB-W-26902-026	Scaffolding required for a more accurate measurement reading.
46	W-26902-027	S2FLB-W-26902-027	Scaffolding required for a more accurate measurement reading.
47	W-26902-028	S2FLB-W-26902-028	Scaffolding required for a more accurate measurement reading.
48	24 BLD & EQUIP DRAINS(WD) RESID HEAT REMOVAL SMP PMP START-STOP SW	S2WD -2LD7755	In sump pit, high dose rate precluded access, in room 25101
49	23 BLD & EQUIP DRAINS(WD) RESID HEAT REMOVAL SMP PMP START-STOP SW	S2WD -2LD7756	In sump pit, high dose rate precluded access, in room 25101
50	22 BLD & EQUIP DRAINS(WD) RESID HEAT REMOVAL SMP PMP START-STOP SW	S2WD -2LD7754	In sump pit, high dose rate precluded access, in room 25101
51	21 BLD & EQUIP DRAINS(WD) RESID HEAT REMOVAL SMP PMP START-STOP SW	S2WD -2LD7753	In sump pit, high dose rate precluded access, in room 25101
52	W-25440-001	S2FLB-W-25540-001	SCAFFOLD REQUIRED (ROUGHLY 8.5 FT OFF GROUND)
53	W-25417-066-BS	S2FBR-W-25417-066-BS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
54	W-25417-061-BS	S2FBR-W-25417-061-BS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
55	W-25417-058-BS	S2FBR-W-25417-058-BS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING

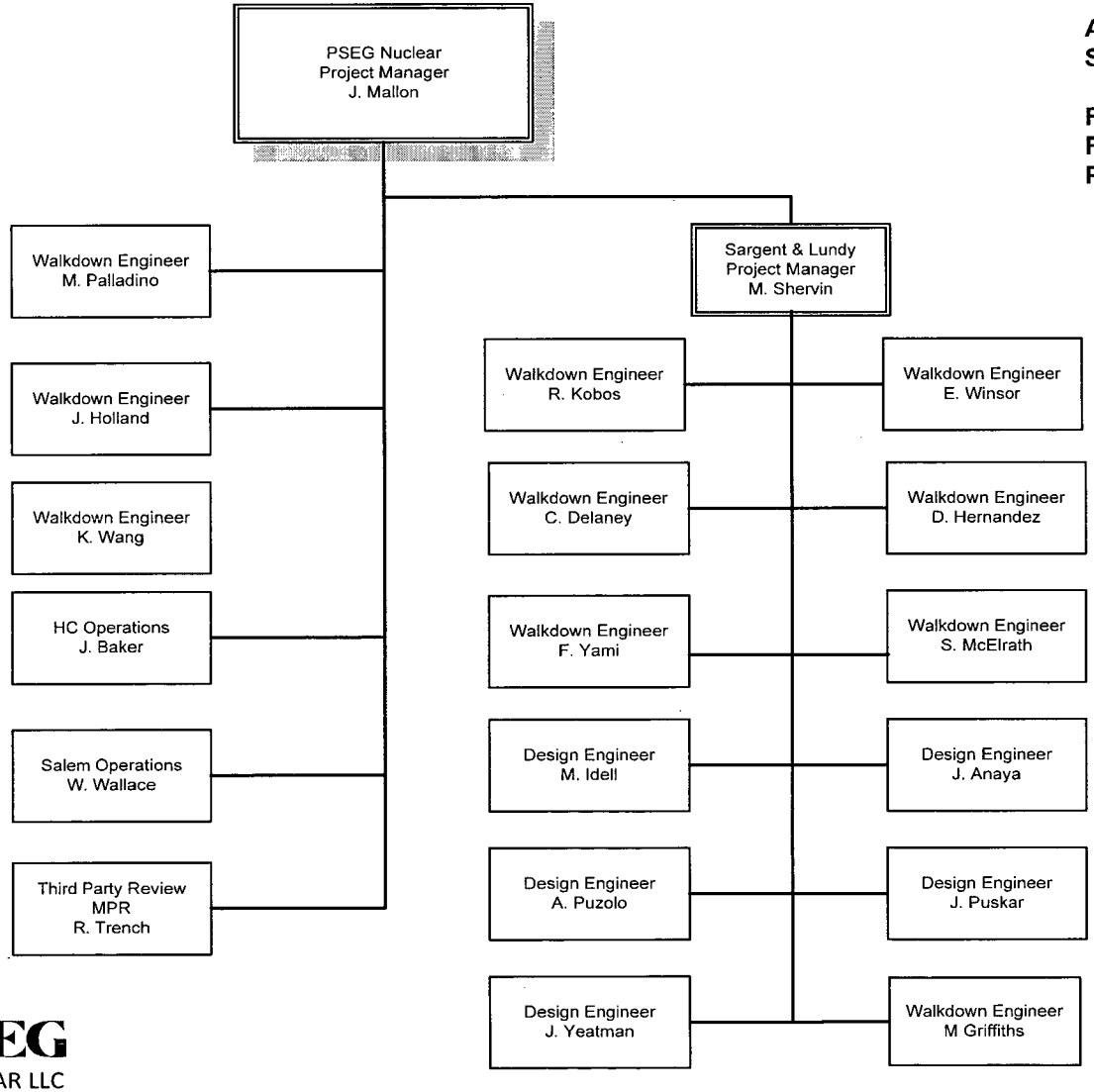
No.	Flood Protection Feature ID	FLOC	Short Description of Justification
56	W-25417-057-BS	S2FBR-W-25417-057-BS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
57	W-25417-054-BS	S2FBR-W-25417-054-BS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
58	W-25417-052-AS	S2FLB-W-25417-052-AS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
59	W-25417-049-BS	S2FBR-W-25417-049-BS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
60	W-25417-048-AS	S2FLB-W-25417-048-AS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
61	W-25417-047-BS	S2FBR-W-25417-047-BS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
62	W-25417-047-AS	S2FLB-W-25417-047-AS	REQUIRES SCAFFOLD AND ELECTRICIAN TO OPEN CONDUIT / PULL BOX INSIDE AUX BUILDING
63	N-25612-027	S2FBR-N-25612-027	Located behind steel plate enclosure, need maintenance to assess if plate can be removed.
64	N-25612-026	S2FBR-N-25612-026	Located behind steel plate enclosure, need maintenance to assess if plate can be removed.
65	N-25612-025	S2FBR-N-25612-025	Located behind steel plate enclosure, need maintenance to assess if plate can be removed.
66	N-25612-004	S2FBR-N-25612-004	Located behind steel plate enclosure, need maintenance to assess if plate can be removed.
67	N-25612-003	S2FBR-N-25612-003	Located behind steel plate enclosure, need maintenance to assess if plate can be removed.
68	N-25549-007	S2FLB-N-25549-007	Conduit LB fittings - maintenance necessary to open
69	N-25549-006	S2FLB-N-25549-006	Conduit LB fittings - maintenance necessary to open
70	N-25522-028	S2FLB-N-25522-028	Conduit LB fittings - require maintenance support
71	N-25522-025	S2FLB-N-25522-025	Conduit LB fittings - require maintenance support
72	N-25522-024	S2FLB-N-25522-024	Conduit LB fittings - require maintenance support
73	N-25522-023	S2FLB-N-25522-023	Conduit LB fittings - require maintenance support
74	N-25522-022	S2FLB-N-25522-022	Conduit LB fittings - require maintenance support
75	N-25522-021	S2FLB-N-25522-021	Conduit LB fittings - require maintenance support
76	N-25522-020	S2FLB-N-25522-020	Conduit LB fittings - require maintenance support
77	N-25522-019	S2FLB-N-25522-019	Conduit LB fittings - require maintenance support
78	N-25522-018	S2FLB-N-25522-018	Conduit LB fittings - require maintenance support
79	N-25522-017	S2FLB-N-25522-017	Conduit LB fittings - require maintenance support
80	N-25522-016	S2FLB-N-25522-016	Conduit LB fittings - require maintenance support
81	N-25522-015	S2FLB-N-25522-015	Conduit LB fittings - require maintenance support
82	N-25522-013	S2FLB-N-25522-013	SCAFFOLD REQUIRED

No.	Flood Protection Feature ID	FLOC	Short Description of Justification
83	N-25522-012	S2FLB-N-25522-012	SCAFFOLD REQUIRED
84	N-25522-011	S2FLB-N-25522-011	SCAFFOLD REQUIRED
85	N-25522-010	S2FLB-N-25522-010	SCAFFOLD REQUIRED
86	N-25522-009	S2FLB-N-25522-009	SCAFFOLD REQUIRED
87	N-25522-008	S2FLB-N-25522-008	SCAFFOLD REQUIRED
88	N-25522-007	S2FLB-N-25522-007	SCAFFOLD REQUIRED
89	N-25437-010-AS	S2FLB-N-25437-010-AS	SCAFFOLD REQUIRED
90	N-25437-001	S2FLB-N-25437-001	SCAFFOLD REQUIRED
91	N-25429-036	S2FLB-N-25429-036	Access restricted due to presence of fire wrap.
92	N-25429-035	S2FLB-N-25429-035	Access restricted due to presence of fire wrap.
93	N-25429-034	S2FLB-N-25429-034	Access restricted due to presence of fire wrap.
94	N-25429-033	S2FLB-N-25429-033	Access restricted due to presence of fire wrap.
95	N-25429-032	S2FLB-N-25429-032	Access restricted due to presence of fire wrap.
96	N-25429-031	S2FLB-N-25429-031	Access restricted due to presence of fire wrap.
97	N-25429-030	S2FLB-N-25429-030	Access restricted due to presence of fire wrap.
98	N-25429-029	S2FLB-N-25429-029	Access restricted due to presence of fire wrap.
99	N-25429-028	S2FLB-N-25429-028	Access restricted due to presence of fire wrap.
100	N-25429-027	S2FLB-N-25429-027	Access restricted due to presence of fire wrap.
101	N-25429-026	S2FLB-N-25429-026	Access restricted due to presence of fire wrap.
102	N-25429-025	S2FLB-N-25429-025	Access restricted due to presence of fire wrap.
103	N-25429-024	S2FLB-N-25429-024	Access restricted due to presence of fire wrap.
104	N-25429-023	S2FLB-N-25429-023	Access restricted due to presence of fire wrap.
105	N-25429-021	S2FLB-N-25429-021	Access restricted due to presence of fire wrap.
106	N-25429-020	S2FLB-N-25429-020	Access restricted due to presence of fire wrap.
107	N-25429-019	S2FLB-N-25429-019	Access restricted due to presence of fire wrap.
108	N-25429-018	S2FLB-N-25429-018	Access restricted due to presence of fire wrap.
109	N-25429-017	S2FLB-N-25429-017	Access restricted due to presence of fire wrap.
110	N-25429-016	S2FLB-N-25429-016	Access restricted due to presence of fire wrap.
111	N-25429-015	S2FLB-N-25429-015	Access restricted due to presence of fire wrap.
112	N-25429-014	S2FLB-N-25429-014	Access restricted due to presence of fire wrap.
113	N-25429-013	S2FLB-N-25429-013	Access restricted due to presence of fire wrap.
114	N-25429-012	S2FLB-N-25429-012	Access restricted due to presence of fire wrap.
115	N-25429-011	S2FLB-N-25429-011	Access restricted due to presence of fire wrap.
116	N-25429-010	S2FLB-N-25429-010	Access restricted due to presence of fire wrap.
117	N-25429-009	S2FLB-N-25429-009	Access restricted due to presence of fire wrap.
118	N-25429-005	S2FLB-N-25429-005	Access restricted due to presence of fire wrap.
119	N-25429-003	S2FLB-N-25429-003	Access restricted due to presence of fire wrap.
120	E-29401-001	S2FLB-E-29401-001	Conduit LB fitting - requires maintenance

No.	Flood Protection Feature ID	FLOC	Short Description of Justification
121	E-25549-005	S2FBR-E-25549-005	junction box - requires maintenance to open
122	E-25549-004	?	junction box - requires maintenance to open
123	E-25434-028	S2FLB-E-25434-028	REQUIRES SCAFFOLDING
124	E-25403-057	S2FBR-E-25403-057	BOROSCOPE AND SCAFFOLD REQUIRED
125	NO. 2 DIESEL GENERATOR SUMP PUMP	S2BD -2BDE11	Can not be inspected due to bolted sump pit cover, need maintenance support to open.
126	24 WD RHR SUMP PMP	S2WD -2WDE4	In room 25101 SUMP PIT (HIGH DOSE)
127	23 WD RHR SUMP PMP	S2WD -2WDE3	In room 25101 SUMP PIT (HIGH DOSE)
128	22 WD RHR SUMP PMP	S2WD -2WDE2	In room 25102 SUMP PIT (HIGH DOSE)
129	21 WD RHR SUMP PMP	S2WD -2WDE1	In room 25102 SUMP PIT (HIGH DOSE)
130	W-25426-	none	CAN NOT ACCESS DUE TO DOSE RATES, BEHIND REMOVABLE CONCRETE WALL IN SPENT RESIN TANK ROOM, REASSESS AT OTHER PLANT MODES
131	N-25206-	none	CAN NOT ACCESS DUE TO DOSE RATES,REASSESS AT OTHER PLANT MODES

Attachment G
SL Report No.: SL-2012-10795

Flood Protection
Feature Walkdown
Project Organization Chart



PSEG
NUCLEAR LLC

Sargent & Lundy

Changes in Walkdown Process / Methodology

	NEI 12-07 Rev. 0A Prescribed Flood Prevention Feature Walkdown Methodology	SGS Flood Prevention Feature Walkdown Methodology
1.	Documentation of field observations shall be recorded on a form provided in the walkdown package.	Walkdown package forms were used to record field data.
	The recommended form is provided in Appendix B.	An alternate tabular form containing the applicable fields to collect the Appendix B identified field data was used.
2.	Section 5.3 recommends that two people should participate in walkdown inspections.	All walkdowns were performed by minimum of two men teams.
3.	The individual who prepares the Walkdown Record Form or who performs the visual inspection or other review documented by the form should sign "Prepared By", "Performed By" or "Evaluated By" space in the applicable section of the form.	Alternate Walkdown Record Forms were generated containing the requested NEI 12-07 Rev. 0A data. "Prepared By", "Performed By" and or "Evaluated By" initials were obtained in accordance with NEI 12-07 Rev. 0A guidance.
4	The second individual performing the visual inspection should sign in the "Performed By" space of section C of the sheet.	Initials for both participants of the visual inspection walkdowns were provided.
5.	The individuals reviewing the information in the form should sign in the "Reviewed By" space in sections B or E as applicable.	The reviewer of the Walkdown Record Form initialed in sections B or E, as applicable.
6.	It is recommended that all of the Walkdown Record Sheets be packaged together with a cover page that documents Management review of the entire package.	Walkdown Record Sheets for each Flood Protection Feature inspected / reviewed are provided in a separate reviewed document.
7.	Perform an overall evaluation of the walkdown results including station staff and the aggregate effect to assure all actions can be completed as required. The reviews described above satisfy the "peer review" activities requested in Reference 8.2, Enclosure 4.	PSEG review of this Report was routed to include station interface.
8	Photographs of visual inspection observations are recommended to create a permanent record.	Photographs taken during the performance of the walkdowns were indexed and provided with the Walkdown Record Forms document.

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9.	All failures to meet acceptance criteria will be entered into the CAP.	All observations were submitted to PSEG for review and input into the PSEG CAP for evaluation and disposition as applicable.
10.	All flood protection features that could not be inspected because of access limitations (inaccessible or restricted access) will be evaluated using the guidance in section 5.1 and reported in the response to the 50.54(F) letter.	A listing of the flood protection features that could not be inspected because of access limitations (inaccessible or restricted access) were provided to PSEG for evaluation and inclusion in the 50.54(f) response.
11.	The 10 CFR 50.54(f) letter enclosure entitled "Recommendation 2.3: Flooding" contains a "Requested Information section that lists all the information that must be included in licensee responses. Appendix D contains guidance for completing the walkdown report.	Guidance reviewed and applied as applicable.