

# Emergency Preparedness for Small Modular Reactors and Other New Technologies Performance-Based Approach

Public Meeting  
August 22, 2016

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# Agenda

1:00-1:15	Welcome <ul style="list-style-type: none"><li>• Logistics, Introductions and Purpose</li></ul>
1:15-2:00	Background on EP for SMRs and ONTs Rulemaking <ul style="list-style-type: none"><li>• SMRs, non-LWRs and Medical Isotope Production and Utilization Facilities</li><li>• Staff Papers and Stakeholder Engagement</li><li>• Commission Direction</li></ul>
2:00-2:45	Performance-Based EP Approach for This Rulemaking <ul style="list-style-type: none"><li>• Comparisons between Prescriptive and Performance-Based approaches to EP</li><li>• Advantages and Disadvantages</li></ul>
2:45-3:45	Discussion and Feedback
3:45-4:00	Meeting Summary and Closure

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**Welcome**  
**Meeting Logistics**  
**Introductions**  
**NRC Staff**  
**NGOs in attendance**  
**Members of the public**  
**Phone participants**

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# Purpose

The purpose of this public meeting is to provide a forum for discussing an approach using performance-based concepts for rulemaking for emergency preparedness (EP) for small modular reactors (SMRs) and other new technologies (ONTs).

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# Background

08/19/2016

Final Slides

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# Background

This presentation may not reflect the final approach by the NRC in the development of the regulatory basis, guidance, and proposed and final rules.

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# Background

- Why are we considering a performance-based approach to EP?
- Commission directive (SRM-SECY-16-0077)
  - Interest by applicants in the licensing, construction, and operation of SMRs, non-light-water reactors (non-LWRs), and ONTs
  - Large LWRs, research and test reactors are not in the scope of this rulemaking.

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# Background

## Staff Papers and Stakeholder Engagement

- [SECY-11-0152](#)

## Commission Direction

- [SRM-SECY-15-0077](#)
- [SRM-SECY-16-0069](#)



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# Background

## Rulemaking

- Addresses advanced technology in reactor plant designs
- Includes EP for medical isotope production facilities
- Provides guidance to facilitate the implementation of the rule
- Maintains adequate protection of public health and safety

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# Background

- ## Small Modular Reactors (SMRs)
- Generally, each SMR
    - Is less than 300 megawatts electric power
    - Is built in factories and delivered to site
    - Has passive safety features, smaller core size and source term
  - Can add modules as power needs increase
  - NuScale design certification application expected in 2016
  - EP will be required as is appropriate for design and spectrum of accidents

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# Background

- **Non-light Water Reactors**
  - Gas-cooled reactors
  - Molten salt reactors
  - Liquid metal reactors
- **Many designs have lower operating pressures as compared to large LWRs**
- **Currently, no applicant**

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# Background

## Medical Isotope Production and Utilization Facilities

- Two construction permit (CP) applications submitted
  - SHINE Medical Technologies (CP granted)
  - Northwest Medical Isotopes (CP under review)

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# Background

## EP for SMRs and ONTs

- Proposed advanced designs require new thinking
- Emergency planning zone (EPZ) size – informed by postulated offsite dose consequences
  - EPA Protective Action Guides (PAGs)
  - EPZ size could vary
- 10 CFR Part 100, Reactor Site Criteria – not in the scope of this rulemaking

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# Performance-Based EP Approach

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# Performance-Based EP Approach

- EP as it exists now
  - Post-TMI U2
  - Reassessed after significant industry events
    - Browns Ferry fire
    - TMI U2
    - Chernobyl
    - 9/11
    - Fukushima
  - Relies on methods or processes
- EP by Design
  - EP is included as an element of reactor and plant design
    - Technological advances
    - Leverages new designs
    - Based on advances in reactor studies
  - Relies on demonstrating results

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# Performance-Based EP Approach

## Difference Between Approaches:

### Prescriptive

- Specifies features, actions and programmatic elements
- Defines process and design to achieve goal
- Licensee responsible for meeting prescribed methods and features

### Performance-Based

- Focuses on measurable outcomes
- Provides flexibility on the process or design
- Licensee responsible for design, methods and performance.



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# Performance-Based EP Approach

## **An Example:**

Prescriptive: Adequate methods, systems, and equipment for assessing and monitoring actual or potential consequences of a radiological emergency condition are in use onsite.

Performance-Based: The licensee must access and monitor the radiological consequences resulting from deviations from normal operations.

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# Performance-Based EP Approach

The NRC has issued other performance-based rules and the Reactor Oversight Program

- Maintenance Rule (10CFR50.65)
- Station Blackout Rule (10CFR50.63)
- Reactor Oversight Program
  - Strategic performance areas are cornerstones that reflect the essential safety aspects of facility operation

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# Discussion and Feedback

08/19/2016

Final Slides

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# Discussion and Feedback

What activities would go into performance-based EP, for example:

- Classification
- Notifications
- Protective actions
- Assessment
- Others?

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# Discussion and Feedback

What activities should be evaluated, for example:

- Drills and Exercises
- Performance Indicators
- Consequence-oriented activities?
- Frequency?

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# Discussion and Feedback

Is a system similar to the Reactor Oversight Process and the EP Cornerstone appropriate?

For example:

- Oversight—Regulatory Response to EP Performance
  - Performance levels
    - Green Performance Band
    - White Performance Band
    - Yellow Performance Band

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# Discussion and Feedback

- What do you perceive as the advantages?
- What do you perceive as the disadvantages?

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# Meeting Summary and Closure

08/19/2016

Final Slides

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# Meeting Summary and Closure

## Next Steps

- **Draft Regulatory Basis**
  - Publication of the draft regulatory basis planned for December, 2016
  - A public meeting planned for first quarter, 2017
- **Final Regulatory Basis**
- **Draft Rule with draft guidance**
- **Final Rule with final guidance**
- **Rulemaking Expected to be completed in 2020**

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# References, not all inclusive

- [SECY-93-0092 \(and SRM\)](#)
- [SECY-10-0034 \(No SRM\)](#)
- [SECY-11-0152 \(No SRM\)](#)
- [SECY-14-0038 \(and SRM\)](#)
- [SECY-15-0077 \(and SRM\)](#)
- [SECY-16-0069 \(and SRM\)](#)
- [NUREG-0396 \(EPA 520/1-78-016\)](#)
- [NUREG/CR-7195](#)
- [NUREG/BR-0303](#)
- [NUREG-0654/FEMA-REP-1](#)
- [EPA-400-R-92-001](#)

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# Information Sites

- NRC website for rulemaking
  - <http://www.nrc.gov/about-nrc/regulatory/rulemaking.html>
- Regulations.gov
  - <https://www.regulations.gov/>

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