Schaperow, Jason

From: Schaperow, Jason
Sent: Wednesday, January 05, 2011 10:54 AM
To: Chang, Richard
Cc: Tinkler, Charles
Subject: RE: Comm Plan Rev 6.docx
Attachments: Comm Plan Rev 6 Mod1.docx; ML090340092.pdf

Hi Richard,

Attached is my proposed revision to the Comm Plan. It now meets the required format for Comm Plans, and, as a result, it is much shorter.

I deleted the Q's and A's from the attached Comm Plan. I request that you add the Q's and A's from the version of the Comm Plan that we sent to the Commission in March 2009 as part of SECY-09-0045. This version is attached. I have confidence in the March 2009 version, because it was developed by Terry Brock and Dorothy Collins, with input from cognizant staff in OEDO and OPA. Also, the March 2009 version went through interoffice concurrence.

After you add the Q's and A's, I request that you provide the Comm Plan to Joe Zabel to edit and confirm it meets the required format of Comm Plans.

Thanks,
Jason

From: Chang, Richard
Sent: Wednesday, January 05, 2011 9:04 AM
To: Schaperow, Jason
Subject: Comm Plan Rev 6.docx

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~~Pre-Decisional – Internal Draft Document~~

Communication Plan for the State-of-the-Art Reactor Consequence Analyses January 2011

Key Messages

- In carrying out its mission to protect public health and safety, NRC performs research to determine the risk to the public from commercial nuclear power plant operation. The SOARCA project develops the best estimates of the health consequences to the public using state-of-the-art understanding of accident phenomena and plant performance under accident conditions and understanding of radiation effects on humans.

- Scenarios could reasonably be mitigated resulting in either averted core damage or delay or reduction of the radiation release.

- For cases assumed to proceed unmitigated:
  - Accidents progress more slowly and result in smaller and more delayed radiological releases than previously assumed/predicted
  - Individual early fatality risk is essentially zero; no large early releases were predicted

- Individual latent cancer fatality risk within the Emergency Planning zone is very low
  - Thousands of times lower than the NRC safety goal and millions of times lower than other cancer risks (assuming the linear no-threshold hypothesis
  - Generally dominated by long-term exposure to small annual doses
  - Non-LNT models predict risk is even lower (a factor of 3 to 100 lower)

- Events in which the radiation release bypasses the containment do not pose higher risk than events involving containment failure

- Explicit consideration of seismic impacts on evacuation had no significant impact on predicted risk

- Dominance of external events suggests need for PRA focus and seismic research

Background

The objective of the SOARCA study is to develop a body of knowledge on the realistic outcomes of severe reactor accidents for two pilot plants. Supporting and corresponding objectives are as follows:

- Incorporate plant improvements not reflected in earlier assessments (hardware, procedures, security related enhancements, emergency planning)
- Incorporate state-of-the-art modeling
- Evaluate the benefits of recent improvements, including security related improvements
- Enable the NRC to communicate severe accident aspects of nuclear safety to diverse stakeholders

- Update the quantification of offsite consequences found in earlier publications such as NUREG/CR-2239 (1982 Siting Study)

The study has adopted new approaches in many areas

- Focus on important severe accident scenarios
- Realistic assessments and detailed analyses
- Integrated, self consistent analyses
- Incorporated recent phenomenological research
- Treatment of seismic impacts on evacuation
- Range of health effects modeling

This communication plan is needed, because the topic studied in SOARCA, namely risk to the public from severe reactor accidents, is controversial as are some of the new approaches adopted by the study.

Audience

External Stakeholders include:

- General public
- Public interest groups
- Media
- Congress
- Licensees
- Nuclear industry organizations (e.g., Nuclear Energy Institute, Institute of Nuclear Power Operations, Electric Power Research Institute)
- Department of Homeland Security, Federal Emergency Management Agency, and other Federal and State agencies
- State regulators and Agreement States
- International groups

Internal Stakeholders include:

- The Commission
- Advisory Committee on Reactor Safeguards (ACRS)
- NRC staff

Communication Team

The communication team includes the following members and will be responsible for facilitating communication activities for the SOARCA project:

Team Manager:

- Patricia Santiago, Office of Nuclear Regulatory Research

Team Members:

- Richard Chang, SOARCA Project Manager, Office of Nuclear Regulatory Research
- Charles Tinkler, Office of Nuclear Regulatory Research
- Jason Schaperow, Office of Nuclear Regulatory Research
- Tina Ghosh, Office of Nuclear Regulatory Research
- Richard Guzman, Office of Nuclear Reactor Regulation
- Scott Burnell, Office of Public Affairs
- Susan Bagley, Office of the Executive Director for Operations
- David Decker, Office of Congressional Affairs

Communication Tools

The following tools will be used to communicate with external stakeholders:

Public Website	SOARCA information is available on the external Web site at: http://www.nrc.gov/about-nrc/regulatory/research/soar.html
Questions and Answers	Possible questions that may be asked about the project and the answers that are deemed acceptable are provided at the end of this Communication Plan. They include information that highlights aspects of the project that audience members may inquire about. .
Fact Sheet	A fact sheet will be prepared to provide the public with an overview of the project.
Brochure	A summary of the SOARCA project will be presented in a NUREG/BR brochure using plain language and applying risk communication techniques. This brochure is a tool to enable a good level understanding about risk, for those not interested in technical details. It will be issued in conjunction with the public release of the draft NUREG.
Public Meetings	Meetings will be held to publicly share information at key phases of the project. Meetings will be held when the draft NUREG is released for public review and comment to facilitate public awareness and review of the draft NUREG.
Press Releases	A press release will be issued after the peer review is completed and in conjunction with the NUREG public release, and at other times as appropriate. Press releases will be coordinated with the Office of Public Affairs.
Technical Reports	Technical information about the SOARCA process and results will be documented in a NUREG. The draft NUREG will be made available for public review and comment. An uncertainty analysis, to confirm the robustness of the SOARCA predictions of the most likely outcomes and determine the variability of the SOARCA results to modeling parameters and assumptions, will be documented in a NUREG/CR. In addition, the lessons learned and experiences gained from utilizing the MELCOR and MACCS2

codes for SOARCA will be documented in NUREG/CR reports.

External Briefings — Briefings will be provided to congressional and State stakeholders as requested. Briefings will also be provided to other federal agencies, such as FEMA, as required prior to release of the draft NUREG for public review and comment.

Internal Briefings — Briefings will be provided to headquarters and regional staffs, ACRS, and Commission staffs as required, to help prepare internal stakeholders to communicate the SOARCA results prior to releasing the results to the public.

Timeline

The following table identifies the planned communications activities.

Action	Finish Date
Brief Commission TAs (semi-annual briefing)	March 2011
Public briefing at Regulatory Information Conference	March 10, 2011
Complete revising NUREG to reflect peer review and licensee fact check comments	April 2011
Brief peer review committee on revised NUREG	May 2011
Receive final reports from peer review committee on NUREG	June 2011
Provide Commission with peer reviewed version of NUREG	June 2011
Brief ACRS on peer reviewed version of NUREG	June 2011
Webinar for regional and HQ staff before public release of draft NUREG	June 2011
Inform Surry and Peach Bottom of the pending release of draft NUREG	June 2011
Brief state and Federal agencies, and congressional staffs (coordinating through OCA) as needed on draft NUREG prior to public release	June 2011
Publish brochure	June 2011
Brief peer review committee on revised parameter list and distributions for uncertainty analysis	June 2010
Release draft NUREG for public review and comment along with press release and federal register notice	July 2011
Conduct public meetings at Surry, Peach Bottom and Headquarters areas	July – August 2011
Brief Commission TAs (semi-annual briefing)	September 2011
Brief peer review committee on results of uncertainty analysis	September 2010
ACRS and OGC review of NUREG	September-October 2011
NRC interoffice review of NUREG	September-October 2011
Brief ACRS	October 2011
Incorporate ACRS comments on NUREG	October 2011
Provide final NUREG to Commission with recommendations on next steps for SOARCA	November 2011

Q's and A's

Please take the Q's and A's from the Communication Plan attached to SECY-09-0054.

Communication Plan for the State-of-the-Art Reactor Consequences Analyses (DRAFT - Revision 3)

Overview

The State-of-the-Art Reactor Consequence Analyses (SOARCA) project involves the reanalysis of severe accident consequences to develop a body of knowledge regarding the realistic outcomes of severe reactor accidents. In addition to incorporating the results of over 25 years of research, it is the objective of this study that this updated plant analysis include the significant plant improvements and updates (e.g., system improvements, training and emergency procedures and offsite emergency response), which have been made by plant owners and are not reflected in earlier NRC assessments. These improvements to plant safety also include those enhancements recently made in connection with security-related events.

The first phase of SOARCA analyzed examples of two major types of nuclear reactor in the United States: (1) Peach Bottom Atomic Station, a boiling water reactor (BWR), and (2) Surry Nuclear Power Plant, a pressurized water reactor (PWR). The first phase has been completed and a summary of the results was provided to the Commission. The staff is now developing a draft NUREG for peer review. Upon completion of the independent external peer-review, the staff will incorporate the peer-review comments and release the results of SOARCA in the form of a technical report (NUREG) and a risk communication information booklet (NUREG/BR). NRC will then consider whether analyses are needed for other reactor types and sites.

Goals

The goal of SOARCA is to determine best estimates of the offsite radiological consequences for severe accidents at U.S. operating reactors using a methodology based on state-of-the-art analytical tools and to present those results using risk communication techniques to achieve informed public understanding of the important factors. These factors include the extent and value of defense-in-depth features of plant design and operation as well as mitigation strategies that are employed to reduce risk. As a result, SOARCA will update analyses such as NUREG/CR-2239, "Technical Guidance for Siting Criteria Development," dated November 1982.

Background

To develop information that will help in its regulatory mission to protect the public, NRC has performed several research studies to understand probabilities and potential consequences of severe accidents at nuclear plants. Because limited realistic information was available for these historical studies, they were based on conservative assumptions about how the plants would behave. These publicly available estimates have, at times, been misinterpreted and misused. To improve public understanding, the SOARCA project seeks to produce more realistic and likely estimates.

Over the past 25 years, NRC, industry, and international nuclear safety organizations have completed substantial research on plant response to hypothetical accidents that could damage the core and containment. That research has significantly improved NRC's ability to analyze and predict how nuclear plant systems and operators would respond to severe accidents. During that same time, reactor owners have improved plant designs, emergency procedures, maintenance programs, and operator training, all of which have enhanced plant safety. Plant owners and local governments also have refined and improved emergency preparedness measures to further protect the public in the event of a severe accident. The SOARCA team applied this accumulated research and incorporated plant enhancements to achieve a more realistic evaluation of consequences from severe nuclear accidents. The results of this research will become the foundation for communicating aspects of severe accidents and updating information from older research studies.

The NRC staff used state-of-the-art information and computer modeling tools to develop best estimates of accident progression and, for scenarios in which accidents proceed to core damage, what radioactive material could potentially be released into the environment. The staff then assessed those releases to realistically estimate the potential consequence to the public. The staff considered the following in these new analyses:

1. Design-specific reactor accident sequence progression, taking into account the plant's current design configuration.

2. Design-specific potential containment failure timing, location, and size.

3. Site-specific emergency planning assumptions, including evacuation and sheltering.

4. Credit for operator actions based on emergency operating procedures, severe accident management guidelines, and post-9/11 and other mitigation measures that were in place at the time of the assessment.

5. Site-specific meteorological conditions and updated population data.

The agency learned more about realistic accidents by rigorously and realistically quantifying a relatively few important events. The project set technical criteria to determine which scenarios were important and focused its resources accordingly. The project team included scenarios having an estimated core damage frequency of 10^{-6} per reactor year (one in a million) or greater. Also, bypass scenarios having an estimated core damage frequency of 10^{-7} per reactor year (one in 10 million) or greater were included.

As noted above, the accident analysis for each scenario included credit for operator mitigation actions. Also, to quantify the benefits of the mitigation measures and to provide a basis for comparison to past analyses of unmitigated severe accident scenarios, these same scenarios were analyzed in the SOARCA project assuming the event proceeded as unmitigated, leading ultimately to an offsite release.

An independent, external peer-review committee will examine the approach and underlying assumptions and results obtained for Peach Bottom and Surry to ensure that they are defensible and state-of-the-art.

Key Messages

General Messages

- In carrying out its mission to protect public health and safety, NRC performs research to determine the risk of commercial nuclear power plant operation to the public. The SOARCA research project realistically estimates the potential consequences to the public given the state-of-the-art understanding of accident phenomena and plant performance under accident conditions.

- The results of this project indicate reactor safety has improved over the years as a result of efforts by industry to improve plant design and operation and by NRC to develop improved regulations to enhance safety.

- The SOARCA cancer risk values are all significantly smaller than the NRC-established safety goal that "individual members of the public should be provided a level of protection from the consequences of nuclear power plant operation such that individuals bear no significant additional risk to life and health."

- Both mitigated and unmitigated cases predict that no early fatalities will occur and average individual latent cancer fatality risks are very low for the unmitigated scenarios examined.

- Our analyses indicate that potential radiation releases would occur several hours later than earlier thought, and they would be substantially smaller; as a result, offsite consequences from severe accidents at nuclear power plants would be smaller than previously predicted.

- The results of this consequence analysis provide the public, NRC, and other government agencies with a more realistic picture and a better understanding of potential consequences in the unlikely event of an accident.

Additional Key Messages for the Scientific Community

- Information developed from years of research has been incorporated into the tools that NRC uses to evaluate potential accidents. These tools are the SPAR, MELCOR, and MACCS2 computer codes. These codes were used to select the scenarios, to model nuclear power plant systems and operator responses to severe accident conditions, and to produce a best estimate of consequences to the public.

- This study focuses on those accidents estimated to have a one in a million chance per year or greater of core damage (a core damage frequency of approximately equal to or greater than 10^{-6} per reactor year). SPAR models were used to identify those potential scenarios for further evaluation.

- In addition, the project placed emphasis on sequences that may be a little less likely to occur but with the potential for more severe consequences. Containment bypass events have the potential for more severe consequences and, therefore, those bypass sequences estimated to have a 1 in 10 million chance per year or greater to result in core damage (a core damage frequency equal to or greater than 10^{-7} per reactor year) were included within the scope of SOARCA. The project teams used the SPAR models to identify the included potential bypass scenarios.

- Plant-specific MELCOR analyses reflected design-specific features. MELCOR code modeled the nuclear power plant behavior, the progression of the accident, and the radioactive material released into the environment. This includes the timing of fuel damage, component failures, and releases to the environment.

- Structural analyses determined the expected containment performance during accidents.

- MACCS2 calculations used site-specific actions, emergency planning, weather data, population data, and evacuation times (including sheltering) to estimate consequences such as early fatalities and latent cancer injuries.

Communication Team

The communication team includes the following members and will be responsible for facilitating communication activities for the SOARCA project:

- Team Manager: Jimi Yerokun, Office of Nuclear Regulatory Research
- Team Members: Terry Brock, Office of Nuclear Regulatory Research
- Charles Tinkler, Office of Nuclear Regulatory Research
- Richard Guzman, Office of Nuclear Reactor Regulation
- Scott Burnell, Office of Public Affairs
- Susan Bagley, Office of the Executive Director for Operations
- David Decker, Office of Congressional Affairs

As the project progresses, it is expected that other NRC staff members will participate in communication activities, as needed.

Audiences

External Stakeholders include:

- General public
- Public interest groups
- Media
- Congress
- Licensees
- Nuclear industry organizations (e.g., Nuclear Energy Institute, Institute of Nuclear Power Operations, Electric Power Research Institute)
- Department of Homeland Security and other Federal and State agencies
- State regulators and Agreement States
- International groups

Internal Stakeholders include:

- The Commission
- Advisory Committee on Reactor Safeguards (ACRS)
- NRC staff

Communication Tools

The following tools will be used to communicate with external stakeholders:

Public Website	SOARCA information will be placed on the external website.
Questions and Answers	This contains information that highlights aspects of the project that audience members may inquire about. These questions and answers are given at the end of this Communication Plan.
Fact Sheet	A fact sheet will be prepared to provide the public with an overview of the project.
Information booklet	A summary of the SOARCA project will be presented in a separate NUREG/CR booklet using plain language and applying risk communication techniques. This booklet is a tool to enable NRC and its stakeholders to develop a common understanding about risk. It will be issued after the peer review is completed.
Public Meetings	Meetings will be held to publicly share information at key phases of the project.
Press Releases	A press release will be issued after the peer review is completed and at other times as appropriate. Press releases will be coordinated with the Office of Public Affairs.
Technical Reports	Technical information about the process and results will be documented in a NUREG and will be made publicly available through the Agencywide Documents Access and Management System (ADAMS) and the NRC's external website. This NUREG is being developed and will be issued after the peer review is completed.
External Briefings	Briefings will be provided to Congressional and State stakeholders as requested.
Internal Briefings	Prior to releasing the results, the SOARCA staff will hold briefings for technical staff in NRC Regional offices and other interested NRC staff to help prepare them to communicate about the results.

MILESTONES OF COMMUNICATION ACTIVITIES

COMMUNICATION ACTIVITIES	RESPONSIBILITY	DATE
Semi-annual TA brief	T. Brock	ongoing
Quarterly DEDO brief	T. Brock	ongoing
Meeting with ACRS	SOARCA Team	July 2009
Independent Peer Review of documents starts – issue press release	SOARCA Team/OPA	July 2009
Steering Committee meeting	T. Brock	September 2009
Public release of SOARCA results for Peach Bottom and Surry – The following activities are planned to engage stakeholders to promote a common understanding of the SOARCA results.		
Public website update	SOARCA Team	Early 2010
Briefings on results to Regional and HQ staff prior to public release (nonpublic meeting)	T. Brock	Early 2010
Briefings on results to participating licensees	T. Brock	Early 2010
All-Agreement States and Non-Agreement States letter	T. Brock/FSME/DILR	Early 2010
Press release to coincide with the release of the SOARCA results	T. Brock/OPA	Early 2010
Chairman holds press briefing	T. Brock/OPA	Early 2010
Public release of NUREG and the NUREG/BR information booklet	SOARCA Team/SNL/ OPA	Early 2010
Public Workshop	SOARCA Team/SNL	Early 2010
Regulatory Information Conference (RIC) Presentations on final results	SOARCA Team	March 2010

Evaluation and Monitoring

The communication plan continues to be updated to reflect key ideas being communicated to stakeholders and key decision points in the project's progress. Communication from these venues will be reflected in responses to key questions and ideas during the project's progress.

Questions and Answers

What is the State-of-the-Art Reactor Consequences Analyses (SOARCA) project?

SOARCA is a research project that develops realistic estimates of the potential public health effects from a nuclear power plant accident, where low-likelihood scenarios could release radioactive material into the environment and potentially cause offsite consequences. The project also evaluates and improves, as appropriate, methods and models for realistically evaluating both the plant response during such severe accidents, including evacuation and sheltering and the potential public risk.

Why is the U.S. Nuclear Regulatory Commission (NRC) performing this study?

NRC is doing this study to develop the most realistic evaluations possible for the potential consequences of severe nuclear accidents. Over the years, NRC, industry, and international nuclear safety organizations have completed substantial research on plant response to hypothetical accidents that could damage the core and containment. The results have significantly improved NRC's ability to analyze and predict how nuclear plant systems and operators would respond to severe accidents. Also, plant owners have improved the plant design, emergency procedures, maintenance programs, and operator training, all of which have improved plant safety. Emergency preparedness measures also have been refined and improved to further protect the public in the highly unlikely event of a severe accident. Combining all of this new information and analysis will improve the realism of accident consequence evaluations.

How will this study be different from earlier studies?

The SOARCA project will:

- Use an improved understanding of source terms and severe accident phenomenology.
- Credit the use of severe accident mitigation strategies and procedures.
- Use updated emergency preparedness modeling.
- Account for plant improvements.
- Use modern computer resources and advanced software to yield more accurate results.

In addition, the SOARCA project is designed to be a more realistic estimate. Some of the earlier studies also were designed to be best estimates; however, because they were limited by the available knowledge of accident phenomenology, these older studies were conservative (particularly the very improbable severe accidents). The SOARCA project will provide the latest basis from which the public and decision makers can assess the consequences of severe reactor accidents.

What are the potential uses of the SOARCA study?

The overarching purpose of this study is to provide more realistic information about potential nuclear power plant consequences to the public and other stakeholders, including Federal, State, and local authorities. This study also will increase understanding of the value of defense-in-depth features of plant design and operation, including the use of mitigative strategies.

What consequence measures are being estimated?

This study assesses the health effects of a potential radiation release to the general public. State-of-the-art analytical models estimate the individual risk of prompt fatality and latent cancer fatality that could occur in the remote event that a severe reactor accident occurs. Prompt fatalities are those resulting from exposure to very high doses of radiation as the result of a release. These fatalities occur days to months after exposure. Latent cancer fatalities are those resulting from the long-term effect of radiation exposure. The estimates of public health effects in this new study realistically account for the emergency planning measures in place at each reactor site, unlike some of the past studies that used generic assumptions. The results from both mitigated and unmitigated cases predict that no early fatalities will occur and average individual cancer fatality risks are very low for the unmitigated scenarios examined.

Which plants are participating in the SOARCA project?

The first phase of SOARCA analyzes examples of two major types of nuclear reactor in the United States: (1) Peach Bottom Atomic Station, a boiling water reactor (BWR) in Pennsylvania, and (2) Surry Nuclear Power Plant, a pressurized water reactor (PWR) in Virginia. After the first phase has been completed, NRC will consider whether analyses are needed for other reactor types and sites.

Does this study consider new reactors that may be built?

No. New reactor designs and containments are not part of the project. The project analyzes existing reactors.

Are terrorist acts, such as aircraft impacts, being analyzed as part of SOARCA?

No. The focus of this study is on accident scenarios—not terrorist-related ones—that could potentially lead to a radiological release into the environment. NRC addresses security-related events in separate, non-public analysis.

Are accidents at spent fuel pools considered in this study?

No. This study does not consider spent fuel pools. The project is focused on evaluating the severe and very unlikely reactor core accidents that may occur quickly at operating power reactors.

Why are the fatality numbers different from the results predicted by earlier research?

NRC is providing the most realistic, most accurate estimates calculated to date. When NRC published previous studies, the available analytical methods and data about nuclear plant operation were cruder and the results were therefore conservative. Since then, NRC and the industry have improved safety and mitigation measures in the plants. In addition, NRC has improved methods to calculate consequences. Therefore, the SOARCA project is an update to the previous research based on all the information known today.

How much different would the numbers be if NRC did the calculations the same way they were done in the past?

The purpose of the SOARCA project is somewhat different from the calculations done in the past because this project is a "best estimate" consequences analysis. In addition, NRC's knowledge, computational capabilities, and modeling methodologies are better now than in the past. A detailed report (available through Agencywide Documents Access and Management System [ADAMS]) will describe the justifications for the changes in both input values and calculation methods—regardless of their impact on the final number.

Why does NRC report individual latent cancer fatality risk and not total cancer fatalities?

Reporting the latent cancer fatality risk promotes better understanding and meaning to individuals. Cancer fatality risk provides easier comparison to other kinds of cancers and context to what the accident scenarios mean to individuals. In addition, this method better represents the risk due to proximity to the site. The focus on individuals from far away to close to the plant shows the increase in risk due to the postulated severe accident. The Environmental Protection Agency and others also commonly use cancer fatality risk as a way to report consequence.

If I live within one of the reported distances in the results of SOARCA, how do I interpret my specific risk relative to the average value reported?

The human health risks calculated in SOARCA are very small. To interpret the average individual cancer risk results from SOARCA, it is helpful to consider the NRC safety goal for cancer risk of 2 in 1 million per year. The average individual cancer risks calculated in SOARCA within the 10-mile emergency planning zone are all in the 1 in a billion to 1 in a 100 billion per year range. The average individual risk numbers decrease the further the distance out from the plant (e.g., 50 and 100 miles). The SOARCA cancer risk values are all significantly smaller than the NRC-established safety goal that "individual members of the public should be provided a level of protection from the consequences of nuclear power plant operation such that individuals bear no significant additional risk to life and health."

Is this study being reviewed by outside experts?

Yes. In addition to the peer review afforded by NRC's Advisory Committee on Reactor Safeguards, an independent external peer review of scientific and technical experts will

assess the methodological approach, underlying assumptions, and results obtained for Peach Bottom and Surry to ensure that they are defensible and state-of-the-art. This peer review is a common practice in research and will show both the strengths and weaknesses of the research project. NRC will continue to use the methods shown to be strengths of the research project, and the experts' comments on the weaknesses will help improve future research projects.