

Additional Recommendation Identified in SECY-11-0137

AR 3 Evaluate the basis of the plume exposure Emergency Planning Zone size.

Regulations and Guidance

10 CFR 50.47(c)(2) "Emergency plans," states that the plume exposure pathway emergency planning zone (EPZ) for nuclear power plants shall, generally, consist of an area about 10 miles (16 km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries.

Staff Assessment and Basis for Prioritization

Following the event at Fukushima, the NRC in conjunction with other US Government entities made a prudent, conservative travel advisory for American citizens within a 50-mile range around the Fukushima plant. The 50-mile travel advisory was made in the interest of protecting the health and safety of U.S. citizens in Japan based on the information available at that time and the rapidly evolving situation. Because of this action, the staff determined it was appropriate to consider whether the basis of current EPZ requirements for US nuclear power plants ensures adequate protection of public health and safety.

NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," published in November 1978, provides the technical basis for the plume exposure pathway EPZ and an ingestion exposure pathway EPZ. NUREG 0396 analyzes a spectrum of potential nuclear plant accidents and determined the size of EPZs in which detailed planning would be appropriate for the protection of public health and safety.

The task force that developed NUREG-0396 considered several possible rationales for establishing the size of the EPZs, including risk, cost effectiveness, and the accident consequence spectrum. After reviewing these alternatives, the task force concluded that the objective of emergency response plans should be to provide dose savings for a spectrum of accidents that could produce offsite doses in excess of the EPA PAGs (EPA-400, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents"). This rationale established bounds for the area in which detailed planning would be required as a defense in depth measure. The EPZ requirements also provide consistency in nuclear plant preparedness across the nuclear fleet and the supporting State and local governments.

All US nuclear power plants currently have approved emergency plans that include EPZs in compliance with the regulations. The Federal Emergency Management Agency (FEMA)

provides oversight of offsite response plans that support nuclear plants. Any changes to EPZs will be reviewed in coordination with FEMA.

The staff has conducted several studies that can inform an evaluation of the adequacy of the plume exposure pathway EPZ. NUREG/CR-6953, "Review of NUREG-0654, Supplement 3, 'Criteria for Protective Action Recommendations for Severe Accidents,'" V evaluated the efficacy of various protective action strategies within the EPZ. NUREG/CR-6864, "Identification and Analysis of Factors Affecting Emergency Evacuations" examined large evacuations in the US between 1990 and 2003 to more fully understand the dynamics involved. Draft NUREG-1935 the "State of the Art Reactor Consequence Analysis" evaluated hypothetical evacuations within EPZs and beyond in response to a series of accident scenarios. NUREG-1935 is undergoing management review and will be provided to the Commission upon completion. These analyses informed the staff conclusion that the current requirements for EPZs remain protective of public health and safety. The staff, in response to a frequently asked question regarding protective action recommendations, informed all licensees that it is a regulatory requirement for a licensee to develop and communicate a PAR when EPA PAG doses may be exceeded beyond the 10 mile plume exposure pathway EPZ. This provides the basis for expanding protective actions beyond the 10-mile EPZ if conditions warrant. In conclusion, the staff believes that the tools to effect appropriate protective actions exist within the response framework and current strategies within the 10-mile EPZ supports such protective action decisions.

Staff Recommendations

The staff believes the existing basis for the EPZ size remains valid (including for multi-unit events). This is viewed as a longer-term action that is already being evaluated by existing activities. The staff will utilize insights from the current Level 3 Probabilistic Risk Assessment (PRA) study results to inform the process for evaluation of potential impact that a multi-unit event may have on the EPZ. Insights gained from the Level 3 PRA study relevant to informing the process for evaluation of the potential impact on the EPZ that a multi-unit event may have would be primarily related to understanding the sensitivity of the calculated offsite health consequences to various modeling assumptions.

Unique Implementation Challenges

The staff has not identified any unique challenges which would preclude moving forward.

Schedule and Milestones

The staff will utilize the results of the Level 3 PRA to inform the process of evaluating the EPZ basis.