



# Protective Action Recommendation Study

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## Introduction

- Staff recommended a review of protective action recommendation guidance as found in NUREG-0654, Supplement 3
- Commission directed that the study proceed
- Sandia chosen to support study
- Study began in late 2004

# Background

## Commission Direction

“Continue to evaluate the NRC protective action recommendation guidance to assure that it continues to reflect our current state of knowledge with regard to evacuation and sheltering. Update the guidance, as necessary.”

# Background

## Emergency Preparedness Planning Basis:

- Key technical elements of EP planning basis:
  - Reactor accident probability is within the bounds of the Commission's Safety Goals (they are unlikely)
  - Accidental radiological releases (including security events) are no greater than identified in WASH-1400 (EPZ basis)
  - Radiological releases from accidents are no faster than those identified in WASH-1400, i.e., 30 minutes. (notification basis)

## Background

- NRC EP regulations have not yet been risk informed
- Defense-in-depth measure from Safety Goal Policy
- Regulations largely prescriptive

# PAR Study

## Objective

Investigate if the use of alternative protective actions can reduce public dose during severe accidents

# Technique

- Compare public dose consequences for alternative PAR regimens to the Supp 3 standard (radial keyhole evacuation)
- Absolute consequences not assessed
- Relative efficacy assessed qualitatively

# Technique

- Analyses for rapidly developing releases
- Analyses for more slowly developing releases
- Analyses for accidents w/o containment failure

# Technique

Establish source terms to be used

- Reflect EP Planning Basis  
(large early release)
- Used NUREG-1150 source terms
  - Desired a more current NRC reference

# Technique

- Used the NRC MACCS2 code
  - Models population movement
- Standard US meteorology
- EPZ with about 80,000 people
- Varied Evacuation Time (ETE)  
from 4-10 hours
  - Varied travel speed accordingly

## Alternative PARs Tested

- Shelter in place (SIP) for various times – (within current regimen, but limited use)
- Preferred sheltering for various times (in large public buildings, etc.)
- Lateral evacuation (crosswind)
- Staged evacuation (evacuation nearby, initially shelter others)

## Stakeholder Input

- Discussed alternative PARs with State EP personnel
  - Practicality of implementation
  - Cost-benefit
  - Applicability to physical site

# Sociological Review

- Public likely to implement as directed
- Public requires consistent emergency information
- Other sociological factors for consideration

# Recommendations

- Consider revision of NUREG-0654, Supplement 3
- Evacuation remains the major element
- Consider early and staged evacuation
- Precautionary actions at Site Area Emergency are prudent
- Consider action regarding strategies that reduce evacuation times in order to reduce consequences

# Recommendations

- Enhance usefulness of ETEs for the planning process
  - Develop ETE for each potential protective action to improve the information for decision makers
- Planning for special needs groups not in special facilities should be enhanced

# Recommendations

- Shelter in place followed by evacuation is more protective than standard PAR for large early release at sites with longer evacuation times
- Sheltering of special needs individuals followed by evacuation can result in fewer consequences.
- Enhancements to emergency communication with the public were identified

## Next Steps

- NUREG Vol. 1 ready for publication
- SECY Paper with recommendation to revise Supp 3 is in process for Commission decision

## SOARCA Considerations

- The SOARCA project may show that LER does not credibly exist
  - Staff may propose changes to the EP planning basis for Commission consideration
- Test efficacy of staged evacuation and sheltering in SOARCA project

## PAR Study Public Survey

- Completed Public and Emergency Responder Focus Groups at:
  - Duane Arnold
  - San Onofre
  - Seabrook
  - Limerick
  - St. Lucie

## Focus Group Results

- People will generally do what they are asked
- The effectiveness of notification influences decisions
- ER will report for duty and are confident in their training
- Infrastructure may not have kept up with evacuation demand

# PAR Study Public Survey

- Information from Focus Groups informed the telephone survey
- National telephone survey (within EPZs) to be conducted in January/February 2008
  - Public willingness to follow direction for alternative protective actions
  - Best methods to communicate advanced PAR strategies to the public

# PAR Study Public Survey

- Protective action strategy implementation
- Communication with the public in the unlikely event that protective actions are necessary.
- Conducted by a company that specializes in telephone surveys
- Conducted randomly in the EPZs

# PAR Study Public Survey

- Data compiled nationally, with some broad regional analysis of results
- Data cannot be analyzed by site
- 2,500 phone calls to collect about 800 completed surveys
- About 5 million people live in EPZs
- Individual EPZ may receive only a few calls or as many as perhaps 80
- Higher pop sites will likely receive more calls

## **PAR Study Public Survey**

- Expect Survey to be conducted in January/February 2008
- Results may be available for 2008 NREP
- Results will be published as PAR Study Vol.2 (NUREG/CR)

## Summary

- PAR Study in final stages of review
- Supports revision of Supp 3
- Commission will decide path forward
- Public survey planned for Jan-Feb 08
- Outreach before survey
- Initial results expected by April

# Questions???

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