



# **NRC Overview on Hazard Reviews for ESP/COL sites**

June 2012

## Current Hydrologic Safety Review Sections

Section	Topic
2.4.1	Descriptive Hydrology
2.4.2	Floods
2.4.3	PMF
2.4.4	Dam Failure
2.4.5	Surge & Seiche
2.4.6	Tsunami Hazards
2.4.7	Ice Effects

Section	Topic
2.4.8	Cooling System
2.4.9	Channel Diversion
2.4.10	Flood Protection
2.4.11	NA for 50.54(f)
2.4.12	NA for 50.54(f)
2.4.13	NA for 50.54(f)
2.4.14	Tech Specs

## 2.4.1 Hydrologic Description

---

- ✧ SER section 2.4.1 describes the hydrologic setting of the site and surrounding area.
- ✧ Emphasis should be on changes to the hydrologic setting

## 2.4.1 Hydrologic Description (cont)

---

1	Interface of the Plant with the Hydrosphere
2	Hydrological Causal Mechanisms
3	Surface & Groundwater Uses
4	Data (spatial & temporal, site relevant)
5	Alternate Conceptual Models
6	Other Site-Related Evaluation Criteria
7	Additional Info for 10 CFR 52 Applications

## 2.4.2 Floods

---

- ✧ Flood history at the site
- ✧ Identification of potential mechanisms for flooding at the site
- ✧ Computation of local-intense precipitation
- ✧ Local Flooding & Drainage Design
- ✧ Stream Flooding
- ✧ Surges and Seiches
- ✧ Tsunami

## 2.4.2 Floods (cont)

---

- ✧ Seismically Induced Dam Failure
- ✧ Flooding from Landslides
- ✧ Effects of Ice Formation
  - ✧ Anchor or frazil ice on intakes, ice dams
- ✧ Combined Events Criteria
  - ✧ PMP with dam break, hurricane w/dam break
- ✧ Other Site-Related Evaluation Criteria
- ✧ Additional Info for 10CFR52 Applications

## 2.4.3 Probable Maximum Flood

---

### 1. Design Bases for Flooding in Streams & Rivers

- ✦ Computation of the PMP over the watershed
- ✦ Computation of the PMF maximum water level at the site in combination with other effects (wind wave, surge, etc).

### 2. Design Bases for Site Drainage

- ✦ Produced by 2.4.2 local-intense precipitation
- ✦ Potential effects of erosion and sedimentation
- ✦ Rainfall-runoff processes are modeled to estimate flooding conditions at the site.

### 3. Other Site-Related Evaluation Criteria

### 4. Additional Info for 10 CFR 52 Applications

## 2.4.4 Potential Dam Failures

---

- ✧ Severe Breaching of an Upstream Dam
- ✧ Domino Type or Cascading Dam Failures
- ✧ Dynamic Effects on Structures
- ✧ Loss of Water Supply due to Failure of Downstream Dam.
- ✧ Effects of Erosion and Sedimentation
- ✧ Failure of On-Site Water Control or Storage Structure



## 2.4.5 and 2.4.6 Storm Surge, Seiche and Tsunami

---

### 2.4.5 Probable Maximum Surge and Seiche Flooding

- ✧ Meteorological Parameters (wind speed & direction, fetch, storm tracks, historical storm events)
- ✧ Bathymetry and Hydrographic Characteristics
- ✧ Surge and Seiche Water levels
- ✧ Wave Action
- ✧ Resonance
- ✧ Protective Structures

### 2.4.6 Probable Maximum Tsunami Hazards

- ✧ Probable Maximum Tsunami
- ✧ Historical Tsunami Record
- ✧ Source Generator Characteristics
- ✧ Tsunami Analysis
- ✧ Tsunami Water Levels
- ✧ Hydrographic and Harbor or Breakwater Influences
- ✧ Effects on Safety-Related Facilities

## 2.4.7 Ice Effects

---

- ✧ Review areas include:
  - ✧ Historical ice
  - ✧ High & low water levels
  - ✧ Ice forces and blockage
  - ✧ Consecutive degree days below freezing
  - ✧ Develop design basis conditions for site
  - ✧ Ensure that safety-related SSCs and water supply are not affected by ice-induced hazards

## 2.4.8 Cooling Water Canals and Reservoirs

---

- ✧ The review area includes canals and reservoirs used to transport and impound water supplied to SSCs important to safety.
- ✧ The review also includes stream channel diversions toward the site, which may lead to flooding.
- ✧ Many of the new designs (AP1000, ESBWR) employ passive cooling technologies thus minimizing the COL review burden.

## 2.4.9 Channel Diversions

---

- ✧ Review of stream channel diversions away from the site, which may lead to loss of safety-related water.
- ✧ Review of stream channel diversions toward the site which may lead to flooding.

## 2.4.10 Flooding Protection Requirements

---

### ✧ Review safety-related SSCs

- ✧ Review type of flood protection

- ✧ Review emergency procedures

- ✧ Only applies if the site is 'wet'

  - ✧ If the design basis flood exceeds the prescribed maximum flood level, site is wet

  - ✧ In the event that the site is wet, staff will review design information on flooding protection



# Questions?