FULL-SCOPE SITE LEVEL 3 PRA PROJECT COMMUNICATION PLAN

March 2016
(ML16069A218)

Goal

This plan will guide staff communications with internal and external stakeholders of the United States Nuclear Regulatory Commission (NRC) as they relate to the Full-Scope Site Level 3 Probabilistic Risk Assessment (PRA) project.

Key Messages

The key messages to be communicated to stakeholders are as follows:

- **A full-scope site Level 3 probabilistic risk assessment (PRA) is being conducted:** The NRC Office of Nuclear Regulatory Research is performing the PRA for the Vogtle Electric Generating Plant, Units 1 and 2. The technical work is expected to be completed by Spring 2018.

- **The scope of the Level 3 PRA study includes all major site radiological sources, all internal and external initiating event hazards typically considered in previous internal and external event PRAs, and all modes of plant operation:** Major site radiological sources include reactor cores, spent fuel pools, and dry cask storage, but exclude fresh nuclear fuel, radiological waste, and minor radiological sources (such as calibration devices). Deliberate malevolent acts (such as terrorism and sabotage) are specifically excluded from the scope of the study.

- **In general, the Level 3 PRA project will be based on current state-of-practice methods, tools, and data**[1]**:** Additional advancements in PRA technology will be required in some areas (e.g., multi-unit risk), but the desire for realism will be balanced against budgeted resources and schedule.

- **The resulting PRA will provide insights into the relative importance of various risk contributors at the site:** These insights may be used to further enhance regulatory policy and decision making and to help focus limited agency resources on issues most directly related to the agency's mission to protect public health and safety. Numerous technical advances have been made and additional scope considerations have been identified that were not reflected in earlier Level 3 PRA models.

[1] "State-of-practice" methods, tools, and data refer to those that are routinely used by the NRC and licensees and/or have acceptance in the PRA technical community. It is recognized that some aspects of the study will require advancements in PRA technology, ranging from minor modification of existing methods to development of innovative methods to address previously unanalyzed aspects of the study.

Background

Regulatory Context

In 1995, the Commission established the current framework for risk-informed regulation by issuing a PRA Policy Statement[2] that stated the use of PRA technology should be increased in all regulatory matters to the extent supported by the state-of-the-art and in a manner that complements NRC's deterministic approach and traditional defense-in-depth philosophy.

Although Level 3 PRAs have since been performed to some extent within both the United States and international nuclear industries, the U.S. Nuclear Regulatory Commission (NRC) has not sponsored development of a Level 3 PRA for a nuclear power plant site since the NUREG-1150 study[3]. In the more than two decades that have passed since the NUREG-1150 Level 3 PRAs were performed, numerous technical advances have been made that were not reflected in the NUREG-1150 PRA models. The staff also identified additional scope considerations not previously considered that could be addressed by performing a new full-scope site Level 3 PRA.

During the Annual Commission Meeting on Research Programs, Performance, and Future Plans on February 18, 2010, the staff proposed a scoping study to evaluate the feasibility of performing a new full-scope site Level 3 PRA for a nuclear power plant site. On March 19, 2010, the Commission expressed conditional support[4] for Level 3 PRA related activities and directed the staff to provide the Commission with various options for proceeding with this work that would include costs and perspectives on future regulatory uses for Level 3 PRAs. On July 7, 2011, the NRC staff responded[5] by providing three proposed options for proceeding with the Level 3 PRA development project. These three options consisted of (1) maintaining the status quo (i.e., continuing with evolutionary development of PRA technology); (2) conducting focused research to address identified gaps in existing PRA technology before performing a full-scope site Level 3 PRA; and (3) conducting a full-scope site Level 3 PRA. On September 21, 2011, the Commission approved[6] the third option.

Technical Context

PRA is a structured, analytical process that provides both qualitative insights and quantitative estimates of risk by (1) identifying potential sequences that can challenge system operations and lead to an adverse event, (2) estimating the likelihood of these sequences, and (3) estimating the consequences associated with these sequences, if they were to occur. U.S. nuclear reactor PRAs are used to characterize three regimes of accident progression. A Level 1 PRA models system (plant and operator) response to various initiating events that challenge system operation to estimate reactor core damage frequency. A Level 2 PRA includes Level 1 PRA analyses and, in addition, models system and containment response to severe core damage accidents to estimate conditional containment failure probabilities, radioactive material

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[2] 60 FR 42622, "Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities" (August 16, 1995).
[3] NUREG-1150, "Severe Accident Risk: An Assessment for Five U.S. Nuclear Power Plants," December 1990.
[4] SRM 100218, "Staff Requirements—Briefing on Research Programs, Performance, and Future Plans," dated March 19, 2010 (ADAMS Accession № ML100780578).
[5] SECY-11-0089, "Options for Proceeding with Future Level 3 Probabilistic Risk Assessment Activities," dated July 7, 2011 (ADAMS Accession № ML11090A039).
[6] SRM-SECY-11-0089, "Staff Requirements—SECY-11-0089—Options for Proceeding with Future Level 3 Probabilistic Risk Assessment (PRA) Activities," dated September, 21, 2011 (ADAMS Accession № ML112640419).

release frequencies (e.g., large early release frequency), and various source term characteristics. Finally, a Level 3 PRA includes Level 2 PRA analyses and, in addition, models the transport and dispersion of released radioactive materials to estimate various offsite radiological health and economic consequence measures.

A full-scope site Level 3 PRA is a complex model that consists of many technical aspects (e.g., event tree and fault tree analysis, data analysis, accident progression and source term analysis, and consequence analysis). A PRA is considered to be full-scope when the technical aspects are adequately developed for all major hazard groups (e.g., internal fire, internal flooding, seismic events) and all modes of reactor operation (i.e., including low power and shutdown configurations). Additionally, a site PRA is considered to include the risk contributions from initiating events that impact more than one unit at the site; the impact of accidents at one unit on any other units at the site; and non-reactor sources of radiological material, such as spent fuel in pools and dry storage casks.

A full-scope site Level 3 PRA for a nuclear power plant site can provide valuable insights into the relative importance of various risk contributors by assessing accidents involving one or more reactor cores as well as other site radiological sources (i.e., spent fuel in pools and dry storage casks). These insights may be used to further enhance regulatory policy and decision making and to help focus limited agency resources on issues most directly related to the agency's mission to protect public health and safety.

Communication Team

Name	Organization	Phone	Email
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Audience and Stakeholders

Internal

Internal stakeholders include:

- The Commission
- Office of the Executive Director for Operations (OEDO)
- Advisory Committee on Reactor Safeguards (ACRS)
- Office of Nuclear Regulatory Research (RES)
- Office of Nuclear Reactor Regulation (NRR)
- Office of New Reactors (NRO)
- Office of Nuclear Security and Incident Response (NSIR)
- Office of Nuclear Material Safety and Safeguards (NMSS)
- Regions
- Senior Reactor Analysts (SRAs)
- Office of Public Affairs (OPA)
- Office of Congressional Affairs (OCA)

External

External stakeholders include:

- Southern Nuclear Operating Company (SNC)

- Other licensees
- Electric Power Research Institute (EPRI)
- Nuclear Energy Institute (NEI)
- Pressurized Water Reactor Owners Group (PWROG)
- Federal Emergency Management Agency (FEMA)
- State emergency response organizations
- Media
- Congress
- Union of Concerned Scientists (UCS)
- Other public interest groups
- General public

Contact information for key external stakeholders is as follows:

Name	Organization	Phone	Email
Faramarz Pournia (Director, Risk-Informed Engineering)	Vogtle, SNC	205-992-5933	fpournia@southernco.com
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Ed Lyman *(Senior Scientist, Global Security)*	UCS	202-331-5445	elyman@ucsusa.org

Communication Tools

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

Public Website	Level 3 PRA project information and publicly available documents will soon be available on the NRC external Website.
SharePoint	For internal project team use only, Level 3 PRA project information is available on the Level 3 PRA project SharePoint site. The SharePoint site includes links to background documents (e.g., early SECY and SRM documents), project planning documents (e.g., the current Project Plan, Communication Plan), and briefing material (e.g., ACRS and public meeting presentations). The SharePoint site also includes separate sections for information provided by the licensee and for in-progress technical development work (e.g., to be used by Technical Advisory Group members and co-authors collaborating on draft documents).

Public Meetings	Meetings will be held to publicly share information at key phases of the project.
External Briefings	Briefings will be provided to congressional, state and local government stakeholders and licensee personnel, as needed.
Internal Briefings	Briefings will be provided to headquarters and regional staffs, ACRS, and Commission staffs, as needed. Such briefings will also be used to help prepare internal stakeholders to communicate the Level 3 PRA results prior to releasing the results to the public.
Questions and Answers	Possible questions that may be asked about the project and the answers that are deemed appropriate and relevant 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 has been developed to provide an overview of the project to interested external and internal stakeholders. It is contained in NUREG-1925, and is updated annually.
Press Releases	Press releases will be issued for major project milestones. Press releases will be coordinated with the Office of Public Affairs (OPA).
EDO Daily Note	EDO Daily Notes, that may have links to relevant documents, will be utilized as needed.
One Week Look-Ahead	One Week Look-Aheads will be utilized as needed.
Weekly Highlight	Weekly Highlights will be utilized as needed.

Communication Timeline

The purpose of the activities in this communication plan is to keep internal and external stakeholders informed of progress on the L3PRA project. The following table provides the timeline for communicating with stakeholders.

Communication Milestones					
No.	**Action**	**Lead Org.**	**Support Org.**	**Date**	**Done**
Public Meetings					
1	Public Meeting – Site selection criteria	RES/DRA	NRR, NRO	*November 10, 2011*	√
2	Public Meeting – Technical Analysis Approach Plan	RES/DRA	RES/DSA	*November 28, 2012*	√

Communication Milestones					
No.	**Action**	**Lead Org.**	**Support Org.**	**Date**	**Done**
3	Public Meeting – Project status	RES/DRA	SNC	*December 18, 2014*	√
…	Public meeting with Georgia and South Carolina state and local authorities and Federal Emergency Management Agency	RES/DRA	TBD	TBD	
…	Public Meetings – For each significant project interim deliverable (invite NEI, EPRI, UCS)	RES/DRA	TBD	TBD	
Commissioner and Commissioner Technical Assistant Briefings and SECY Papers					
1	Briefing for Commissioners Apostolakis and Ostendorff on L3PRA project	RES/DRA	N/A	February 17, 2012	√
2	Commission Staff Briefing (and RES front office pre-briefing) – *First annual*	RES/DRA	N/A	September 12, 2012	√
3	SECY Information Paper to the Commission – On applying project results to regulatory framework	RES/DRA	NRR	September 13, 2012	√
4	Briefing for Commissioners Apostolakis and Ostendorff on L3PRA project	RES/DRA	N/A	October 24, 2012	√
5	Commission Staff Briefing (and RES front office pre-briefing) – *Second annual*	RES/DRA	N/A	October 3, 2013	√
6	Briefing for Commissioner Apostolakis on L3PRA project	RES/DRA	N/A	December 6, 2013	√
7	Commission Staff Briefing (and RES front office pre-briefing) –*Third annual*	RES/DRA	N/A	September 3, 2014	√
8	Commission Staff Briefing (and RES front office pre-briefing) – *Fourth annual*	RES/DRA	N/A	September 2, 2015	√
…	Commission Staff Briefing (and RES front office pre-briefing)	RES/DRA	TBD	Annually	
ACRS Meetings					
1	ACRS Subcommittee Meeting – On project plan	RES/DRA	N/A	March 6, 2012	√

Communication Milestones					
No.	**Action**	**Lead Org.**	**Support Org.**	**Date**	**Done**
2	ACRS Subcommittee Meeting – On technical analysis approach plan	RES/DRA	RES/DSA	December 4, 2012	√
3	ACRS Subcommittee Meeting – On technical analysis approach plan	RES/DRA	N/A	May 22, 2013	√
4	ACRS Subcommittee Meeting – On integrated site risk, human reliability analysis, and [closed] initial Level 1 PRA models for internal events and floods	RES/DRA	INL	July 22, 2013	√
5	ACRS Subcommittee Meeting – On project status, Level 2 PRA, Level 3 PRA, SNC perspectives, and [closed] technical discussions	RES/DRA	RES/DSA, SNC	February 19, 2014	√
6	ACRS Full Committee Meeting – On project background and status	RES/DRA	N/A	June 11, 2014	√
7	ACRS Subcommittee Meeting – On project status, Level 2 PRA HRA, and [closed] Level 1 PRA event trees and Level 1 and Level 2 PRA technical issues	RES/DRA	SNL, INL, ERI	October 15, 2014	√
8	ACRS Subcommittee Meeting – On project status, MACCS analysis, EP modeling, and [closed] Level 1 PRA event trees and technical issues	RES/DRA	RES/DSA, NSIR, INL	February 18, 2015	√
9	ACRS Subcommittee Meeting – On project status and ISLOCA expert elicitation	RES/DRA	PNNL	March 1, 2016	√
…	ACRS Subcommittee Meetings	RES/DRA	TBD	Semi-annually	
OEDO and Office Director/Regional Administrator (OD/RA) Briefings					
1	OEDO Briefing – On SECY-12-0123	RES/DRA	N/A	August 7, 2012	√
2	NRC OD/RA Briefing – On project status	RES/DRA	N/A	June 13, 2013	√
3	OEDO Briefing – On project status	RES/DRA	N/A	January 23, 2014	√
4	NRC OD/RA Briefing – On project status	RES/DRA	N/A	January 6, 2015	√
…	NRC OD/RA Briefings	RES/DRA	TBD	Annually	

Communication Milestones					
No.	**Action**	**Lead Org.**	**Support Org.**	**Date**	**Done**
Other Communication Activities					
…	RES Division Director Briefings – Periodic project status briefings for RES Division Directors	RES/DRA	N/A	Bi-monthly (since May 9, 2013)	
…	Closed briefings for Georgia and South Carolina state and local authorities and Federal Emergency Management Agency	RES/DRA	TBD	TBD	
…	Press releases for major project milestones	OPA	RES/DRA	TBD	

Questions and Answers

Project Overview

Q1. Where can I get information about the project?

A1. An NRC external website will soon be launched. For additional information, contact Michelle Gonzalez, RES/DRA, Michelle.Gonzalez@nrc.gov or Lauren Ning, RES/DRA, 301-415-2439, LaurenKillian.Ning@nrc.gov.

Q2. Why is NRC performing this study?

A2. The NRC is performing this study in order to:

1. Develop a Level 3 probabilistic risk assessment (PRA) that (1) reflects technical advances since the last NRC-sponsored Level 3 PRAs were completed over 20 years ago, and (2) addresses scope considerations that were not previously considered (e.g., low power/shutdown, multi-unit risk, other radiological sources)

2. Extract new insights to enhance regulatory policy and decision making and to help focus limited agency resources on issues most directly related to the agency's mission to protect public health and safety

3. Enhance PRA capability, expertise, and documentation

4. Demonstrate technical feasibility and gain insight into the cost of developing new Level 3 PRAs

Q3. Which nuclear power plant is participating in this project?

A3. Vogtle Electric Generating Plant is participating in this project. Vogtle is located in Waynesboro, GA and is operated by Southern Nuclear Operating Co., Inc (SNC). Two pressurized water reactors operate at the Vogtle site. SNC recently received a combined operating license to construct two new reactors at the Vogtle site. These new reactors are not within the scope of the site Level 3 probabilistic risk assessment study.

Q4. What is the scope of this study? Are terrorist acts, such as aircraft impacts, being analyzed as part of this study? Accidents at spent fuel pools? Dry cask storage?

A4. The scope of this Level 3 probabilistic risk assessment (PRA) study includes all major site radiological sources, all internal and external initiating event hazards typically considered in previous internal and external event PRAs, and all modes of plant operation. Major site radiological sources include reactor cores, spent fuel pools, and dry cask storage, but exclude fresh nuclear fuel, radiological waste, and minor radiological sources (e.g., calibration devices). Deliberate malevolent acts (e.g., terrorism and sabotage) are specifically excluded from the scope of the study.

Q5. Is this project related to follow-up on the Fukushima events?

A5. No, this project is not related to Fukushima events follow-up since it was proposed prior to the events in Japan in 2011. Some Fukushima insights may inform this study, but many are not expected to be available in an appropriate time frame to be incorporated into this study.

Q6. Will the study be reviewed by outside experts?

A6. Yes, there will be several external peer reviews. Each major project deliverable will be peer reviewed to the applicable ASME/ANS PRA standard. The reviews will be organized and led by the PWR Owners Group (PWROG). If no approved or trial-use standard exists, the PWROG may lead an effort to identify a set of review criteria for the L3PRA project. In addition, an independent technical review will be performed using recognized experts from a wide range of stakeholders potentially including, but not limited to, U.S. National Laboratories, academic institutions, other Federal agencies, industry organizations, and public interest groups.

<u>Technical Background</u>

Q7. What is a full-scope site Level 3 probabilistic risk assessment (PRA)?

A7. A full-scope site Level 3 PRA is a complex analytical model that consists of many technical elements. Some of these technical elements include, but are not limited to, initiating event analysis, event tree development and analysis, system reliability model (e.g., fault tree) development and analysis, human reliability analysis, data analysis, accident sequence quantification, and uncertainty analysis. A PRA is considered to be full-scope when the technical elements are adequately developed for all major hazard groups (e.g., internal fire, internal flooding, seismic) and all modes of reactor operation (i.e., including low power and shutdown configurations). Additionally, a site PRA is considered to include the risk contributions from initiating events that impact more than one unit at the site; the impact of accidents at one

unit on any other units at the site; and non-reactor sources of radiological material, such as spent fuel pools and dry storage casks.

Q8. What is the Full-Scope Site Level 3 Probabilistic Risk Assessment (PRA) project?

A8. The NRC Office of Nuclear Regulatory Research is performing a full-scope site Level 3 PRA (see A7) for an operating plant site. (The site was selected in February 2012.) The scope of the Level 3 PRA study includes all major site radiological sources, all internal and external initiating event hazards, and all modes of plant operation. Site radiological sources include reactor cores and spent fuel in pools and dry cask storage, but exclude fresh nuclear fuel, radiological waste, and minor radiological sources. The only initiating events specifically excluded are deliberate malevolent acts (e.g., terrorism and sabotage). Numerous technical advances have been made and additional scope considerations have been identified that were not reflected in earlier Level 3 PRA models. In general, the Level 3 PRA project will be based on current state-of-practice methods, tools, and data. Additional advancements in PRA technology will be required in some areas (e.g., multi-unit risk). The resulting PRA will provide insights into the relative importance of various risk contributors at the site. These insights can be used to further enhance regulatory policy and decision making and to help focus limited agency resources on issues most directly related to the agency's mission to protect public health and safety.

Q9. How will this probabilistic risk assessment (PRA) study be different from other PRA studies?

A9. Level 3 PRAs have been performed to some extent within both the United States and international nuclear industries. The U.S. Nuclear Regulatory Commission (NRC) has not sponsored development of a Level 3 PRA for a nuclear power plant site since NUREG-1150 [NUREG-1150, "Severe Accident Risk: An Assessment for Five U.S. Nuclear Power Plants," December 1990]. In the more than two decades that have passed since the NUREG-1150 Level 3 PRAs were performed, numerous technical advances have been made that were not reflected in the NUREG-1150 PRA models. This new PRA will be different from the NUREG-1150 study in terms of scope, PRA technology, and nuclear power plant changes since that study was performed.

Note: The scope of the Level 3 PRA study includes all major site radiological sources, all internal and external initiating event hazards, and all modes of plant operation. The NUREG-1150 studies did not include an assessment of accidents involving other radiological sources such as spent fuel pools, dry storage casks, and other units on site. Also, the NUREG-1150 studies only addressed at-power operation (though subsequent studies for two of the NUREG-1150 plants involved a limited analysis of low power and shutdown modes of operation) and only partially addressed external hazards.

In addition, the current Level 3 PRA study will incorporate advancements in PRA technology such as (1) increased understanding and improved modeling of severe accident phenomena, (2) development of improved methods for common cause failure analysis and human reliability analysis, and (3) improved quality and quantity of data for initiating events, component failures, and operator errors.

The Level 3 PRA study will also incorporate nuclear power plant improvements in operational performance and safety that have occurred since the time of the NUREG-1150 studies (e.g., improved operational, maintenance, and training practices; implementation of severe accident mitigation guidelines and extensive damage mitigation guidelines; and modifications to meet the station blackout rule [10 CFR 50.63], as well as account for any plant power uprate and higher fuel burn-up).

Q10. What do the following terms mean?

- ***Probabilistic Risk Assessment (PRA)***
  - ***Level 1 PRA***
  - ***Level 2 PRA***
  - ***Level 3 PRA***

A10. The terms are defined as follows:

- *Probabilistic Risk Assessment (PRA)* – PRA is a tool used to estimate risk to the public and environment from a nuclear power plant accident by determining what can go wrong, how likely is it, and what are its consequences. Thus, PRA provides insights into the strengths and weaknesses of the design and operation of a nuclear power plant.

  For the type of nuclear plant currently operating in the United States, a PRA can estimate three levels of risk.

  - *Level 1 PRA* – A Level 1 PRA estimates the frequency of accidents that cause damage to the nuclear reactor core. This is commonly called core damage frequency (CDF).

  - *Level 2 PRA* – A Level 2 PRA extends a Level 1 PRA to include estimating the frequency of accidents that release radioactivity from the nuclear power plant.

  - *Level 3 PRA* – A Level 3 PRA extends a Level 2 PRA to include estimating the consequences in terms of injury to the public and damage to the environment.

Q11. Which risk metrics do you plan to compute?

A11. A tentative list of risk metrics that may be provided includes the following:

- Number of early fatalities
- Number of early injuries
- Number of latent cancer fatalities
- Population dose (person-rem) at various locations
- Individual early fatality risk, as defined in the Quantitative Health Objectives (QHOs) [51 FR 30028, “Safety Goals for the Operations of Nuclear Power Plants,” August 21, 1986]
- Individual latent cancer fatality risk, as defined in the QHOs
- Economic costs of mitigation actions
- Affected population
- Contaminated land area
- Core damage frequency
- Large early release frequency

Outcomes

Q12. How might the results of this project be used?

A12. A full-scope site Level 3 probabilistic risk assessment for a nuclear power plant site can provide valuable insights into the relative importance of various risk contributors by assessing accidents involving one or more reactor cores as well as other site radiological sources (i.e., spent fuel in pools and dry storage casks). These insights may be used to further enhance regulatory policy and decision making and to help focus limited agency resources on issues most directly related to the agency's mission to protect public health and safety.

More specifically, potential future uses of the Level 3 PRA project can be categorized as follows (a more detailed list is provided in SECY-12-0123):

- Enhancing the technical basis for the use of risk information (e.g., obtaining updated and enhanced understanding of plant risk)
- Improving the PRA state-of-practice (e.g., demonstrating new methods for site risk assessments)
- Identifying safety and regulatory improvements (e.g. identifying potential safety improvements that may lead to either regulatory improvements or voluntary implementation by licensees)
- Supporting knowledge management (e.g., developing or enhancing in-house PRA technical capabilities)

Schedule

Q13. How long will this project take?

A13. The technical work for the project is anticipated to be completed by Spring 2018.

Q14. What has been accomplished since the project began?

A14. At the outset of the project, a substantial effort was put into establishing the project infrastructure. The infrastructure activities included such things as developing a preliminary project plan; selecting a volunteer site and establishing communication protocols with the volunteer licensee; preparing a Commission paper identifying the potential uses of the project (SECY-12-0123); putting in place contracts with national laboratories and commercial contractors; staffing the project team; developing a technical analysis approach plan, including a quality assurance plan; establishing a technical advisory group; and holding briefings for various internal and external stakeholders.

To date, the following principal technical activities have been completed:

- Development of the reactor, at-power, Level 1, internal event and internal flood PRA, including PWROG-led ASME/ANS PRA Standard-based peer review (July 2014)
- Development of the reactor, at-power, Level 1, high wind and other hazards PRA, including PWROG-led ASME/ANS PRA Standard-based peer review (November 2014)
- Development of the reactor, at-power, Level 2, internal event and internal flood PRA, including PWROG-led ASME/ANS PRA Standard-based peer review (December 2014)
- PWROG-led public workshop on dry cask storage PRA review criteria (January 2015)

- Development of the reactor, at-power, Level 3, internal event and internal flood PRA, including PWROG-led ASME/ANS PRA Standard-based peer review (October 2015)

Q15. What will happen next on the project?

A15. Through calendar year 2016, the following principal technical activities are anticipated to be completed:

- Update of the reactor, at-power, Level 1, Level 2, and Level 3 internal event and internal flood PRAs
- Update of the reactor, at-power, Level 1, high wind and other hazards PRA
- Revision of the reactor, at-power, Level 1, seismic PRA, including PWROG-led ASME/ANS PRA Standard-based peer review
- Revision of the reactor, at-power, Level 1, internal fire PRA
- Development of the dry cask storage, combined Level 1, Level 2, and Level 3 PRA, including PWROG-led peer review against the set of review criteria established during the January 2015 public workshop.

Q16. What are some of the key technical challenges that the project needs to address?

A16. Some of the key technical challenges that the project has encountered already or will need to address in the future include:

- Complications in converting the licensee Level 1 internal events PRA model from industry software to NRC software (SAPHIRE) and in enhancing SAPHIRE to fully integrate the Level 1 and Level 2 PRA models
- Taking “ownership” of the converted model (i.e., understanding and being able to defend, or modifying, the technical details of the licensee’s PRA model)
- Treatment of Level 1 PRA sequences that do not result in core damage at 24 hours after event initiation, but are not stable (i.e., without further intervention, they would result in core damage at some point after 24 hours)
- Determining the appropriate reactor coolant pump seal LOCA model to be applied and how widely to apply it without overly complicating the reactor Level 1 PRA model
- Determining the common cause failure probabilities for large leakage through redundant valves that can result in an interfacing systems LOCA
- Mapping of licensee’s fire PRA model (which includes thousands of fire scenarios) to the Level 3 PRA project fire PRA model
- Incorporating the effect of relay chatter into the seismic PRA
- Human reliability analysis (HRA) for (1) onsite accident management and treatment of offsite resources, (2) area events, (3) low pressure and shutdown (LPSD) operations, and (4) integrated site risk
- The capability of the NRC’s consequence analysis code (MACCS2) to address multisource and longer term releases
- Managing the scope (vis-à-vis available resources) for the (1) reactor LPSD PRA (especially for fire and external hazards), (2) spent fuel pool PRA, and (3) integrated site risk modeling