Risk Insights and Severe Accident Vulnerability Information for LWR CP Applications

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U.S. Nuclear Regulatory Commission
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Purpose of Meeting

- **Describe** staff's initiative to develop guidance
- **Request feedback**

Background

- **Regulations**
  - Content of applications (10 CFR 50.34)
  - Issuance of CPs (10 CFR 50.35)
- **Commission Policy Statements**
  - Severe Reactor Accidents for Future Designs and Existing Plants
  - Safety Goals for the Operations of Nuclear Power Plants
  - Use of Probabilistic Risk Assessment Methods In Nuclear Regulatory Activities
- **Direction**
  - Proposed Updates of Licensing Policies, Rules, and Guidance for Future New Reactor Applications (SRM-SECY-2015-0002)
- **Rulemaking**
  - Aligning 10 CFR Parts 50 and 52 (Proposed and Pending)

Objective of Initiative

- Publish guidance on scope of information and level of detail for risk insights and severe accident information supporting a CP application
  - Focus on LWRs, including small modular reactors (SMRs)
  - Collaborate with related non-LWR efforts
- Describe risk insights and severe accident information in support of an application commensurate with:
  - Design readiness at time of CP application submission
  - Risk insights and information to support staff findings
- Overcome misconception that risk insights for CP implies achieving technical acceptability against endorsed PRA Standards
- Determine regulatory vehicle for guidance

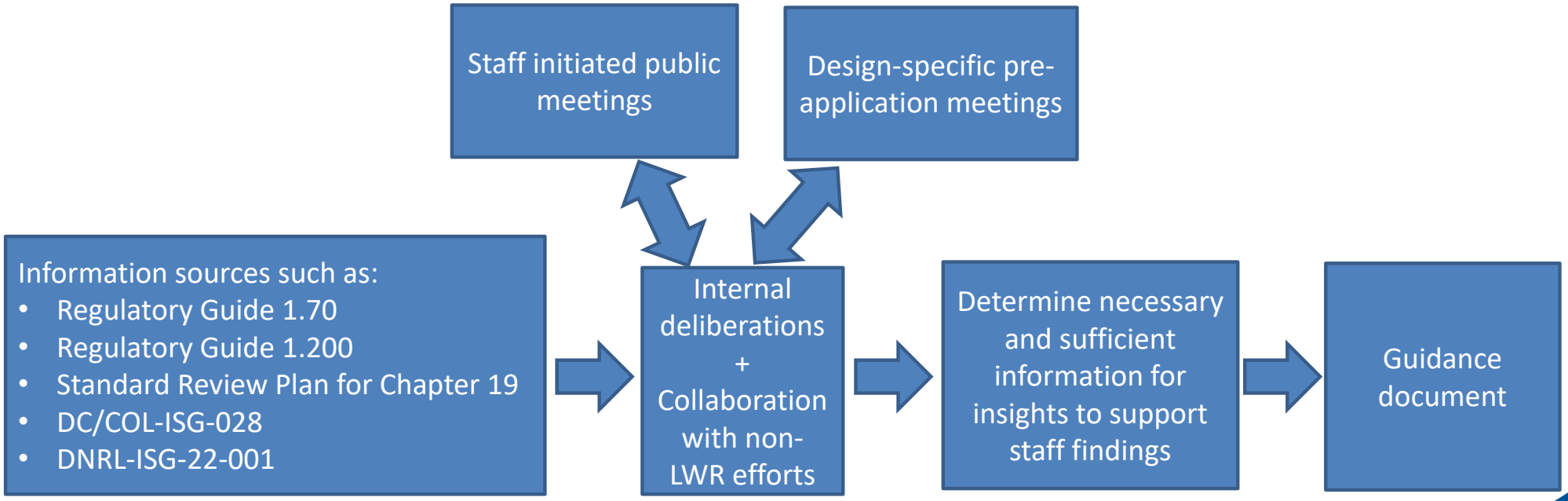
Reason for Staff's Initiative

- Some near-term applicants stated preference for utilizing 10 CFR Part 50
- Staff identified gap in regulatory guidance for risk insights and severe accident information in CP applications
  - No CP applications for nearly 40 years
  - Past CP applications pre-dated agency's key PRA-related actions
    - » Three Mile Island Action Plan
    - » Generic Letter 88-20
    - » Commission's Policy Statements on Severe Accidents and PRA
- Gap exists regarding content of CP application

Benefits of Risk Insights in a CP Application

- **Safety benefits**
  - Identify and focus design efforts on risk and safety-significant items
  - Support demonstrating safety of design
- **Focused staff review**
  - Leverage risk insights to focus on risk-significant items
  - Benefit demonstrated in Part 52 licensing reviews
- **Improve OL application reviews**
  - Reduced regulatory risk
  - Increased effectiveness of review
  - Focus staff attention on changes compared to CP application

Staff's Approach



Issues Under Discussion by NRC staff (Feedback Requested)

- Graded level of risk insights and severe accident information for CP application (§ 50.34(a)). Level of detail commensurate with:
  - Maturity of the design at CP stage
  - Reliance on PRA information for design and licensing decisions
  - Finality for any SSCs at CP stage
- Treatment of external hazards.
- Process to ensure PRA and severe accident information continues to reflect changes between CP and OL.
- Type and scope of independent review of CP PRA (esp. for FOAK).

Next Steps

- Continue communication and engagement
  - Additional public meeting late spring 2023
- Encourage design-specific preapplication engagements
- Identify regulatory document for guidance
- Draft guidance for comment by late summer or early fall of 2023

List of Abbreviations

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
COL	combined license
CP	construction permit
DC	design certification
FOAK	first-of-a-kind
FR	Federal Register
ISG	interim staff guidance
LWR	light-water reactor
SRM	staff requirements memorandum
SSC	structure, system, and component

List of References

SRM-SECY-2015-0002 "Proposed Updates of Licensing. Policies, Rules and Guidance for Future New. Reactor Applications," ADAMS ML15266A023

NUREG-0660, NRC Action Plan Developed as a Result of the TMI-2 Accident, May 1980.

Individual Plant Examination for Severe Accident Vulnerabilities - 10 CFR 50.54(f) (Generic Letter No. 88-20), November 23, 1988

Severe Reactor Accidents Regarding Future Designs and Existing Plants; 50 FR 32138, August 8, 1985

Safety Goals for the Operations of Nuclear Power Plants; 51 FR 28044, August 4, 1986

Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities; 60 FR 42622, August 16, 1995

Regulatory Guide 1.70, "Standard Format and Content of. Safety Analysis Reports for Nuclear Power Plants," Revision 3, November, 1978

Regulatory Guide 1.200, "Acceptability of Probabilistic Risk Assessment Results for Risk-Informed Activities," Revision 3, December, 2020

NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition - Severe Accidents."

DC/COL-ISG-028, "Assessing the Technical Adequacy of the Advanced Light-Water Reactor Probabilistic Risk Assessment for the Design Certification Application and Combined License Application," December 2016

DNRL-ISG-22-001, "Safety Review of Light-Water Power Reactor Construction Permit Applications," Interim Staff Guidance, October 2022, ML22189A099

Questions, Comments, or Feedback