



U.S. NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Small Modular Reactors Emergency Preparedness

Patricia A. Milligan, CHP
Senior Technical Advisor

Office of Nuclear Security and Incident Response

Small Modular Reactors

- Less than 300 megawatts
 - typical nuclear power plant ~ 1,000 megawatts
- Built in factories and delivered to site
- Add modules as power needs increase
- Passive/inherent safety features, smaller size, longer time to release

Small Modular Reactors

- How does emergency planning fit in with small modular reactors?
 - SECY 15-0077 “Options for Emergency Preparedness for Small Modular Reactors and other New Technologies”
 - Staff recommended Commission approve rulemaking for new EP requirements for SMRs
 - Variable size EPZ including site boundary EPZ
 - Limited to no REP program offsite
 - If accident* doses at site boundary do not exceed 1 rem no offsite EP will be required.

*Accidents to be determined

Small Modular Reactors

- STAFF REQUIREMENTS – SECY-15-0077 –
OPTIONS FOR EMERGENCY PREPAREDNESS FOR
SMALL MODULAR REACTORS AND OTHER NEW
TECHNOLOGIES
- Approved the staff’s recommendation for rulemaking to
revise regulations and guidance for EP for SMRs et al.
- Commission noted the potential benefit of a
performance-based emergency preparedness regimen
for small modular reactors and directed staff not to rule
it out.
- Rulemaking plan to Commission within 9 months.

Basis for Current LWR EPZ Size

- EPZ is of “sufficient size to provide for dose savings to the population in areas where the projected dose from design basis accidents could be expected to **exceed** the **applicable PAGES** under unfavorable atmospheric conditions” NUREG 0396

Emergency Planning Zones

- Two emergency planning zones (EPZs) around each nuclear power plant help plan a strategy for protective actions during an emergency.
 - Plume exposure pathway EPZ radius ~10 miles from the reactor.
 - Ingestion exposure pathway EPZ has a radius ~ 50 miles from the reactor.
- These distances represent the distances where the PAGs won't be exceeded for most events

Site boundary EPZ

- “since it will usually not be necessary to have offsite planning if PAGs cannot be exceeded offsite, EPZs need not be established for such cases.” EPA 400
 - Decommissioned power reactors granted exemption requests to adjust offsite EP commensurate with the risk.
 - RTRs, planned production facilities, i.e. “SHINE” isotope production reactor

SMR EP

- May have site boundary EPZ only
 - What would offsite look like?
 - What would onsite EP look like?
- What is “performance based?”
 - Does it fit with SMR EP?
- Thoughts? Comments? Questions?