



# Advanced Reactor Content of Application Project Public Meeting



July 31, 2020  
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# Agenda

Time	Topic	Presenter
10: -10:10 am	Introduction	NRC
10:10 – 10:40 am	Discussion of Response to June 12, 2020, Public Meeting to Develop Near-Term Construction Permit Guidance	NRC
10:40 -11:20 am	Feedback from Nuclear Energy Institute (NEI) and U.S. Nuclear Industry Council (USNIC) on Near-Term Construction Permit Guidance	NEI/USNIC
11:20 - 11:45am	Other Stakeholder Feedback on Near-Term Construction Permit Guidance	All
11:45 - 12:45 pm	Break	All
12:45 to 1:15 pm	Discussion of Advanced Reactor Content of Application Project Including Additional Thoughts on Use of Performance-Based Approach	NRC/INL
1:15 to 1:35 pm	Feedback from NEI and USNIC on ARCAP	NEI/USNIC
1:35 to 1:50 pm	Other Stakeholder Feedback on ARCAP	All
1:50 to 2:00 pm	Next Steps and Concluding Remarks	All

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# Discussion of Near-Term Construction Permit Guidance

# Near-Term Construction Permit Guidance

- During the June 12, 2020, ARCAP meeting the staff received the following feedback from the Nuclear Energy Institute (NEI) and U.S. Nuclear Industry Council (NIC):
  - Focus on streamlining reviews and achieving appropriate scope and level of detail in applications to support near term application
  - Must be technology-inclusive (more than just non-LWRs using LMP)
  - Clarify the safety decision that NRC will make for a given topic, and why/how requested information is used to make the decision
    - Clarify what historically provided information, is not necessary for NRC to make safety decisions
    - Option 3 for radioactive material control headed in right direction
  - Work with industry to prioritize technical areas
  - Implement through ISGs (similar to environmental considerations)
  - Should include near-term construction permit guidance for light water small modular reactors

# Near –Term Construction Permit Guidance

- Based on industry comments, staff in the Division of New and Renewed Licenses (DNRL) and the Division of Advanced Reactors and Non-Power Production and Utilization Facilities (DANU) are working to develop near-term construction permit guidance.
  - DNRL has responsibility for light water SMRs
  - DANU has responsibility for non light water reactors
- Initial Considerations
  - Last large light water reactor construction permit that was issued was for Yellow Creek using Regulatory Guide 1.70 Revision 3 (circa 1978)
  - Since 2016, the NRC has issued 10 CFR Part 50 construction permits to two non-power production and utilization facility (NPUF) applicants, SHINE Medical Technologies (SHINE) and Northwest Medical Isotopes (NWMI), for medical radioisotope production
  - Initial ARCAP focus has been on Part 50 operating license or Part 52 combined license application level of detail

# Near-Term Construction Permit Guidance

- Considerations
  - Given industry request for near-term guidance staff does not believe a revision to Regulatory Guide 1.70 or Regulatory Guide 1.206 is feasible on the timeline necessary to support applications planned in the next 1 to 2 years.
  - NRC is continuing work on updating the standard review plan (NUREG-0800)
    - This is a longer-term effort that does not meet industry's request for near-term guidance
    - Review Standard (similar to power uprate or used for first early site permits) potential approach that was considered
      - Redundant to SRP update effort
  - Staff considering following three options:
    - Develop Interim Staff Guidance to clarify specific information in a construction permit (CP) application
    - Issue Draft White Paper on the Review Strategy for SMR CP applications
    - Develop an Office Instruction

# Near-Term Construction Permit Guidance

- Considerations
  - Preapplication discussions are key to providing near-term guidance
  - Important insights from the issuance of NPUF construction permits include:
    - In accordance with 10 CFR Part 50 an applicant can request approval at the CP stage.
      - The level of information needed by the staff would increase for areas where approval is requested
      - Shine and NwMI did not request approval for any technical areas during the CP reviews

# Near-Term Construction Permit Guidance

- Considerations
  - Important insights from the issuance of NPUF construction permits continued:
    - There was early interaction on what parts of an operating license application are not needed at the CP stage
      - For example, a materials control and accounting program is not required at the CP stage since the CP does not authorize the possession of source, byproduct, or special nuclear material
      - Many operational programs descriptions were also not needed at the CP stage



# Near-Term Construction Permit Guidance

- Considerations
  - Important insights from the issuance of NPUF construction permits continued:
    - NPUF construction permit application reviews focused on ensuring appropriate use of analysis methodologies. Staff accepted incomplete descriptions of programs, structures, systems, and components in the PSAR where the applicant made regulatory commitments to provide complete information as part of the operating license application
    - The use of license conditions ensured that the NRC staff was kept informed of safety significant areas of construction prior to the submission of an operating license application

# Near-Term Construction Permit Guidance

- Next Steps
  - Staff will continue to develop ARCAP guidance for an operating license or combined license level of detail
  - Staff considering options for providing near-term construction permit guidance
    - Key to guidance is understanding of areas where applicant's may be requesting approval
    - Staff will apply insights from recently issued construction permits to NPUFs to ensure consistency of agency reviews and promote use of best practices and lessons learned

# Near-Term Construction Permit Guidance

- Next Steps
  - Staff considering options for providing near-term construction permit guidance (continued)
    - Staff will continue to engage stakeholders as guidance is developed
      - Staff would like to better understand what industry believes is needed with respect to guidance.
      - Need for more certainty on industry plans and schedules for CP applications so we can appropriately schedule issuance of CP guidance and apply the necessary resources to achieve that schedule.

# Additional Considerations

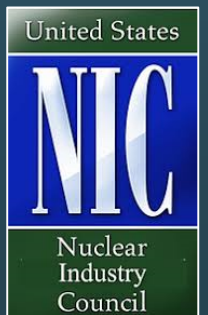
- Longer Term Construction Permit (CP) Guidance
  - In developing ARCAP, guidance for CP applications can be added if there is a need expressed by industry
  - This will also require Technology Inclusive Content of Application Project (TICAP) to include guidance for CP applications addressing factors such as:
    - The completeness of the probabilistic risk assessment (PRA) analysis needed to support a CP application
    - The degree to which licensing basis event (LBE) analysis, structures, systems, and component (SSC) classification, and evaluation of defense in depth need to be completed
    - How quality attributes will be factored into the construction process
    - Commitments to develop sufficient information (through testing or research and development) to support the reliability, availability and performance of SSCs and human actions modelled in the final PRA. This could include commitments for items such as fuel testing and analytical code Verification and validation.
  - Feedback from industry is requested on the above items

# U.S. Nuclear Industry Council Comments on Near Term Construction Permit Guidance

## Nuclear Regulatory Commission Meeting

Jeffrey S. Merrifield  
Chairman, Advanced Nuclear Task Force  
U.S. Nuclear Industry Council

**31 July 2020**



# U.S. Nuclear Industry Council (USNIC) feedback on NRC Construction Permit Guidance

- USNIC appreciates the opportunity to provide comments at the 12 June 2020 NRC Stakeholders Meeting regarding ARCAP that highlighted the following:
  - Streamlining near term application reviews to define appropriate scope and level of detail
  - Need to be technology-inclusive (beyond non-LWRs using LMP)
  - NRC need to define how and why requested information is used to make a regulatory decision
  - Use of Option 3 for radioactive material control is the best of the three options
  - Utilize interim staff guidance (ISG) for implementation (similar to environmental considerations)
  - Need for near-term construction permit guidance for light water small modular reactors
- We appreciate the NRC staff's recognition of USNIC's input
- USNIC is looking forward to review NRC's revised guidance

# U.S. Nuclear Industry Council (USNIC) feedback on NRC Construction Permit Guidance

- Construction Permit (CP) guidance as part of LMP/TICAP/ARCAP is appropriate as vendors may wish to use LMP prior to Part 53
- Regulatory requirements and processes in LMP/TICAP/ARCAP need to be developed separately
- USNIC continues to believe a “blank slate” approach is most appropriate
- Concur with NRC’s staff recommendation (slide 12) regarding TICAP to include guidance for a CP
- NRC needs to ensure that Structures, Systems, and Components (SSCs) are selected appropriately
  - This can only be done if NRC staff have agreement on the PRA, LBE selection, and Defense in Depth (i.e. major portions of LMP), which are precursors to SSC selection

# U.S. Nuclear Industry Council (USNIC) feedback on NRC Construction Permit Guidance

- NRC Staff considering three options for Construction Permit Guidance:
  - Develop Interim Staff Guidance (ISG) to clarify specific information in a CP application
  - Issue Draft White Paper on the Review Strategy for SMR CP applications
  - Develop an Office Instruction
- USNIC is currently evaluating options, but generally inclined to believe ISG provides most certainty
- NRC staff considering options for providing near term construction permit guidance
  - We recognize this is key to understanding areas where applicants may request approval
  - USNIC is gathering information from Developers regarding their plans for CP approval – may be an issue that will take 6-9 months to refine



# U.S. Nuclear Industry Council

For questions/comments contact

## **Jeffrey S. Merrifield**

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# Advanced Reactor Content of Application Project

# Break

# Discussion of Advanced Reactor Content of Application Project – Use of Performance Based Approach

# Summary of Previous Industry Feedback on NRC ARCAP Chapter 8 Approach

- During the June 12, 2020, ARCAP meeting the staff received feedback from the Nuclear Energy Institute (NEI) and U.S. Nuclear Industry Council (NIC) regarding the draft example ARCAP Chapter 8:
  - Not applicable to Part 50 applications; include construction permit (CP) guidance
  - Not technology-inclusive (limited to non-LWRs using LMP)
  - No criteria for acceptance; increases uncertainty
  - Level of detail issues; more guidance for system description and monitoring program detail
  - Need clarification on the use of monitoring programs to demonstrate compliance
  - Include guidance for microreactors
  - Duplication of information

# Overview of Changes to ARCAP Chapter 8 to Address Industry Feedback

- Applicability to Part 50 applicants
  - Added text that specifies applicability to Part 50 operating license applicants
  - Added text specifying content guidance for Part 50 CP applications – need broader discussion regarding CP guidance for applications using LMP
- Technology inclusive
  - Added text to specify that the guidance applies to non-LWRs and small modular LWRs
- Acceptance criteria
  - Added acceptance criteria section to add clarity regarding what level of detail the staff would consider necessary

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***Note: The updated ARCAP draft Chapter 8 can be found in ADAMS – Accession No. ML20197A234***

# Overview of Changes to ARCAP Chapter 8 to Address Industry Feedback

- Level of detail (e.g., for system descriptions)
  - Provided more specificity regarding application content
  - Provided clarity regarding system description content – for example, information related to physical systems can be limited to general descriptions of layout and technologies used to limit the release of the various inventories of radioactive materials within the plant
- Use of monitoring program
  - Added criteria for the monitoring program description
  - Guidance asks for a description of a radiation protection program and an effluent release monitoring program that will confirm effluent release limits are being met during normal operation or, if not, provide an alert that corrective action is needed to avoid exceeding the release limits

# Overview of Changes to ARCAP Chapter 8 to Address Industry Feedback

- Include guidance for microreactors
  - The staff does not believe that separate guidance is needed for microreactors
  - Text added to the draft ARCAP Section 8.1, *Liquid and Gaseous Effluents*, to specify that:

“...if a particular reactor design can be shown to not generate any normal radioactive effluent releases throughout its life cycle (e.g., a microreactor using a heat pipe design) then the application need only describe (1) sufficient information to substantiate this design attribute, (2) a description of controls to ensure the design will maintain this characteristic throughout the life of the plant, and (3) a description of how the applicant will detect a unexpected radioactive effluent release.”

# Overview of Changes to ARCAP Chapter 8 to Address Industry Feedback

- Include guidance for microreactors (continued)
  - Draft ARCAP Section 8.2, *Contamination Control*, clarified to state:

“....even applications that do not deal with large or significant amounts of radioactive material need to address the minimization and facilitation provisions of the regulations, but they should do so using common sense and good judgment. Refer to guidance in Regulatory Guide 4.21, *Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning*”



# Overview of Changes to ARCAP Chapter 8 to Address Industry Feedback

- Duplication of information
  - Text added to clarify that information being requested in Chapter 8 may alternatively be described in the Radiation Protection Program (RPP) which may be part of a separate application document
  - Because the staff will rely on information in both documents to make its safety finding, information does not need to be replicated in both the FSAR and RPP
  - However, the FSAR should incorporate this information by reference to ensure that future changes to this information are properly evaluated by the FSAR change process to determine the need for prior NRC approval

# Additional Considerations

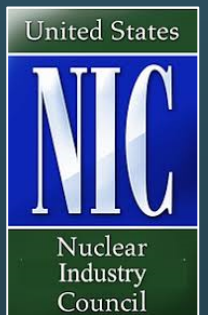
- Regarding analysis of estimated effluent releases
  - Some type of exemption (generic or plant-specific) will likely be necessary to address the requirements in 10 CFR 50.34, 50.34a, 52.47, and 52.79
  - While the specific analysis of effluent releases is not required to be included in the application, an applicant should develop such analysis for its internal engineering documents
  - These analyses could be the subject of audit by NRC staff reviewers at the time of application review or subsequently as part of inspections during plant construction or operation

# U.S. Nuclear Industry Council Comments on Advanced Reactors Content of Applications (ARCAP)

## Nuclear Regulatory Commission Meeting

Jeffrey S. Merrifield  
Chairman, Advanced Nuclear Task Force  
U.S. Nuclear Industry Council

**31 July 2020**



# U.S. Nuclear Industry Council (USNIC) input on NRC licensing

- We appreciate the thoughtful effort the NRC staff has made to respond to USNIC's comments
- We recognize the NRC needs to develop a feasible method to streamline and modernize the licensing of Advanced Reactor designs before 2027
  - Appreciate recognition that process should be clear, risk informed and consistent with NRC safety goals
  - Reduction of unnecessary burden, particularly where there is no nexus to safety, should remain a key goal
  - USNIC continues to support efforts to validate how LMP/TICAP works within the ARCAP framework
    - Process necessitates prompt elevation and expedited resolution of policy issues
  - Commissioners need to be fully engaged, recognizing a license application is being reviewed by the NRC and multiple license applications will be forthcoming in 2021-22

# U.S. Nuclear Industry Council (USNIC) feedback on ARCAP approach

- USNIC continues to believe that ARCAP should include all advanced reactor types
  - We appreciate the NRC's willingness to expand scope but the outcome must be transformative
  - We believe continued focus on areas for elimination in a risk-informed review is appropriate
  - We are interested to learn more about the NRC's proposed approach to Microreactors
  - We are convinced ARCAP needs to provide a clear benefit to near and long term applicants
- The staff should continue to think creatively about how ARCAP can be used for advanced reactor reviews (including under Parts 50 and 52)
- Performance-based requirements, beyond the Chapter 8, should be developed to accomplish this goal
  - Chapter 8 example indicates Agency is creatively thinking about appropriately focused outcomes

# U.S. Nuclear Industry Council (USNIC) feedback on ARCAP approach: Relation of ARCAP to Part 53 (p 1)

- While we support creative thinking, we remain concerned about ARCAP ties to the existing regulatory framework unduly influencing Part 53 development
- ARCAP should not be the default basis for Part 53
  - ARCAP is a bridge not a destination
  - Making Part 53 more applicable to a wider variety of technologies will benefit staff and industry
  - Must have clear high level requirements, fewer exemptions, and less iteration on existing rules
- Performance-based requirements, beyond the Chapter 8, should be developed

# U.S. Nuclear Industry Council (USNIC) feedback on ARCAP approach

- For ARCAP, NRC staff should consider other areas that could apply Approach 3 (e.g., EPZ, Security, and Siting)
- Some developers are concerned about how they will meet the NRC's expectations for an application using ARCAP without specific guidance
  - Need to have clear acceptance criteria to help developers understand the scope and depth of an application
  - NRC has provided acceptance criteria in their updated Chapter 8
  - Need to provide similar criteria for other elements for ARCAP review
- USNIC looks forward to constructive engagement with Commission and Commission Staff to develop these vital regulatory review tools for advanced reactor deployment

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