U.S. Nuclear Regulatory Commission Update

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Director

Division of Preparedness and Response

Nuclear Security and Incident Response

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Accomplishments

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- Completion of new operations center and subsequent training of response teams
- Implementation of HAB exercises
- Completion of Phase I review of NTTF EP 9.3 Communications and Staffing Safety Assessments for all sites
- Published draft NSIR/DPR-ISG-02, “Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants” on January 10, 2014 for 60-day public comment period

Priorities

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- Maintain readiness of the response organization and center
- Develop integrated and transparent approach for EP decommissioning for nuclear power plants
- Continue progress on NUREG-0654 revision
- Continue progress on Tier 2 and Tier 3 NTTF EP items
- Provide accurate and timely outreach to all key stakeholders

Emergency Preparedness Activities

Joseph Anderson

Chief, Operating Reactor Licensing and Outreach Branch

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Discussion Topics

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- Reactor Decommissioning
  - Generic Process
  - Emergency Planning (EP) Aspects/Considerations
- EP Licensing Activities
  - Operating Reactors
  - New Reactors
  - Small Modular Reactors

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Reactor Decommissioning

Termination of License (10 CFR Part 50.82)

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- Licensee notifies (certifies to) NRC:
  - Within 30 days of permanently ceasing operation
  - Once fuel has been permanently removed from the reactor vessel
- Licensee submits a **Post-Shutdown Decommissioning Activities Report** (PSDAR) within 2 years of cessation of operation
- Licensee submits a **License Termination Plan** (LTP) at least 2 years prior to requesting license termination
- Licensee submits **Final Status Survey Report** (FSSR)

Termination of License (10 CFR Part 50.82)

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- Reactor decommissioning is required to be completed in 60 years.
- Bases: 50 years in SAFSTOR + 10 years DECON
  - Radiation dose rates reduced to 1-2 %
  - Radioactive waste volumes reduced to 10%
  - Allows decommissioning fund to increase

Decommissioning Strategies

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- **DECON** – Equipment, structure. etc., removed or decontaminated to a level that permits release
- **SAFSTOR** – Plant placed in a safe, stable condition and maintained in that state until it is subsequently decontaminated to levels that permits release
- **ENTOMB** – Plant is encased in a structurally long-lived substance to allow decay until levels permit unrestricted release (not currently available)

NRC Public Website:

http://www.nrc.gov/waste/decommissioning.html

Current Decommissioning Status

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- 17 **Power Reactors** in decommissioning
  - 4 active DECON
  - 13 in SAFSTOR
- 8 **Research Reactors** in decommissioning
  - 4 active DECON
  - 4 in SAFSTOR
  - 1 additional to decommissioning in 2014/2015

Decommissioning: The Future?

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- **Vermont Yankee** announced it will be permanently shutting down in 2014
- **Oyster Creek** (2019) and other small single unit plants have been rumored to be considering shutting down
  - It has been speculated that as many as 6 to 12 power reactors permanently ceasing operations

Decommissioning: EP Regulatory Basis

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- Current EP regulations do NOT take into consideration reduced consequences associated with potential accidents that may occur at a permanently shutdown nuclear power plant
- **Historically, exemptions have been used to grant regulatory relief on a case-by-case basis**
  - Until an exemption is issued, onsite and offsite EP programs must be maintained and all EP requirements met, including exercises

Decommissioning: EP Accident Considerations

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- After reactor defueled, the traditional accidents that dominate operating plant risk are no longer applicable
- Risk to public is primarily associated with the spent fuel stored in the Spent Fuel Pool (SFP)
- Risk of SFP accident dominated by beyond design basis earthquake
  - Possible oxidation of fuel cladding becomes self-sustaining ("zirconium fire")

Decommissioning: EP Exemption Precedent

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Licensee SFP analyses demonstrating that:

- Applicable Design Basis Accident(s) could NOT result in projected doses to public exceeding EPA protective action guides
- Spent fuel is NOT susceptible to a zirconium fire or sufficient time would be available to take mitigative actions and, if necessary, offsite protective measures on an “all hazards” basis (without detailed REP preplanning)
  - NRC previously determined that 10 hours was sufficient time in its evaluation of previous site-specific exemption requests

Decommissioning: EP Exemption Precedent

Previous exemptions reduced EP requirements similar to Independent Spent Fuel Installation (ISFSI)

Operating Reactor(s)

Multi-faceted, to address a variety of emergencies, including hostile action events (HAB), affecting public health and safety

- Formal offsite REP plans
  - Emergency Planning Zone (EPZ)
  - Alert and Notification System (ANS)
  - Evacuation Time Estimate Studies (ETE)
  - Emergency Classification (NOUE-->GE)
- Predetermined offsite Protective Actions
- Immediate (15 min) offsite notification
- Extensive site/offsite emergency response organizations (EROs)
- Dedicated on- and off-site facilities
- Joint, biennial exercises
- Comprehensive site/offsite training

Decommissioning Site

Focused on addressing low consequence, limited impact emergencies

- No formal offsite REP plans: no EPZ / ANS / ETE; removes SAE & GE classification levels
  - ➢ HAB event planning not required
- "Prompt" offsite agency notification
- Streamlined site ERO, to include: assessment, ERO activation, notification/communication, training, facilities and equipment, and recovery
- No dedicated offsite facilities; common onsite facility
- Offsite response organizations invited to participate in onsite biennial exercises

Decommissioning: Current Challenges

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- **Commission Approval (SRM-SECY-08-0024)**
  - Decommissioning rulemaking?
- **NSIR/DPR-ISG-02** *(Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants)*
- **Transition Phases:**
  - Operating Power Reactor Emergency Plan to Decommissioning Emergency Plan/EALs
  - Decommissioning Emergency Plan/EALs (spent fuel pool) to ISFSI Emergency Plan/EALs

Decommissioning: EP Inspection Program

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Inspection Manual Chapter 2515, "Light Water Reactor Inspection Program – Operations Phase"

- In effect until licensee submits written certification to cease operation in accordance with 10 CFR 50.82(a)(1)(i)
- After certification is received by NRC, facility is no longer subject to Reactor Oversight Process (ROP)
- Resident Inspector will typically remain onsite for a period of 6 to 12 months after the 50.82 certification is submitted to the NRC

Decommissioning: EP Inspection Program

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Inspection Manual Chapter 2561, "Decommissioning Power Reactor Inspection Program"

- Inspection program comprises two major elements:
  - Core Inspection
  - Discretionary Inspection (i.e., Reactive and Initiative Inspections)
- Inspection Program will remain until the license is terminated

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Operating Reactor Licensing

EP Licensing: Operating Reactors

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- Evacuation Time Estimate (ETEs)
- Emergency Response Organization augmentation (timing & staffing)
- Emergency Action Level (EAL) scheme changes
  - NEI 99-01, Revision 6
- Considerations:
  - Engage staff early and often
  - Prioritization of reviews

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New Reactor Licensing

EP Licensing: COL/ESPs

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- Vogtle and Summer
- Watts Bar
- Design Certifications
- Combined Operating License (COL) applications
- Mo-99 Production Facility
- Anticipated Future Applications

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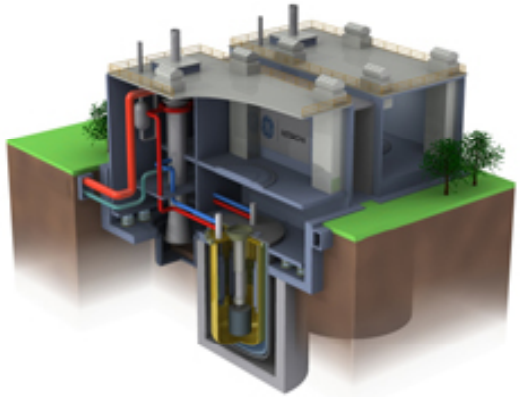
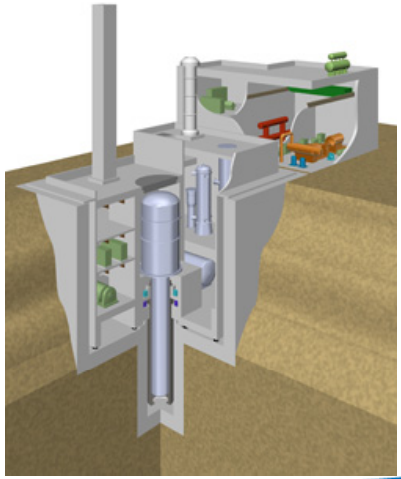


Small Modular Reactors



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EP Licensing: SMR Policy Issues

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- "Right Sized" Emergency Preparedness Program
  - EPZ
  - EP program elements
- NEI White Paper
  - December 23, 2013-White Paper on EPZ sizing methodology provided to the NRC
  - April 8, 2014-NEI and NRC held public meeting to exchange ideas and receive public comments
  - Staff provided an update to the ACRS on April 10, 2014
- NRC staff preparing Commission papers for September Commission meeting on SMRs

Incident Response Activities

Sally Billings

Emergency Response Coordinator

Division of Preparedness and Response

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Web EOC – Webfusion

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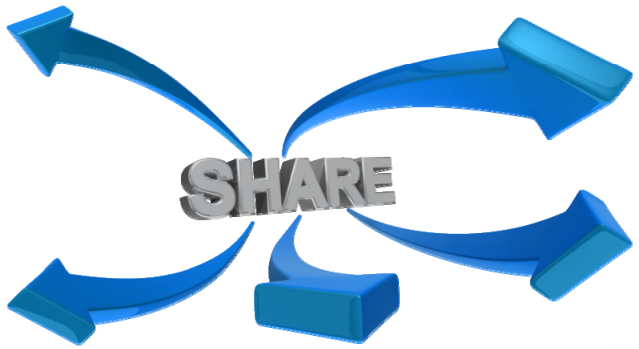
Webfusion will allow an electronic exchange, or sharing, of response information among all elements of the response operation and external stakeholders.

- Sharing amongst NRC, licensees, NEI, INPO, States/local, Federal agencies, etc…
- Help to better maximize the response capabilities.



RASCAL v4.3 Upgrades

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- Contains scalable SOARCA station blackout source term model and tracks radionuclide inventories
- Allow source terms for two or more reactors to be compiled into a common source term.
- Allows for dose projections out to 100 miles.
- Allows for extended release duration of 96 hours.
- Contains a standardized interface for sharing and importing source terms from other models.

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Thank You