ATTACHMENT 71111.06

INSPECTABLE AREA: Flood Protection Measures

CORNERSTONES: Initiating Events (40%)
Mitigating Systems (60%)

INSPECTION BASES: Flooding due to external and internal causes has been shown to be a significant contributor to risk at some facilities. In addition, flooding has the potential to make multiple trains of equipment and support equipment inoperable which would result in a significant increase in plant risk. Flooding also has a significant consequence of preventing or limiting operator mitigation and recovery actions.

LEVEL OF EFFORT: At least annually, inspect flood protection barriers and review procedures for coping with external flooding. It is expected that the above review may be appropriate throughout the assessment period, with priority given to risk-significant seasonal susceptibilities. Semi-annually, select 1-2 plant areas and inspect internal flood protection features for risk-significant structures, systems, and components (SSCs).

71111.06-01 INSPECTION OBJECTIVE

01.01 This inspection will focus on verifying that the licensee's flooding mitigation plans and equipment are consistent with the licensee's design requirements and the risk analysis assumptions.

71111.06-02 INSPECTION REQUIREMENTS

02.01 Document Review and Inspection Area Selection

a. Review the FSAR and related flood analysis documents to identify those areas that can be affected by internal or external flooding, including water intake facilities. For external flooding, review seasonal susceptibilities such as floods caused by hurricanes, heavy rains and flash flood. Review licensee documentation that shows the design flood levels for areas containing safety-related equipment. Review problem reports and corrective actions for past flooding events.

b. Based on licensee's flooding risk studies, select plant areas containing risk-significant SSCs which are below flood levels or otherwise susceptible to flooding. For sites where external flooding is a risk, use weather related information gathered during plant status reviews or from external news sources to assist in scheduling this inspection prior to the season of highest risk.

02.02 Inspection Activities

a. Walkdown the selected areas or rooms. By observation/design review, including reviews of preventive maintenance (PM) activities, consider the following attributes.

Give priority to those attributes which are risk significant for the site specific installation.

1. Sealing of equipment below the floodline, such as electrical conduits.
2. Holes or unsealed penetrations in floors and walls between flood areas.
3. Adequacy of watertight doors between flood areas.
4. Common drain system and sumps, including floor drain piping and check valves where credited for isolation of flood areas within plant buildings
5. Operable sump pumps, level alarm and control circuits including maintenance and calibrations of flood protection equipment
6. Sources of potential internal flooding that are not analyzed or not adequately maintained, for example failure of flexible piping expansion joints, failure of fire protection system sprinklers, roof leaks, rest room backups, and failure of service water lines.
7. Condition and availability of temporary or removable flood barriers (i.e., gaskets).

b. Inspect underground bunkers/manholes subject to flooding, that contain multiple train or multiple function risk-significant cables. Consider the following attributes which are risk significant for the site specific installation .

1. Verify by record review that operable sump pumps will deliver at the expected flow rate established by the licensee's design basis documentation or FSAR.
2. Verify level alarm circuits are set appropriately.
3. Cables/splices subject to submergence appear intact.
4. Determine whether drainage is provided for the bunkers/manholes selected, or if not, why not?

NOTE: It is not intended to inspect bunkers/manholes that are welded shut or to request extraordinary effort on the part of the licensee to open for inspection. It is recommended that resident inspectors be alert for open bunkers/manholes and take advantage of the opportunity to inspect.

c. For those areas where operator actions are credited, verify that the procedures such as abnormal or emergency procedures for coping with flooding, can reasonably be used to achieve the desired actions, including whether the flooding event could limit or preclude the required operator actions.

d. Evaluate implementation of flood protection preparation procedures and compensatory measures during impending conditions of flooding or heavy rains.

02.03 Problem Identification and Resolution. Flooding has the potential to cause common mode failure of equipment in multiple areas. Verify that the licensee has entered the problems identified during the inspection in the licensee's corrective action program. Verify that the licensee is identifying issues at an appropriate threshold and entering them in the corrective action program. Verify that problems included in the licensee's corrective action program are properly addressed for resolution. See Inspection Procedure 71152, "Identification and Resolution of Problems," for additional guidance.

71111.06-03 INSPECTION GUIDANCE

Cornerstone	Inspection Objective	Risk Priority	Example
Initiating Events	Identify internal or external flooding which could cause initiating events	Potentials for common-cause failures Barriers between flood areas Unanalyzed sources of internal flooding Areas below the flood plane	Adequate maintenance of expansion joints on high volume/low pressure systems Firewater sprinkler maintenance Unusual testing configurations for large volume water systems
Mitigating Systems	Identify internal or external flooding events which could cause loss of safe-shutdown equipment	Locations containing high volume/low pressure systems, such as firewater, service water and component cooling water, especially in areas contain flexible piping expansion joints Site specific: hurricane river/level caused flooding	Water-tight doors, sump pumps, and alarms Adequate sealing of safe-shutdown electrical equipment below the flood line Check valves in open drain systems common to different flood areas

71111.06-04 RESOURCE ESTIMATE

The annual resource expenditure for this inspection procedure is estimated to be 17 to 23 hours to review internal and external flood protection features at a site regardless of the number of units at that site.

71111.06-05 COMPLETION STATUS

Inspection of the minimum sample size will constitute completion of this procedure in the Reactor Programs Systems (RPS). That minimum sample size will consist of 3 samples representing the review of licensee's internal flooding protection features for 2 plant areas each year and external flooding protection features once a year regardless of the number of reactor units at the site.

71111.06-06 REFERENCES

Inspection Procedure 71152, "Identification and Resolution of Problems"

Regulatory Guide 1.102, "Flood Protection for Nuclear Power Plants"

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