

# IEMA

Illinois Emergency Management Agency  
Division of Nuclear Safety

Pat Quinn, Governor  
Joseph Klingler, Interim Director

July 30, 2010

Ms. Cindy Bladey, Chief  
Rules, Announcements & Directives Branch  
Office of Administration  
Mail Stop: TWB-05-B01M  
US Nuclear Regulatory Commission  
Washington, DC 20555-0001

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RULES AND DIRECTIVES  
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**Subject: Comments on NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 3, Guidance for Protective Action Recommendations for General Emergencies; Draft for Comment, Docket ID-NRC-2010-0080**

To Whom It May Concern:

The Illinois Emergency Management Agency (IEMA) believes that the NRC's project to revise the current draft guidance contained in NUREG-0654, Supplement 3, Guidance for Protective Action Recommendations is an important contribution to protecting the public health and safety. In particular the three volumes of the NUREG/CR-6953, "Review of NUREG-0654, Supplement 3, Criteria for Protective Action Recommendations for Severe Accidents." series are recognized as providing a valuable basis for the understanding of various protective action strategies. Before providing specific comments on the proposed guidance a few general comments are in order. The most significant comment is related to risk and consequences of an accident.

At the time the current NUREG-0654 was issued, WASH 1400 or the Reactor Safety Study was considered to be the definitive reference to characterize and quantify reactor accidents and their consequences. At the same time NUREG-0396, Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants, laid the foundation for the emergency planning basis or the 10-mile EPZ. Today, our knowledge of severe reactor accidents has greatly progressed where results from the Reactor Safety Study are now known to be unrealistic. The NRC has recognized this with their current efforts to more accurately characterize the consequences of a reactor accident by funding the SOARCA (State of the Art Reactor Consequence Analyses) Project. Although this project is not yet complete, the results are scheduled to be published before Supplement 3 to NUREG-0654 is issued in final form. IEMA feels that it is vital that Supplement 3 to NUREG-0654 incorporate the insights provided in the SOARCA study. The two conclusions presented at the March 11, 2009 Regulatory Information Conference, 1) "For unmitigated sensitivity cases-no LERF" and 2) "Releases are

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*Template = ADA-013*

*E-RIDS = ADH-03*



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dramatically smaller and delayed from 1982 Sitting Study (SSTI)", eliminate many of the benefits of shelter as a protective action strategy and lessen the importance of evacuation time estimates in determining the optimum protective action strategy. At a minimum the proposed PAR strategy in Supplement 3 to NUREG-0654 should undergo a sensitivity analysis to determine if, based on the new insights from SOARCA, the process can be simplified to create a more easily implemented PAR chart yielding consistent implementation and thereby greater public health and safety in the unlikely event of a severe nuclear power plant accident.

Our second comment has to do with "heightened preparedness". We believe that this is not a Protective Action Strategy but rather falls under the planning standard for Alert and Notification of the public. "Heightened Preparedness" should be completely removed as a Protective Action.

Our third comment concerns the Evacuation Time Estimates. Current guidance on Evacuation Time Estimates does not require estimating a 90% figure for the 0-2 mile radius much less the entire Emergency Planning Zone (EPZ). To effectively use the new guidance will require Evacuation Time Estimates to be redone. With the new census underway it would be efficacious for all parties to delay implementation of this provision to avoid unnecessary duplication of efforts and resources.

Our fourth comment is that NUREG-0654/FEMA-REP-1, Rev. 1, Supplement 3, "Guidance for Protective Action Recommendations for General Emergencies"; Draft for Comment is a multi-agency document that requires DHS/FEMA endorsement. Yet, there has been minimal DHS/FEMA involvement in this process that we can see from a stakeholder perspective. Since the guidance has a significant impact on offsite response organization plans and procedures, it would seem prudent to have DHS/FEMA endorsement prior to publication.

Our fifth comment has to do with the timing of Supplement 3 to NUREG-0654. In May of last year a massive number of Emergency Preparedness documents including the rule change on Emergency Planning and Preparedness as well as guidance on Evacuation Time Estimates were issued for review. The final disposition of the comments on these documents will determine what the final regulations and guidance will be on Emergency Planning and Preparedness. It would be prudent to issue Supplement 3 for comment after the final rule and guidance on Emergency Planning and Preparedness is issued.

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Our sixth comment has to do with Appendix A to Supplement 3. We feel that this Appendix dealing with emergency messaging does not belong in this supplement but rather should be included with the project to revise the entire NUREG-0654. It is also our understanding that the NRC is currently in the process of issuing a NUREG on Emergency communications sometime later this year. Appendix A to Supplement 3 of NUREG-0654 should be withdrawn as it is beyond the scope of this document and would only be confused with existing guidance and future efforts to clarify this topic.

Our seventh comment is that the The Illinois Emergency Management Agency has extensive technical capabilities that are used to develop protective action recommendations. The NRC has chosen to include guidance in this document that requires the utility to consider offsite impediments that were formally the jurisdiction of OROs and FEMA. The utilities recommendations should be based on an assessment of plant conditions and any impediments that may exist onsite. Offsite impediments and their effect on protective action recommendations remain the responsibility of the OROs. Requiring the utility to factor offsite impediments into their decision-making process has the potential to delay protective action recommendations to OROs and therefore should be removed from the proposed guidance.

Thank you for the opportunity to comment on this important guidance document, Supplement 3 to NUREG-0654. Specific comments related to Supplement 3 and the technical basis documents are provided in the attachment.

Sincerely,

  
Joseph Klingler  
Interim Director

KE/tc

Attachment(s)

cc: File 3.B

## ATTACHMENT

### SPECIFIC COMMENTS ON PROPOSED Supplement 3 to NUREG-0654

1. There are conclusions drawn from the "State-of-the-Art Reactor Consequence Analysis" in this document. Why was this document not used in the development of the PAR logic?
2. NUREG/CR 6953, Volume 3, TECHNICAL BASIS FOR PROTECTIVE ACTION STRATEGIES, uses completely different source terms than the ones used in Volume 1 of NUREG/CR 6953. Volume 3 states, "Accident sequences from ongoing NRC projects were reviewed but not useful for this study because the studies reviewed did not find any credible rapidly progressing accidents." It is not clear why this decision was made to use non credible accidents and why no references were cited for these accidents.
3. Volume 3 of NUREG/CR 6953 is the technical basis behind Supplement 3 to NUREG-0654 but the only accident analyzed is the so called fast breaker for a medium to high population density EPZ with uniform population density. The results therefore are applicable only to an accident that can not happen according to SOARCA and an EPZ that does not exist in Illinois and is far from representative of most EPZs.
4. The United States is currently in the middle of a national census. Licensees are currently required to develop new Evacuation Time Estimates (ETEs) following each national census. It generally takes a year to evaluate this census data and prepare new ETEs. The NRC needs to take these facts into account when issuing a schedule for implementation.
5. PAR decisions are based on 2 mile and 5 mile evacuation time estimates. Some state plans use Emergency Response Planning Areas that do not include 2 mile areas. The guidance needs to be clarified to reference ETEs to the preplanned sub-areas that are actually evacuated and not an imaginary 2 mile circle. As an example some low population EPZs evacuate almost a 5 mile area as that is the smallest sub-area than can be evacuated.
6. It is not clear from the Supplement 3 document if consideration was given to low population EPZs in that while ETEs were varied to simulate different population densities there appears to be no analysis of EPZs where the population density varies from close to zero to higher values near the edge of the EPZ.
7. For states like Illinois that have more than one nuclear power plant site, it is conceivable that for a hypothetical accident, evacuation is the preferred strategy at one site while shelter may be the preferred strategy at another site. What does the NRC recommend for such instances? Does the NRC intend to provide support to state and local government decision makers to explain the basis for the radically different actions taken in response to the exact same event?
8. If state or local decision makers disagree with the NRC/FEMA logic in Supplement 3 and continue to take an alternative approach to protective actions, what will be the NRC's /FEMA's response?
9. With regard to the PAR logic diagram the left hand of the chart could be greatly simplified for low population EPZs. In other words instead of complicating the chart for

most, would it not have been easier to add notes to those high population EPZs and leave evacuation as the preferred option for most?

10. There seems to be an undue emphasis placed on the rapidly progressing severe accident given its uncertainty of existence to the point it is deemed non credible. Our dispute is not with the Emergency Planning Basis itself as that is established in the current Emergency Planning Regulations, although studies such as SOARCA once reviewed and properly analyzed may necessitate the revision of the Emergency Planning Basis. Our dispute is with the need to focus most of the effort on the Supplement 3 PAR Logic diagram on the rapidly progressing severe accident and all of the effort in Volume 3 of NUREG/CR-6953 on the rapidly progressing severe accident. What should be done is to focus on a spectrum of accidents that are severe but credible as well as General Emergencies that are not severe accidents.
11. Has the NRC evaluated the impact that changing this guidance may have on other existing guidance such as the RTM?
12. Previous NRC guidance has stated that evacuation is the preferred strategy unless there is a short term release of less than one hour. Can you explain the technical flaw that now makes this guidance obsolete?
13. On page 38 of NUREG/CR-6953, section 5.4.1 talks about the Rapidly Progressing Accident. The accident chosen for this analysis also referenced on page 38 is the so called ST-1 which is an accident where the release starts 40 minutes after the General Emergency was declared and the release lasts for 6 hours. Section 5.4.1 also refers to table 5.3D on page 40 which is based on a 10 hour ETE. This table points out that radial evacuation is the least effective strategy and various shelter strategies are more effective. The statement at the bottom of section 3.4.1 is made that, "This analysis is supportive of a conclusion to revise NUREG-0654, Supplement 3 to include more detail on the decision process for selecting a shelter based protective action". Several observations are in order here. First of all the soon to be issued SOARCA analysis concludes that the so called ST-1 accident is no longer thought to be a credible accident. In addition most nuclear plants in the United States have ETE's that are much less than 10 hours. It is also generally recognized that most severe accidents are unpredictable and therefore impossible to determine the release duration. The benefit of determining a shelter strategy assumes you know the release duration so you may weight the benefits of shelter vs. evacuation. In a real life situation this may not be the case.
14. The decision to shelter is dependent on the source term and release timing. If you take a look at the results for the ST-1M which is the same magnitude source term as the ST-1 but instead of a 40 minute release time it is now up to 3 hours still a relatively short release time you find that shelter in place for 4 hours followed by a radial evacuation has less benefit than evacuation for all cases studied. This is again from NUREG/CR-6953, Volume 1 pages 43-45. Likewise for this same case a shelter in place for 8 hours followed by evacuation is only beneficial when ETEs are greater than 6 hours.
15. Shelter clearly has some benefits over evacuation when the public can not be evacuated in a timely manner. There are so many variables that determine when shelter should be selected that it is hard to specify these in the PAR flowchart and notes. Therefore our recommendation is to remove all references to specific ETEs and leave the decision up to best engineering judgment.

16. Our recommendation is to simplify the PAR chart as follows. The initial recommendation would be evacuate a 2 mile radius, shelter downwind to 5 miles unless there are impediments to evacuation. The next step would be to evacuate those areas where impediments are cleared and expand evacuation to cover areas where PAGs are exceeded or dose projections indicate PAGs will be exceeded. As far as the rapidly progressing severe accident is concerned it may be left the way it is.
17. The two accidents used for the study the ST-1 and ST-2 are described on pages 33-34 of Volume 1 of NUREG/CR-6953. The descriptions don't match the technical descriptions in the Appendix pages A-1-A-2. Just using ST-1 as described on pages 33-34 the time of 40 minutes (2.4E3) seconds and release duration of 6 hours (2.16E5 seconds) differs from page A-1 with a start time of 1.8E3 seconds and two releases with a time of 1.8E3 and 2.2E4 seconds respectively. The two releases added together are about an order of magnitude less in duration than what is stated on pages 33-34. There are similar problems for ST-2 on page A-2. The numbers matter very much as the main conclusion is based on these inputs.
18. There are problems with the way MACCS2 does staged evacuation. Again from page 33 of the NUREG for a 4 hour ETE MACCS2 assumes an evacuation time of 6.8 mph for staged evacuations in the 0-2 mile ring as opposed to the speed of 2.5 mph for a radial evacuation. If you increase your speed by a factor of almost 3 you will decrease your dose by a factor of 3 also. It is no wonder staged evacuation is an improvement over radial evacuation. Of course they assume uniform population density, never the case in real life.
19. Page 76 has an interesting conclusion, "Although 4 hours was identified in this study of a uniformly distributed population, many sites have small populations within 8.0km (5miles) of the site, thus a site specific analysis would be necessary." In Illinois this is the case which means the new PAR study really can not be used as written.
20. The straight line Gaussian model used in the MACCS2 program for consequence calculations that form the technical basis behind the new Supplement 3 is outdated and does not reflect the current understanding of atmospheric transport and dispersion as referenced in the NRC's current dose assessment program RASCAL. The RASCAL dose or consequences are generally lower than the results calculated by MACCS2. Straight line Gaussian models tend to be overly conservative and would not be representative of actual real world dose to the population. The dispersion parameters used in RASCAL 4.0 are now a function of time and atmospheric turbulence and produce lower, more realistic concentrations. The consequence calculations that form the technical basis to Supplement 3 to NUREG-0654 should be redone using current dose modeling techniques such as those used by RASCAL 4.0.
21. The title of Volume 3 of NUREG/CR-6953, "TECHNICAL BASIS FOR PROTECTIVE ACTION STRATEGIES," does not match the stated objective on page 1., "The objective of the Volume 3 analysis was to establish a technical basis for developing PAR guidance for rapidly progressing accidents and to establish criteria for determining the most appropriate protective action recommendations and decisions for these events." This scope is too narrow in that it only considers one type of accident which can not even be quantified as it is deemed non credible. This leaves the question unanswered as to what the technical basis was for most of the flowchart from

Supplement 3 to NUREG-0654. As Volume 3 is currently written it only provides the technical basis for the left hand column of the flowchart in Supplement 3.

22. In section 2 of the Implementation of Guidance the statement is made "The Attachment is intended to guide the development of a PAR procedure." Also in section 2 it states that "The notes included with the PAR logic diagram provide direction for developing site-specific elements and criteria." It appears that the inclusion of the PAR logic diagram is not so much a PAR diagram as it is a repository of questions to develop a PAR logic diagram. It may be more appropriate to go back to the original format used in the NRC's 2008 presentation at the National REP Conference on slide 15 and define the impediments in a question and answer format. The answers to these questions would then be used to develop a site specific diagram.
23. The proposed Supplement 3 to NUREG-0654 does not have a "Purpose and Use of Document" section like the current draft Supplement 3. This section should be added and in particular the statement, "Nuclear Power Plant licensees and State and local emergency response organizations may use the updated and simplified guidance in this document or alternately, they may continue to use previous guidance." needs to be included in this Purpose section as it is in the current draft Supplement 3 to NUREG-0654.
24. The ORO and the respective utility should be able to modify the PAR chart in Supplement 3, based on sound technical analysis. An example of this would be to eliminate the left-hand side of the PAR chart based on an analysis of plant specific PRA results and evacuation time estimates and consequence analysis.