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Comment On: NRC-2010-0080-0001

NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 3, Guidance for Protective Action Recommendations for General Emergencies; Draft for Comment

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**Pennsylvania Department of Environmental Protection
Bureau of Radiation Protection**

DATE: May 12, 2010

SUBJECT: Comments on NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 3,
Guidance for Protective Action Recommendations for General
Emergencies; Draft for Comment

REFERENCE: (1.) Federal Register Notice 75 FR 10524, March 8, 2010

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In Reference (1.), the Nuclear Regulatory Commission requested comments on NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 3, "Guidance for Protective Action Recommendations for General Emergencies, Draft Report for Comment" (hereinafter referred to as 2010 Draft NUREG-0654, Supp. 3). The Pennsylvania Department of Environmental Protection, Bureau of Radiation Protection (BRP), has reviewed the document and appreciates the opportunity to submit comments.

Overall, BRP has serious reservations about the 2010 Draft NUREG-0654, Supp. 3 document. We do not believe this document advances Protective Action Recommendation (PAR) development relative to the 1996 version of NUREG-0654, Supp. 3. The revised document relies on a flawed technical study, NUREG/CR-6953, "Review of NUREG-0654, Supplement 3, Criteria for Protective Action Recommendations for Severe Accidents, Volumes 1 and 2," (NRC, 2007a, and NRC, 2008) (referred to as the PAR Study), to provide a technical basis for concluding that under certain specified conditions sheltering-in-place and staged evacuation can be more protective to public health and safety than radial evacuation. It also promotes an overly complicated PAR Logic Diagram, which is accompanied by three pages of dense footnotes. It is our view that the 2010 Draft NUREG-0654, Supp. 3 document misses the basic point that for a severe reactor accident (at a General Emergency classification), the most effective protective action is to move the population away from the plant as quickly as possible in a radial evacuation. Extending the use of sheltering-in-place and staged evacuation is counter productive.

BRP believes that the proposed revision to NUREG-0654, Supp. 3 has not received sufficient input from stakeholders and the public. BRP requests that the NRC hold stakeholder workshops and additional public meetings in each NRC Region to gather additional stakeholder and public input, prior to implementing any changes to NUREG-0654, Supp. 3.

Specific comments on the document follow:

1. The Need for Revised Guidance

The 2010 Draft NUREG-0654, Supp. 3 is intended to supersede previous guidance on the development of PAR logic for nuclear power plant accidents, including guidance contained in NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and

Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," (NRC, 1980), at Appendix 1, "Emergency Action Level Guidelines for Nuclear Power Plants," and NUREG-0654/FEMA-REP-1, Revision 1, Supplement 3, "Criteria for Protective Action Recommendations for Severe Accidents," (NRC, 1996). BRP believes that (NRC, 1980), supplemented by the guidance in (NRC, 1996) adequately addresses PAR development for nuclear power plant accidents, and that adoption of the proposed 2010 Draft NUREG-0654, Supp. 3, is not necessary or desirable. It strikes BRP that the 2010 Draft NUREG-0654, Supp. 3 is written from an academic perspective, not a practical one. BRP does not believe that PAR development would be enhanced by adoption of the 2010 Draft NUREG-0654, Supp. 3.

2. Technical Basis for 2010 Draft NUREG-0654, Supp. 3

In BRP's view, the PAR Study that this document relies on heavily is a weak basis for the sweeping recommendations that are derived from it. The PAR Study used Focus Groups and Telephone Surveys to develop a basis for its findings on the effectiveness of protective actions, particularly sheltering-in-place and staged evacuation. The PAR Study highlights data that supports sheltering-in-place and staged evacuation, but gives short shrift to data which casts doubt on these strategies. For example, in the Emergency Responder Focus Group section (NRC, 2008, page 16), it is noted that emergency responders believed that if a sheltering-in-place protective action was ordered, the public would be unlikely to comply. On the same page, emergency responders frequently expressed the view that the public is likely to do what they feel is best for their family, even if it is different from the protective action recommended. However, the focus group data was discounted, and in the Executive Summary (NRC, 2008, page viii) the authors write, "The telephone survey data indicates that compliance with protective actions is likely and also identified that not all of the focus group themes were valid when assessed against the larger data set of the public telephone survey." BRP has serious doubts about the value of the telephone survey in determining how people in the vicinity of a nuclear power plant would behave in an actual emergency. Does calling people on a calm day and asking questions about their response to an accident reflect what their actual behavior would be in the crisis of an emergency, when sirens are sounding, the TV and radio are announcing a severe reactor accident at a nearby nuclear plant, phones are ringing off the hook, and people are streaming down the road away from the plant? It appears that the focus groups, particularly those involving emergency responders, provided a more realistic view of the reaction by the public during an emergency. The phone survey was convenient to do, but is not a very credible instrument.

3. Complexity of the PAR Logic Diagram

The Advisory Committee on Reactor Safeguards in its review of NUREG/CR-6953 (the PAR Study) recommended against making PAR strategies overly complicated, such that they slow down decision making during emergencies. It appears that the authors of the 2010 Draft NUREG-0654, Supp. 3 document ignored this important recommendation. The document is overly complicated and, if implemented, could slow down protective action decision making during emergencies.

It should be pointed out that severe reactor accidents are very infrequent events. Since Oyster Creek, the first large-scale commercial nuclear power plant in the United States to become operational in 1969, there has only been one severe reactor accident at a US

commercial reactor requiring extensive offsite protective actions, namely the 1979 TMI-2 accident. Common sense calls for simplicity in analysis and an abundance of caution in responding to these events. BRP believes that protective action decision making must be clear and straightforward in its presentation. The 2010 Draft NUREG-0654, Supp. 3 document adds complexity and requires intricate analysis and finely nuanced decision making in situations where clear, straightforward direction is needed. The PAR Logic Diagram in this document is excessively complex, and nearly every box in it refers to a footnote, the sum of which comprises three additional pages. It relies on multiple decision points, requiring decision makers to repeatedly reevaluate information and reassess their decisions. There are two problems associated with this approach. First, following an initial protective action decision, failure to recognize and act on a newly emerging threat to the public could result in additional or unacceptable radiation doses to people who are sheltered-in-place, even after an initial evacuation of some areas is successfully executed. Secondly, issuing a stream of new or updated protective action decisions to the public could cause the public to question the credibility of the government officials making those recommendations. If the recommendations are changing from hour to hour, how much confidence can one place in those recommendations?

BRP is also concerned about the 2010 Draft NUREG-0654, Supp. 3 recommendation that the Offsite Response Organizations (OROs) participate in the development of the licensee's PAR logic diagram. BRP believes that few OROs have the technical background to effectively evaluate licensee PAR logic diagrams, and that involvement of OROs in this process would create an unwarranted supposition that OROs involved in the process evaluated and approved a licensee's PAR logic diagram.

In BRP's view, the 2010 Draft NUREG-0654, Supp. 3 misses the basic point that for a severe reactor accident requiring offsite protective actions, the most effective protective action is to MOVE THE POPULATION AWAY FROM THE PLANT AS QUICKLY AS POSSIBLE. The case for this approach was made convincingly in the 1996 NUREG-0654, Supp. 3 document. The 2010 revised document, with its emphasis on sheltering-in-place and staged evacuation, dilutes and undermines the 1996 guidance, and would detract from an effective protective action response to a severe nuclear power plant accident.

4. Need for Strong, Decisive Protective Actions

Severe reactor accidents are high consequence events. When a plant declares a General Emergency, the engineered safeguards, as well as human intervention, have failed to protect the core. If the event involves a hostile action, security precautions might have failed to protect the core. At General Emergency, we no longer have confidence that operators can control the plant, nor can we predict with confidence the prognosis of the accident in the hours and days ahead. For this reason, strong and decisive protective actions are necessary to protect the public from actual or expected radiological releases from the plant. The most effective protective action (assuming no adverse weather or road conditions) is to move people away from the plant as quickly as possible in a radial evacuation. In simple terms, minimize their time of exposure, and maximize their distance from the source term. The 2010 NUREG-0654, Supp. 3 preference for sheltering-in-place and staged evacuation over immediate radial evacuation reduces the effectiveness of protective actions for the public. People are

needlessly left in harm's way longer through use of sheltering-in-place and staged evacuation.

In the PAR Logic Diagram from the 2010 Draft NUREG-0654, Supp. 3, the distances over which the protective actions are recommended are inadequate. The use of a 2-mile sheltering or evacuation radius, with 5 miles downwind, is frequently recommended in the PAR Logic Diagram. These recommendations ignore the one actual experience we have had with implementing protective actions for a nuclear power plant accident, namely the 1979 TMI-2 accident. The details of the response to this accident are set out in, "Staff Reports to the President's Commission on The Accident at Three Mile Island, Emergency Preparedness, Emergency Response," Washington, D.C., October 1979. During the TMI-2 accident, the minimum distance for which protective actions were implemented was 5 miles. Some protective actions were implemented out to a distance of 10 miles. Further, at one point during the accident, a senior NRC official stated that protective actions at distances of 10-20 miles might be needed. In the 2010 Draft NUREG-0654, Supp. 3, the rationale for the recommended 2-mile radius and 5 miles downwind distances is not explained. (If the 2-mile radius for protective actions is based on the Low Population Zone methodology from 10 CFR 100, BRP would have grave concerns, since the Low Population Zone is intended to be used in reactor siting criteria, not for emergency planning.) Two-mile radius distances for protective actions were deemed inadequate in 1979, and are still inadequate today for almost all scenarios resulting in a General Emergency.

5. Implementation by State and Local Government

The 2010 Draft NUREG-0654, Supp. 3 document proposes several strategies that would require participation of State and Local Governments for successful implementation. Several of these strategies would impose new requirements on State and Local Governments and would require additional resources and funding:

- State and Local Governments would need to work with licensees in the development of various elements and criteria of the licensees' PAR logic diagram;
- State and Local Governments would need to develop detailed implementation guidance for staged evacuation, extended use of sheltering-in-place, and specific enhancements in the improvement of communications to the public.

BRP is concerned that State and Local Governments will be saddled with these new requirements, without additional resources to address them.

6. Reliance on Evacuation Time Estimates (ETEs)

The 2010 Draft NUREG-0654, Supp. 3 document emphasizes the value of Evacuation Time Estimates (ETEs) in planning PAR strategies. In Section 3 of the document, ETEs are used to drive protective action decision making in rapidly progressing scenarios. BRP questions whether ETEs should be used in this way. Protective action decision making must be driven by plant conditions, anticipated or actual radiological releases, and road and weather conditions. Having to reference ETEs to decide on a protective action strategy will only cause evacuation delays and increase the risk of exposure to the public from radiological releases at the plant.

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