



## Conference of Radiation Control Program Directors, Inc.

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ATTN: Rulemakings and Adjudications Staff

The Conference of Radiation Control Program Director's Board of Directors appreciates the opportunity to provide comments on the Petition for Rulemaking (PRM-50-104 or Petition) noticed in the Federal Register on April 30, 2012. The petition was filed with the Nuclear Regulatory Commission (NRC) by Mr. Michael Mariotte and was dated February 15, 2012. The Petition was filed on behalf of the Nuclear Information and Resource Service (NIRS) and 37 co-petitioners. In short, the petitioner requests that the NRC amend its regulations to expand the Emergency Planning Zones for nuclear power plants in the United States.

The petitioner bases the justification for the rule amendment on their own interpretation of the lessons learned from Chernobyl, the September 11, 2001 attacks on the United States and the most recent accident at the Fukushima Daiichi Nuclear Power Station in Japan. However, the CRCPD disagrees with the conclusions that are drawn within the petition and believes many of the assertions made by the petitioner are incomplete and misrepresented. A more detailed discussion of the CRCPD's assessment of EPZ size and the applicability of recent historical events is enclosed.

Based on careful deliberation and assessment of available radiological data from Fukushima, technical analysis of reactor accidents (including Chernobyl and Fukushima), and current studies of reactor consequence analysis, the CRCPD does not support the assertions nor the conclusions expressed in the petition. The CRCPD finds no technical basis for the expansion of either the Plume Exposure Pathway or the Ingestion Pathway, and believes the current rules and guidance provide an adequate margin of conservatism to support the current EPZ size.

Therefore, the CRCPD recommends that the NRC deny the petition because the petitioner failed to provide adequate justification to support a modification to the current rule.

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If you have any questions or concerns regarding the comments or conclusions provided in this correspondence, please feel free to contact Patrick Mulligan, Chair of CRCPD's Committee on Emergency Response Planning at (609) 984-7701 or via e-mail at [patrick.mulligan@dep.state.nj.us](mailto:patrick.mulligan@dep.state.nj.us).

Sincerely,



Earl Fordham, CHP  
Chairperson

Enclosure

cc: CRCPD Board of Directors  
Patrick Mulligan, Chair, HS/ER-5  
Brian McDermott, NRC/FSME

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## **Planning Basis Discussion**

The current technical planning basis for the plume and ingestion pathway Emergency Planning Zones is outlined in joint NRC and EPA Task Force report titled "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants" (NUREG-0396, December 1978). In determining the size of the EPZs the Task Force considered several possible rationales including risk, probability, cost effectiveness and accident consequence spectrum. After reviewing all the alternatives, the technical basis rationale was based on a full spectrum of accidents and postulated consequences that also considered probability.

The Task Force agreed that emergency response plans should address response to any accidents that would produce offsite dose consequences in excess of the established Protective Action Guides. In the technical analysis of design basis accidents and Class 9 accident consequence sequences, the Task Force derived the general guidelines of 10 miles for the plume exposure pathway and 50 miles for the Ingestion Pathway. It was the consensus of the Task Force that emergency plans could be based on these generic distances and predetermined actions would provide dose savings for the general public. The Task Force also included within their conclusions that actions could be readily taken beyond these predetermined areas on an ad hoc basis using the same considerations as the initial protective actions. Also included in the Task Force recommendations were considerations of plant specific criteria that may affect the general size of the EPZ including demography, topography, land characteristics, access routes and local jurisdictional boundaries.

While it is true that the planning basis for the size of emergency planning zones has not been revised or updated since the original Task Force recommendations and subsequent NRC policy, it is inaccurate to assert that the NRC, FEMA, EPA, DOE, state and local government agencies and the nuclear industry have not been consistently engaged in evaluating the overall effectiveness and appropriateness of emergency response plans and procedures. In fact, over the past three plus decades there has been considerable amount of technical analysis and study of reactor accident consequences, dose modeling, atmospheric modeling, emergency planning and source term evaluation. However, none of the latest technical studies or analysis indicates that the current EPZ size and planning basis need modification.

In October 1975, NRC published WASH-1400, "Reactor Safety Study: An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants". That document analyzed reactor accident consequences and quantified risk probabilities and core release fractions for a wide range of severe reactor accidents. The conclusions of this study became the basis for the development of the EPZ planning basis. In December 1990, the NRC issued NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants. The important conclusion of this report was the notable reduction in risk from the original Reactor Safety Study. It was some time before these risk reductions became widely known and accepted. NUREG-1150 evaluated the median, mean, 5<sup>th</sup> and 95<sup>th</sup> percentile data while WASH-1400 only considered the median values. In order to accurately note the reduced risk, one must compare the median values of NUREG-1150 with the WASH-1400 values. Subsequent to the publication of NUREG-1150, the American Nuclear Society published, "Report of the Special Committee on NUREG-1150, The NRC's Study of Severe Accident Risks", that clearly points out these

differences between NUREG-1150 and WASH-1400. To quote from page 4-11 about Surry, "For iodine and cesium the median frequency of releases of 10% or more of the core inventory in NUREG-1150 is more than an order of magnitude lower than reported in WASH-1400". Also to quote from page 4-14 in relation to Peach Bottom, "For iodine and cesium the median frequency of release of 10% or more of the core inventory in NUREG-1150 are approximately two orders of magnitude lower than reported in WASH-1400."

More recently the draft "State of the Art Reactor Consequence Analysis" (SOARCA) report was issued. Section 6.4 of SOARCA compares the NUREG/CR-2239, Sandia Siting Study (SST1) source term to SOARCA. It should be noted that the SST1 source term is developed from the Reactor Safety Study (WASH-1400) and represents the largest or most severe source term included in that analysis. The SOARCA report concludes that source terms for severe reactor accidents are much smaller than any of the previous studies and any releases that may occur are well beyond the 30 minute assumption used as the design basis for the Emergency Planning Zone in NUREG-0396. Based on the SOARCA conclusions early fatality risk for the cases of both Surry and Peach Bottom is essentially zero. That conclusion is in sharp contrast to that of 92 early fatalities for Peach Bottom and 45 for Surry based on the SST1 source term. Based on the most current knowledge (State of the Art) of reactor safety analysis, the current EPZ size provides for a substantial reduction in early health effects and is generally considered to have a large margin of conservatism included. There are some within the nuclear industry that would argue that it is overly conservative based on the latest studies.

The Fukushima accident has provided a wealth of information about how accidents progress when they are not successfully mitigated. Of particular importance to this discussion is that radiological releases at the Fukushima Daiichi site took a long time to develop and the fraction of Iodine and Cesium released agrees well with what was predicted for the unmitigated STSBO for Peach Bottom analyzed in SOARCA. In fact, the latest RASCAL Manual documents these findings in Table 1.11, "Total Radionuclide Release Estimates from Fukushima units 1, 2, and 3". The Cesium numbers are in the 2-3% range and the Iodine numbers are in the 3-10% range. In contrast, the BWR-2 Source Term from WASH-1400 assumed that 90% of the Iodine and 50% of the Cesium was released.

In conclusion in 1978 when NUREG-0396 was released the 10 Mile EPZ and 50 Mile Ingestion Pathway Zone were realistic zones to be establish for a major reactor accident. Today with the latest research from SOARCA and the real life data from Fukushima, the 10 mile and 50 mile Plume Exposure and Ingestion Exposure zones respectively are overly conservative and provide an additional margin of safety. Therefore any request to expand these zones cannot be supported by any scientific or technical facts based on the most current data and analysis.

## **Emergency Response and Planning Efforts**

Since September 11, 2001, the federal government has awarded billions of dollars in grants and assistance to state and local governments to assist in strengthening emergency management capabilities. DHS has developed several key policy documents, including the National Response Framework, the National Incident Management System, the Incident Command System and the National Preparedness Goal to guide federal, state, and local efforts. The aftermath of the 2005 hurricane season resulted in a reassessment of the federal role in preparing for and responding to catastrophic events. The studies and reports by Congress, the White House Homeland Security Council, the DHS IG, DHS and FEMA, GAO, and others that followed have provided a number of insights into the strengths and limitations of the nation's capacity to respond to catastrophic disasters and resulted in a number of recommendations for strengthening that capacity.

Collectively, these studies and reports highlighted the complex challenges that federal, state, local, and tribal governments faced in preparing for, responding to, and recovering from catastrophic disasters. The Post-Katrina Reform Act directed many organizational, mission, and policy changes to respond to these findings and challenges. In addition, the Homeland Security Presidential Directive 5 (HSPD-5): Management of Domestic Incidents, the Presidential Policy Directive / PPD-8: National Preparedness and PL 110-53 - Implementing Recommendations of the 9/11 Commission Act of 2007 have all had a profound impact on radiological emergency preparedness and response.

As the initiatives of these federal policies have been implemented at the federal, state, county and local jurisdictions the level of knowledge, expertise and understanding of emergency management and response has grown exponentially at all levels. The applications of the key concepts and planning standards of the DHS guidance has had significant impact on the long established Radiological Emergency Preparedness community as well, strengthening and solidifying already established programs. The expansion and application of an "all hazard" approach has significantly enhanced the ability of REP planners and responders to coordinate with neighboring communities that lie beyond the EPZ.

The result of the National Response Framework and National Incident Management System is a better equipped, better trained and better prepared response community throughout the United States. These significant strides in the roles, responsibilities and resources provides a mechanism for state, county, local and tribal response organizations to expand response capabilities beyond the established EPZs with few logistical hurdles. The effect of the DHS policy and initiatives has provided a solid basis for implementing the ad hoc expansion of Protective Actions for nuclear power plant emergencies as described in the planning basis, NUREG-0396. State and local response organizations have always recognized the possibility that actions may be warranted beyond the established EPZs and in many cases have addressed those decisions within drills and exercises. The development and implementation of NIMS/ICS under the National Response Framework enhances that capability and provides additional resources to facilitate prompt and effective protective measures for all populations that may be affected.

Based on the implemented changes from the Post 9-11 and Post Katrina initiatives, the REP community meets or in most cases exceeds the necessary resources and protocols to expand Protective Actions beyond the current EPZs in order to reduce public health risks from radiation exposure. Therefore, the consideration of expanding the EPZ is not required.

### **NRC Near Term Task Force**

The NRC's Near-Term Task Force was established in response to Commission direction to conduct a systematic and methodical review of U.S. Nuclear Regulatory Commission processes and regulations to determine whether the agency should make additional improvements to its regulatory system and to make recommendations to the Commission for its policy direction, in light of the accident at the Fukushima Daiichi Nuclear Power Plant. "Recommendations for Enhancing Reactor Safety in the 21<sup>st</sup> Century: The Near-Term Task Force Review if Insight from the Fukushima Daiichi Accident" was published on July 12, 2011. That document identified twelve overarching recommendations:

#### **Clarifying the Regulatory Framework**

1. The Task Force recommends establishing a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations.

#### **Ensuring Protection**

2. The Task Force recommends that the NRC require licensees to reevaluate and upgrade as necessary the design-basis seismic and flooding protection of structures, systems, and components for each operating reactor.
3. The Task Force recommends, as part of the longer term review, that the NRC evaluate potential enhancements to the capability to prevent or mitigate seismically induced fires and floods.

#### **Enhancing Mitigation**

4. The Task Force recommends that the NRC strengthen station blackout mitigation capability at all operating and new reactors for design-basis and beyond-design-basis external events.
5. The Task Force recommends requiring reliable hardened vent designs in boiling water reactor facilities with Mark I and Mark II containments.
6. The Task Force recommends, as part of the longer term review, that the NRC identify insights about hydrogen control and mitigation inside containment or in other buildings as additional information is revealed through further study of the Fukushima Daiichi accident.
7. The Task Force recommends enhancing spent fuel pool makeup capability and instrumentation for the spent fuel pool. (Section 4.2.4)

8. The Task Force recommends strengthening and integrating onsite emergency response capabilities such as emergency operating procedures, severe accident management guidelines, and extensive damage mitigation guidelines.

#### **Strengthening Emergency Preparedness**

9. The Task Force recommends that the NRC require that facility emergency plans address prolonged station blackout and multiunit events.
10. The Task Force recommends, as part of the longer term review, that the NRC pursue additional emergency preparedness topics related to multiunit events and prolonged station blackout.
11. The Task Force recommends, as part of the longer term review, that the NRC should pursue emergency preparedness topics related to decision making, radiation monitoring, and public education.

#### **Improving the Efficiency of NRC Programs**

12. The Task Force recommends that the NRC strengthen regulatory oversight of licensee safety performance (i.e., the Reactor Oversight Process) by focusing more attention on defense-in-depth requirements consistent with the recommended defense-in-depth framework.

Subsequent to NTTF Study, the Commission has taken meaningful and well-supported action in response to Fukushima. Thus far, the Commission's regulatory response has been appropriately focused on further reducing the likelihood that initiating events—such as earthquakes, flooding, and loss of power—will result in severe accidents and radiological releases. These actions have included:

- Issuance of Order EA-12-050 requiring that all Boiling Water Reactor licensees with Mark I and Mark II containment designs (similar to those at Fukushima) have a reliable hardened vent to remove decay heat and maintain control of containment pressure within acceptable limits following an event that results in loss of active containment heat removal capability or prolonged Station Blackout. The hardened vent system must be accessible and operable under a range of plant conditions, including prolonged Station Blackout and inadequate containment cooling.
- Issuance of Order EA-12-049 requiring all power reactor licensees and holders of construction permits, in active or deferred status, to implement a three-phased approach for mitigating beyond-design-basis external events. The initial phase requires use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities. The transition phase requires providing sufficient, portable, onsite equipment, and consumables to maintain or restore these functions until they can be accomplished with resources brought from off site. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.
- Issuance of Order EA-12-051 requiring all power reactor licensees and holders of construction permits, in active or deferred status, to implement measures to ensure that reliable spent fuel pool water level indications can be identified by trained personnel. Specifically, personnel must be capable of identifying: (1) the level that is adequate to support operation of the normal fuel pool cooling system, (2) the level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and (3) the level where fuel remains covered and actions to implement make-up water addition should no longer be deferred.

- Issuance of an extensive information request to all power reactor licensees and holders of construction permits, in active or deferred status, requiring the provision of information and conduct of analyses regarding protection against natural phenomena (i.e., earthquakes, flooding) and emergency planning. This information will be used by the NRC to determine whether licenses should be modified, suspended or revoked. More specifically, the information and analyses requested include:
  - Seismic and flooding hazard walk-downs, the purpose of which is to identify degraded, nonconforming, or unanalyzed conditions and verify the adequacy of licensee monitoring and maintenance procedures.
  - Seismic and flooding hazard re-evaluations, the purpose of which is to determine whether there is a need to update the design basis and systems, structures, and components important to safety.
  - An assessment of the licensee's current communications systems and equipment to be used in the event of an emergency involving a large-scale natural event resulting in loss of all alternating current power and extensive damage to normal emergency communications systems both onsite and in the area surrounding the site.
  - An assessment of the licensee's ability to staff emergency preparedness functions during a large-scale natural event that affects all units at the site, and results in extended loss of all alternating current power and impeded site access.

In addition, the NRC has issued Advanced Notices of Proposed Rulemaking in the areas of Station Blackout and integration of severe accident management procedures. Thus, while the NRC has taken the position that an accident like the one that occurred at Fukushima is unlikely to unfold in the United States, the agency continues to take appropriate, precautionary steps to further reduce the likelihood that a severe accident requiring implementation of protective measures in the 10 and 50 mile EPZs will occur.

## **Conclusion**

As discussed in detail above, the CRCPD recommends that the petition for rulemaking be denied by the NRC based on:

1. The current planning basis for the EPZs contained in NUREG-0396 provides for a substantial margin of conservatism in protecting the public health and safety. This finding is supported not only by NRC's SOARCA study but is supported by the data and findings from the study of the reactor accident sequence at Fukushima.
2. The implementation of DHS planning, response and mitigation strategies as described in the National Response Framework and the National Incident Management System provide an adequate and effective means to facilitate the expansion of protective measures beyond the established EPZs as required.



3. The analysis and evaluation of the Near Term Task Force and the continued efforts of NRC to implement the recommendation of the Task Force to decrease the likelihood of the a severe reactor accident at a U.S. nuclear power plant by employing a “defense-in-depth” approach to reactor safety can further reduce the probability of a severe core melt accident.

## Rulemaking Comments

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**From:** Sue Smith [ssmith@crcpd.org]  
**Sent:** Friday, July 13, 2012 11:21 AM  
**To:** Rulemaking Comments  
**Cc:** Mulligan, Patrick; McDermott, Brian; Alice Rogers; David J. Allard; Fisher-Tyler Frieda (DHSS); Fordham, Earl W (DOH); Jared Thompson (Jared.thompson@arkansas.gov); Joe Klinger (joe.klinger@illinois.gov); Lisa Bruedigan; Ruth McBurney; Sue Smith; Terry Frazee  
**Subject:** CRCPD: Comments on the Petition for Rulemaking (PRM-50-104 or Petition)  
**Attachments:** NRC - Petition Rulemaking.pdf

On behalf of the CRCPD Board of Directors please find attached comments on the Petition for Rulemaking (PRM-50104 or Petition) notice in the Federal Register on April 30, 2012.

Regards,

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