



2010 National Evacuation Conference Policy Track

UNDERSTANDING PUBLIC RESPONSE TO NUCLEAR POWER PLANT PROTECTIVE ACTIONS

Focus Group and National Telephone Survey

Presented by: Fotini Walton

What did she say... [Fo (rhymes with mow) teh (???) ni (like what connects your shin bone to your thigh bone) Walton (you can thank my husband for that part)]





Acknowledgements

- **Nuclear Regulatory Commission for funding such interesting work.**
- **Randy Sullivan who developed this project from concept and who has provided technical expertise and NRC project management..**
- **Joe Jones who was the team lead and project manager for the PAR Project as well as countless other projects regarding emergency preparedness. Also, I have to thank Joe for his endless patience dealing with me on a daily basis.**



Before I go much further...

You can find much more information regarding this project at www.nrc.gov.

- **NUREG/CR-6953** - Review of NUREG-0654, Supplement 3, “Criteria for Protective Action Recommendations for Severe Accidents” Volumes I and II (*I’ll refer to it as the PAR Project*)

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UNITED STATES NUCLEAR REGULATORY COMMISSION

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- Employment **NRC #1**
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Key Topics

- DOE Application for Yucca Mountain
- Emergency Preparedness
- New Reactors
- VA Hospital Medical Event
- Reactor Decommissioning Funds
- The National Source

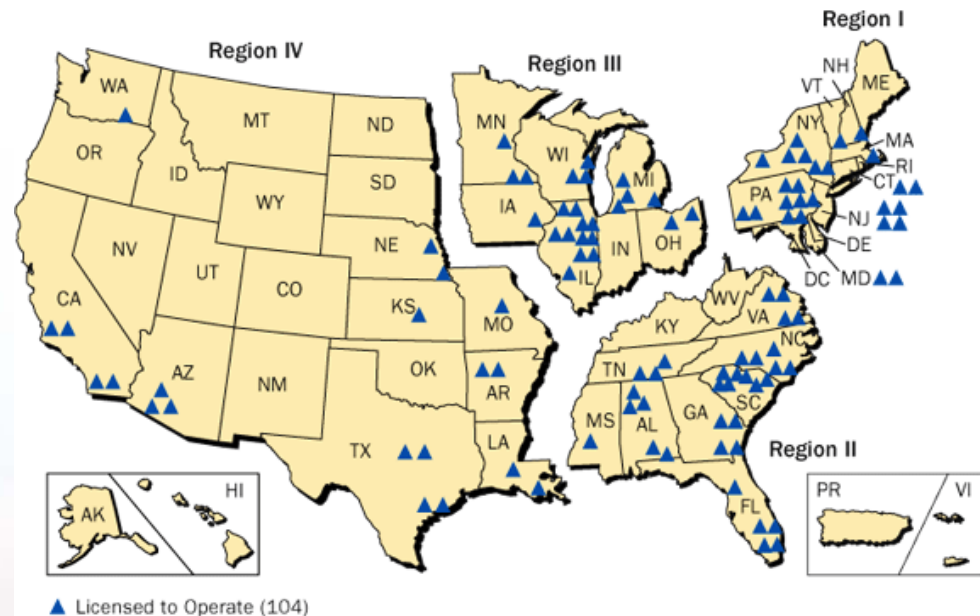
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Sen. Tom Carper (D-Del.) (left) and NRC Chairman Gregory Jaczko (center) toured PSEG's new Energy and Environmental Resource Center near the Hope Creek and Salem Nuclear Generating Stations in Salem, N.J.

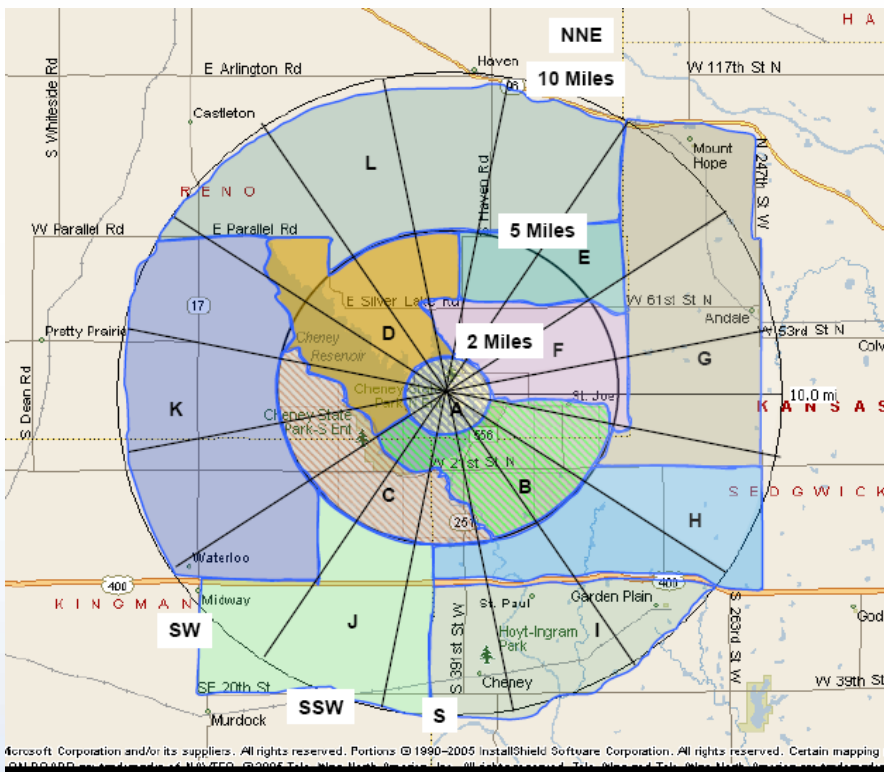


Background Information

- Currently there are 104 commercial nuclear power plants (**NPPs**) in the U.S. located at 64 sites. ~5 million people live within an EPZ.
- The Nuclear Regulatory Commission (**NRC**):
 - Governing agency who regulates the nation's use of nuclear materials to ensure there is adequate protection of the public's safety and safety to the environment.



Background Information...Terminology



- **Plume Exposure Emergency Planning Zone (EPZ):** Area within the 16 km (about 10 mile) radius of the NPP
 - Broken up into the area within a 2 mile radius (3.2 km), five mile radius (8 km), and 10 mile radius (16 km).
- **Emergency Response Planning Areas (ERPAs):**
 - Defined areas located within the EPZ for which emergency response plans have been developed. Typically defined by political or geographic boundaries.

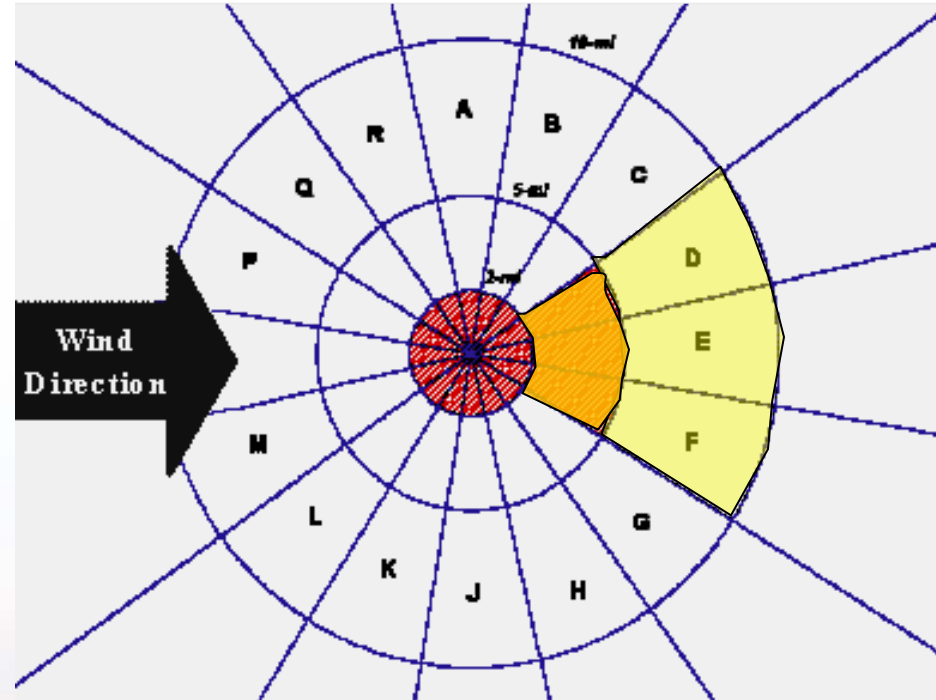
Background Information...Terminology

■ Protective Action Recommendation (PAR) :

- Examples: Evacuation, Sheltering-in-Place (SIP), Staged Evacuation.

■ Staged Evacuation

- Where one geographic area evacuates while other adjacent areas stay in place.
- Allows an area with higher risk to be evacuated first with little effect from background traffic.





Scope

- Studies of severe reactor accidents (with core damage) and their consequences conducted in the early 1990s concluded that the preferred initial PAR was to recommend evacuation within a 2-mile radius and five-miles downwind (NRC, 1996).
- Volume I concluded that alternative PARs (i.e. staged evacuation) could reduce risk to the public during a NPP accident.
- However, if the general population does not *believe* undertaking the protective action will make them safer, and instead follow other actions, *then even the most technically sound plans can be totally ineffective.*





Scope

- **Research has shown that public response to hazards can vary depending on:**
 - Knowledge of emergency planning,
 - Perception of risk,
 - And evaluation of alternative actions (NRC, 2005, 2008, 2008a) (Sorenson, 1986)
- **Therefore, in order to gain a deeper understanding of the views and potential reactions of the general public living within an EPZ to protective actions, the NRC commissioned focus groups and a national telephone survey.**





Methodology

Focus Groups

- **Seven public focus groups at five NPP sites (~55 people).**
 - *Duane Arnold*: Iowa
 - *San Onofre*: California
 - *Seabrook*: New Hampshire
 - *Limerick*: Pennsylvania
 - *St. Lucie*: Florida
- **A moderator asked questions and ensured that all participants were able to express their views.**
- **Diverse group dynamic.**
 - Possibility of an Individual's response being swayed by persuasive person in group.

Telephone Survey

- Administered to random members of households within each of the 63 EPZs using RDD and CATI.
- > than 18 years old, households with employees of the power plant were excluded.
- 821 surveys were completed.
- Questions: binomial, asked respondents to rate themselves on scale.
- Grouping: 0, 1-4, 5-7
- Dynamic: Individual's response not influenced by outside factors





Goals

Focus Groups

- Identify thematic concerns of the public → which would then be used to develop the national telephone survey.

Telephone Survey

- Understand if the themes derived from the Focus Groups were prevalent on a larger scale.
- Gain a deeper and broader understanding of the views and reactions of residents within EPZs to protective actions.





Topics

- **Knowledge of emergency preparedness among residents of EPZs**
- **The public's expected compliance with protective action orders**
- **Desire to evacuate as a family unit**
- **Registration of special needs and transit-dependent populations.**



Knowledge of EP Among Residents of EPZs

■ F.G. and Telephone results are dissimilar

Focus Groups

- Generally, not well-informed
- Varying levels of knowledge regarding EP info they had received
- At all sites, participants wanted more information
- Were not informed regarding terminology.

■ F.G. and Telephone results are similar

Telephone Survey

- 60% felt they were well-informed; 12% didn't feel informed at all
- 78% answered that they had received EP info; 64% said in the last year
- Public views EP info positively.
 - 91% said it was easy to understand
 - 76% felt they are receiving enough info
- Were not informed regarding terminology.



Expected Compliance with Protective Action Orders

Focus Groups

- **Evacuation: Majority said they would evacuate if the sirens sounded**
- **Sheltering: Would still evacuate even if they were told to shelter**
 - Why? : Perception that sheltering is not safe during NPP emergency
 - Houses viewed as “leaky”
- **Some said they would follow instructions if they understood what they were being asked to do and *why* it was beneficial.**

Telephone Survey

- **Evacuation: 81% said they would follow instructions to evacuate**
- **Sheltering: 75% said they would follow instructions to SIP**
- **63% felt they would safe if they sheltered, 50% felt they would be safe if they evacuated.**
- **17% said they would evacuate even if told to SIP so that others at greater risk could evacuate. 23% said they had evacuated previously for other hazards even though they were not instructed to do so.**





Family Will Prefer to Evacuate As a Unit

Focus Groups

- Participants frequently expressed the desire to bring the family together.
- Participants with children typically were more aware of the Emergency Plan and knew that school plans were to evacuate students.
 - Most parents stated they would still attempt to pick up their child[ren] at schools.

Telephone Survey

- 77% of parents with school children would attempt to pick up their children in an emergency.
- **When asked if they would still attempt to pick up children if it was announced that plans were to evacuate them, 42% said they would still attempt the pick-up.**



Registration of Special Needs and Transit-Dependent Populations.

- Typically a registration card is included in annual public information asking those with special needs and the transit-dependent to register.
- Research of large-scale evacuations show that this population may be underserved (NRC, 2007 and 2008a) *and even though Guidance requires emergency plans consider and plan for this population it is generally believed that a considerable percentage may not be registering.*
- ***Eight percent*** of respondents stated that someone in their household would require assistance from “outside their home.”
 - Only 29% have registered.
 - ◆ **Why?** Majority did not know they could register or that assistance was available, 30% said they did not how to register.
 - ◆ *Only 8 percent said it was a privacy issue.*





So What Does This Mean?

- **Communication** will play a key role in the *success or failure* of the emergency response plan.
 - EXAMPLES: Q1 asked: if respondents would be more willing to shelter **so that others in more immediate danger** could evacuate?
 - ◆ 70% said they would follow instructions to SIP.
 - ◆ It is clear that respondent's actions can negatively effect the safety of others.
 - Q2 asked if the respondent would likely evacuate if they were told that other areas were evacuating but **they should shelter because they were not in danger**.
 - ◆ 60% said they would **not follow instructions** and evacuate.
 - ◆ It is not clear that respondent's actions will negatively affect the safety of others in more immediate danger.



So What Does This Mean?

- Families will go to great lengths to evacuate as an unit. Therefore, emergency planners should plan accordingly.
- Efforts towards the identification and registration of special needs populations should be enhanced in order adequately be prepared for the evacuation of this population group.





Thanks for your Attention!

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