OPENING REMARKS

Frederick Brown

Director

Office of New Reactors

Public Meeting
Proposed Updates to NUREG-0800
October 22, 2018

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

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OVERVIEW

Andrew C. Campbell, PhD
Deputy Director

Division of Licensing, Siting, and Environmental Analysis

Office of New Reactors

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Today's Meeting

U.S.NRC
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- Review Scope of Proposed Changes to Four NUREG-0800 Standard Review Plan (SRP) Sections

- Scope of Proposed Changes Summarized in September 28, 2018, *Federal Register* (*FR*) Notices
  - Hydrology and Meteorology (83 FR 49132)
  - Surface Deformation (83 FR 49139)

- Chapter 2.4 SRPs Selected as a Test Case for Risk-Informed/Performance-Based (RI/PB) Revisions

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SRP Lessons-Learned

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- Recent Application of NUREG-0800 – the *Standard Review Plan*
  - Early Site Permit (ESP) and Combined Operating License (COL) Reviews
    - *5 ESPs & 8 COLs (issued)*
  - 2012 §50.54(f) Information Request Following the Fukushima-Daiichi Nuclear Power Plant Accident
    - *Encompassed seismic and flooding re-evaluations at about 60 Reactor Sites*
- Staff Identified Opportunities for Improving the Efficiency and Effectiveness of NRC's Regulatory Review Process
  - Lessons Learned from extensive licensing actions and reviews
  - Expanded use of RI-PB principles
  - More focused Review Criteria

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Desired Outcomes

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- Begin Dialogue with Stakeholders
  - Seek comments on general approach to SRP updates
  - Seek feedback on proposed RI/PB revisions to SRP Chapter 2.4
  - Seek recommendations on how RI/PB approaches can be expanded to other SRP Chapters/Sections
  - Seek recommendations on modifications to SRP format itself

- Discuss Potential Future SRP Updates to Sections 2.3, 2.4, and 2.5 [Calendar Years (CY) 2019 and 2020]

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Current SRP Update Team

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Hydrology	Meteorology	Geology	Project Management
H. Ahn, PhD	R.B. Harvey	L.M. Bauer	J.P. Hoellman
S. Devlin-Gill, PhD	M.D. Mazaika*	G.L. Stirewalt, PhD	M.D. Notich
J.F. Giacinto		J-M. Thompson*	J.K. Rankin
M.P. Lee, PhD*			
N.D. Tiruneh, PhD			

** Presenter Today*

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Today's Agenda

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- Hydrology SRP Chapter 2.4 Updates (Tsunami Hazards and Channel Migration)
  - Mike Lee
- Surface Deformation Update: SRP Section 2.5.3
  - Jenise Thompson
- Onsite Meteorological Monitoring Program Update: SRP Section 2.3.3
  - Mike Mazaika

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HYDROLOGY: SRP CHAPTER 2.4

Michael P. Lee, PhD

Senior Hydrologist

Hydrology and Meteorology Branch

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2018 SRP Update
Lessons Learned and Insights

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ESP & COL Reviews

Flood hazard evaluations done for 13 ESP & COL applications for new nuclear power plants.

Using modern methods and approaches applicants identified flood-causing mechanisms to define the design basis flood.

Staff reviews conducted using SRP 2.4.

Insights from §50.54(f) Reviews

Flood hazard evaluations for all (60) nuclear power plant sites.

Licensees reevaluated all flood-causing mechanisms consistent with modern methods to determine any exceedances to the current design bases.

Staff reviews conducted using SRP 2.4.

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Review Insights

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- Examined Eight Flood-Causing Mechanisms
  - Local Intense Precipitation (LIP) and Associated Drainage
  - Streams and Rivers
  - Failure of Dams and Onsite Water Control/Storage Structures
  - Storm Surge
  - Seiche
  - Tsunami
  - Ice-Induced
  - Channel Migrations or Diversions

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Review Insights *(con't.)*

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- Not All Sites Subject to All Flood-Causing Mechanisms

- A Few Flood-Causing Mechanisms Were Found to be Consequential (Bounding)
  - LIP and Associated Drainage
  - Streams and Rivers
  - Failure of Dams and Onsite Water Control/Storage Structures
  - Storm Surge

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Review Insights *(con't.)*

- Most Flood-Causing Mechanisms are Not Discrete Events
  - Combinations of more than one (1) flood-causing mechanisms are important
  - Consideration of associated effects also important

- Some Flood-Causing Mechanisms are Controlled by Topography, Geography, and/or Climatic Setting
  - Marine/coastal settings
  - Continental/inland locations

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Review Insights *(con't.)*

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- Not All Flood-Causing Mechanisms are Equal in Terms of Occurrence and Consequence
  - Magnitude
  - Intensity
  - Duration
  - Location

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SRP Chapter 2.4 Update Vision

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- Not All Flooding Events are Equal in Time and in Space
  - Different locations around the powerblock affected
  - Magnitude, intensity, and duration not uniform across powerblock
  - Associated effects (both static and dynamic) vary across the powerblock

- Distinction between Consequential vs. Inconsequential Flooding Event
  - Inconsequential floods do not contribute to defining the design bases

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SRP Chapter 2.4 Proposed Revisions

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- Definition of Consequential Flood Should be Focus of Review
- Rely on a Hierarchical/Graded Screening Approach to Identify Consequential Flood-Causing Mechanisms
- For Consequential Flood-Causing Mechanisms, Staff Review to Focus on ...
  - Inundation maps identifying location, magnitude, intensity, and duration of flooding
  - Description of associated flooding effects

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SRP Chapter 2.4 Proposed Revisions *(con't.)*

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- For Flood-Causing Mechanisms Found to be Inconsequential, then ...
  - Content application and safety evaluation report of pertinent SRP Section (2.4.X) could be limited to simple statement that the flood-causing mechanism in question was found to not be applicable at the site
  - Slightly-longer "technical explanation" to be provided for SRP Section 2.4.1 ("Hydrologic Description")
  - The staff plans to add a statement to the SRP sections:
    - *"This section is only applicable to a site where a tsunami flood-causing mechanism is found to be consequential at the proposed site."*

      (Example for SRP Section 2.4.6)

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SRP Chapter 2.4
September 2018 FR Notice

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- Glossary of Terms
  - Described in *Federal Register* Notice (FRN), including LIP
  - Ultimately include in SRP 2.4.1 - Hydrology System Description
- Tsunami Hazards: SRP 2.4.6
  - Introduced revisions to terminology (consequential floods, etc.)
  - Streamlined reference list
- Channel Migrations and Diversions: SRP 2.4.9
  - Introduced revisions to terminology (consequential floods, etc.)
  - Improve reliance on satellite imagery
  - Streamlined reference list

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SRP Chapter 2.4 Future Revisions

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- SRP 2.4.1: Hydrologic Description
  - Differentiate between consequential and inconsequential flood-causing mechanisms
  - Place emphasis on consequential flooding hazard evaluations
  - Eliminate discussion concerning water use; already described in the environmental assessment and environmental impact statement
  - Introduce “Glossary”
- SRP 2.4.2: Floods
  - Re-purpose to focus on LIP
  - Address use of site-specific probable maximum precipitation estimates
  - Address LIP flood modeling methods
- SRPs 2.4.12: Groundwater, and 2.4.13: Accidental Releases of Radioactive Effluents
  - Combine to reduce redundancy

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SURFACE DEFORMATION: SRP SECTION 2.5.3

Jenise-Marie Thompson, PMP

Geologist

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SRP Section 2.5.3 Surface Deformation

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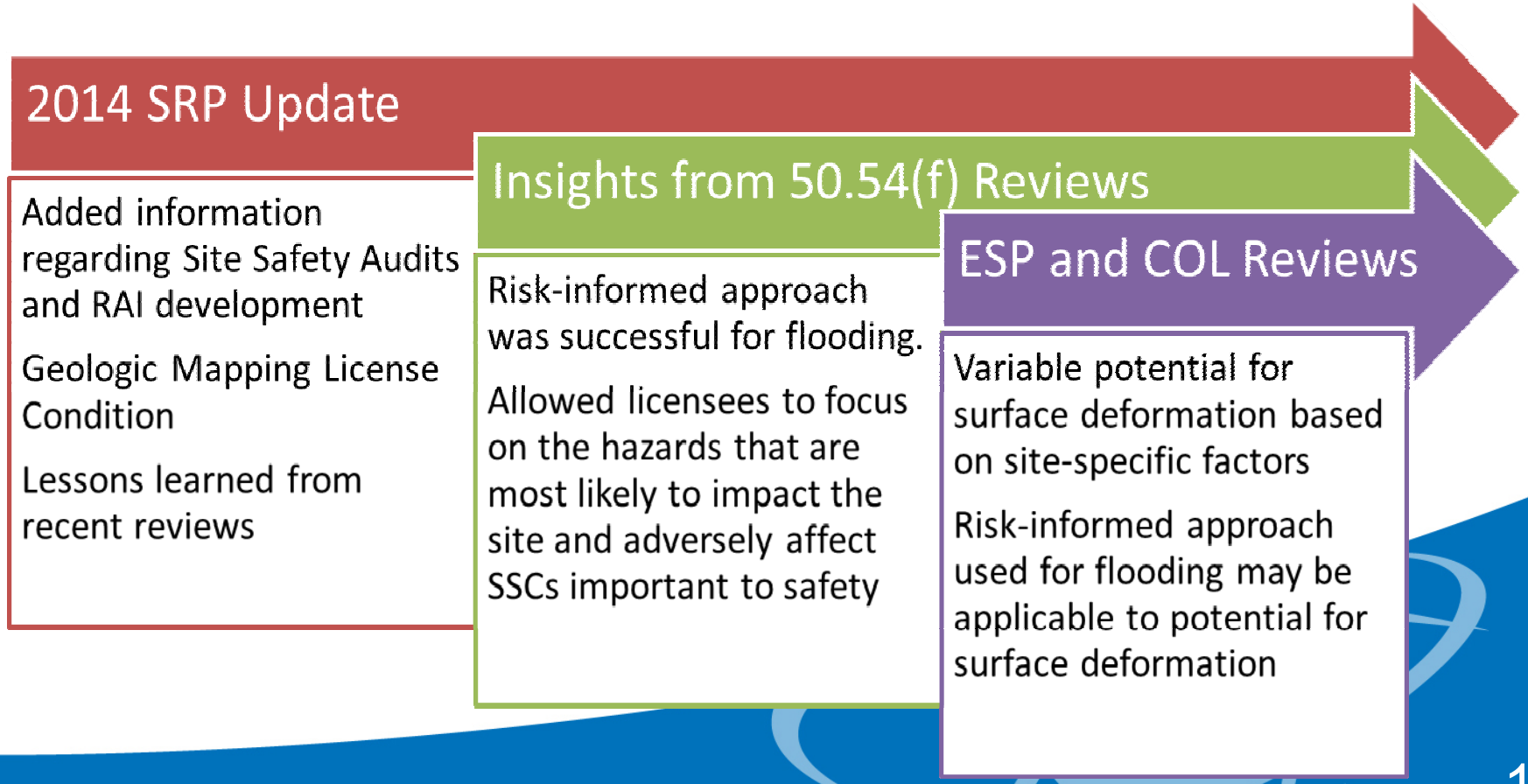
Background



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SRP Section 2.5.3 Surface Deformation

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- Siting Criteria: Appendix A to Part 100
  - Evaluate potential for tectonic and non-tectonic surface deformation

- North America is Geologically Diverse
  - Tectonic/structural history not uniform
  - Potential for surface deformation can vary spatially
    - *Subsurface lithology, local and regional geologic structures, and anthropogenic activities control surface deformation*

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SRP Section 2.5.3 Surface Deformation

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- Staff Update Proposal
  - Investigations of potential for tectonic and non-tectonic surface deformation still need to be conducted for each site
  - Investigations should be commensurate with geologic assessment of evidence
  - Level-of-detail (documentation) consistent with assessment as to whether potential for surface deformation is likely to impact the site and adversely affect structures, systems, and components (SSCs) important to safety
  - Potential for surface deformation due to anthropogenic (human-induced) activities such as mining, underground fluid injection, etc. needs to be considered

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SRP Section 2.5.3 Surface Deformation

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- Summary
  - Risk-Informed approach to focus on potential for surface deformation that could adversely affect SSCs important to safety
  - Added non-tectonic surface deformation due to anthropogenic effects
- Future
  - Looking ahead to risk-informed updates of other 2.5 SRP Sections
    - *2.5.1 – Geologic Characterization Information*
    - *2.5.2 - Vibratory Ground Motion*
    - *2.5.4 – Stability of Subsurface Materials and Foundations*
    - *2.5.5 – Stability of Slopes*
  - No sooner than CY2020

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ONSITE METEROLOGICAL MONITORING PROGRAM: SRP SECTION 2.3.3

Michael D. Mazaika

Physical Scientist (Meteorologist)

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SRP Section 2.3.3 Onsite Meteorological Measurements Program

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- General updates and clarifications
  - Better consistency with Rev. 1 of Regulatory Guide (RG) 1.23
  - Clarified links to regulations by application type
  - Updated references (RG 1.23, ANSI/ANS 3.11-2015, EPA QA Handbook Volume IV Meteorological Measurements)
  - Added cross-references with procedural and QA provisions related to Meteorological monitoring (RGs 1.21, 1.33, 1.97, 4.15)
  - Noted that Generic Technical Specifications typically require procedures for operational Meteorological monitoring program

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SRP Section 2.3.3 Onsite Meteorological Measurements Program *(con't.)*

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- Updates related to siting and instrumentation reviews
  - Recommended pre-application site visit
  - Clarified siting criteria for wind sensors in vicinity of natural draft cooling towers
  - Expanded discussion on Meteorological parameters used to determine atmospheric stability
  - Addressed wind data processing from sonic anemometers
  - Added use of wind deflector shields and heaters for rain gauges
  - Clarified when moisture measurements should be taken consistent with RG 1.23

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SRP Section 2.3.3 Onsite Meteorological Measurements Program *(con't.)*

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- Added considerations for monitoring in remote, harsh regions to ensure capture of valid and useful data
  - Enhanced equipment specs
  - Increased frequency of maintenance and calibration
  - Protective measures to ensure functionality of equipment
  - Approaches for data recording, transmission, surveillance
  - Methods for determining atmospheric stability
- Other issues specific to extreme cold environments
  - Determining measurement heights that account for range of Meteorological conditions over the year (e.g., variation and persistence of inversions relative to release characteristics)

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SRP Section 2.3.3 Onsite Meteorological Measurements Program *(con't.)*

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- Future – Late CY2019
  - SRP 2.3.1, Regional Climatology: greater emphasis on risk-informed site parameters / characteristics, including:
    - *Tornado and hurricane winds and missiles*
    - *Straight-line (e.g., thunderstorm) winds*
    - *Snow / ice events*
    - *Ambient temperature / moisture conditions*
  - SRP 2.3.2, Local Meteorology
    - *Summaries of onsite and offsite measurements*

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CLOSING REMARKS

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Future SRP Revisions
SRP Chapter 2.4

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- Intent is to Revise & Update all Sections in SRP Chapter 2.4 – Hydrology
  - Updates to be Announced in the *FR*
  - Additional Public Meetings to Follow
- Early CY2019 – Updated Drafts Announced in FR
  - SRP 2.4.1: Hydrologic Description
  - SRP 2.4.2: Local Intense Precipitation
    - *Draft NUREG on site-specific probable maximum precipitation*
  - SRP 2.4.8: Cooling Water Canals and Reservoirs
  - SRP 2.4.11: Low Water

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Future SRP Revisions
SRP Chapter 2.3 and 2.5

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- Late CY2019 – Updated Drafts Announced in FR
  - SRP 2.3.1: Regional Climatology
  - SRP 2.3.2: Local Meteorology
- Late CY2020 – Updated Drafts Announced in FR
  - SRP 2.5.1: Geologic Characterization Information
  - SRP 2.5.2: Vibratory Ground Motion
  - SRP 2.5.4: Stability of Subsurface Materials and Foundations
  - SRP 2.5.5: Stability of Slopes

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Next Steps ...

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- Disposition of Public Comments
  - Closing date for submission of public comments on SRP Sections 2.3.3, 2.4.6, 2.4.9, and 2.5.3: **Monday, Oct. 29, 2018**
  - Comments can either be submitted to:
    - *Online: http://www.regulations.gov, Docket ID NRC-2018-0178, or*
    - *Via standard mail, care of: Ms. May Ma, Office of Administration, Mail Stop: TWFN-7-A60M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001*
  - Staff intends to respond to public comments
    - *Availability of public comment disposition to accompany Federal Register notice announcing the availability of the final revised SRP section*
    - *For SRP sections discussed today, final SRP revisions expected in CY2019*

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Comments?
Questions?

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BACKUP SLIDES

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ACRONYMS/ ABBREVIATIONS

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ANSI/ANS	American National Standards Institute/American Nuclear Society
COL	Combined Operating License
CY	Calendar Year
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESP	Early Site Permit
FR	*Federal Register*
FRN	*Federal Register* Notice
LIP	Local Intense Precipitation
NRC	U.S. Nuclear Regulatory Commission
PMP	Probable maximum precipitation
PRA	Probabilistic Risk Assessment
RAI	Request for Additional Information
RI/PB	Risk-informed/performance-based
RG	Regulatory Guide
SER	Safety Evaluation Report
SSCs	Structures, Systems, and Components
QA	Quality Assurance

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SRP Chapter 2.3: Climatology

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SRP SECTION	TITLE
2.3.1	"Regional Climatology"
2.3.2	"Local Meteorology"
2.3.3	"Onsite Meteorological Measurements Programs"
2.3.4	"Short-term Dispersion Estimates for Accident Releases"
2.3.5	"Long-Term Atmospheric Dispersion Estimates for Routine Releases"

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SRP Chapter 2.4: Hydrology

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SRP SECTION	TITLE
2.4.1	"Hydrologic Description"
2.4.2	**"Local Intense Precipitation"** (proposed, currently entitled "Floods")
2.4.3	"Probable Maximum Flood (PMF) on Streams and Rivers"
2.4.4	"Potential Dam Failures"
2.4.5	"Storm Surge"
2.4.6	"Tsunami Hazards"
2.4.7	"Ice Effects"
2.4.8	"Cooling Water Canals and Reservoirs"
2.4.9	"Channel Migration or Diversion"
2.4.10	"Flood Protection Requirements"
2.4.11	"Low Water Considerations"
2.4.12	"Groundwater"
2.4.13	"Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters"
2.4.14	"Technical Specifications and Emergency Operation Requirements"

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SRP Chapter 2.5: Geology, Seismology, and Geotechnical Engineering

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SRP SECTION	TITLE
2.5.1	"Geologic Characterization Information"
2.5.2	"Vibratory Ground Motion"
2.5.3	"Surface Deformation"
2.5.4	"Stability of Subsurface Materials and Foundations"
2.5.5	"Stability of Slopes"

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