January 23, 2012

COMPANY: TENNESSEE VALLEY AUTHORITY

SITE: CLINCH RIVER

SUBJECT: SUMMARY OF NOVEMBER 30, 2011, PUBLIC MEETING WITH TENNESSEE VALLEY AUTHORITY REGARDING THE CLINCH RIVER SITE PROJECT REGULATORY FRAMEWORK

On November 30, 2011, staff from the U.S. Nuclear Regulatory Commission (NRC) met with representatives from the Tennessee Valley Authority (TVA) at the Legacy Hotel in Rockville, MD. This was the third in a series of public workshops to discuss the TVA Clinch River Site Project Regulatory Framework development. The meeting agenda and meeting attendees are included in Enclosures 1 and 2. Enclosure 3 includes comments provided by the NRC staff on selected chapters and sections of the TVA Regulatory Framework materials provided for discussion. Please note that these comments are intended to provide the perspective of the staff preparing for a review of a 10 CFR Part 50 construction permit (CP) application; it is not intended to imply Regulatory Requirements or Policy beyond those approved or directed by the Commission. A summary of the meeting is included below.

TVA started the meeting by discussing the objective of the workshop which was to clarify the level of detail to be provided by TVA for the Clinch River CP application. TVA engaged the NRC staff in discussion on the section outline content to develop understanding of proposed Regulatory Framework for the CP application.

During the public meeting the following Preliminary Safety Analysis Report (PSAR) sections were discussed:

- Chapter 4 - Reactor
- Chapter 5 (excluding 5.3) – Reactor Coolant System and Connected Systems
- Chapter 6 – Engineered Safety Features
- Section 9.4 – Air Conditioning, Heating, Cooling and Ventilation System
- Section 9.5.1 – Fire Protection Program
- Chapter 10 – Steam and Power Conversion System
- Chapter 15 – Transient and Accident Analysis
- Chapter 16 – Technical Specifications

For each of the sections and chapters TVA provided the regulatory framework document and the section outline. During the discussion of Chapter 4 and as a response to a staff question Babcock & Wilcox stated that they will be the fuel manufacturer for the mPower reactor.

The NRC staff provided feedback on the regulatory framework document regarding current Regulatory Guides (RG) available, General Design Criteria (GDCs), and cross referencing issues.

TVA provided the following general clarifications:

- There will be a one-to-one match between the Design Specific Review Standard (DSRS) chapters/sections/subsections and the TVA Regulatory Framework. This numbering will ultimately be consistent with the Construction Permit and Operating License applications. Any new sections required for the mPower design will be numbered and named by the NRC staff via the DSRS document.
- After the final TVA Workshop, TVA will update the Regulatory Framework Document to include comments by NRC staff during workshop meetings. This document will then be submitted to the NRC on the docket. TVA will continue to update the framework as needed during future technical discussions with the NRC staff, and as the mPower design develops.
- TVA clarified that the PSAR would follow the "standard plant" design; no site specific Topical Reports will be submitted by TVA.

TVA's slide presentations are available through the Agencywide Documents Access and Management System (ADAMS). The ADAMS Accession Number for the slide presentation is ML11319A059. ADAMS is the system that provides text and image files of NRC's public documents. Documents are available electronically at the NRC's Electronic Reading Room at http://www.nrc.gov/reading-rm/adams.html. If you do not have access to ADAMS or have problems accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) staff at 1-800-397-4209, 301-415-4737, or pdr@nrc.gov.

Please direct any inquiries to Jan Mazza at 301-415-0498, jan.mazza@nrc.gov, or me at 301-415-6091, joelle.starefos@NRC.gov.

Sincerely,

/RA/

Joelle L. Starefos, Senior Project Manager
Advanced Projects Branch
Division of Advanced Reactors and Rulemaking
Office of New Reactors

Docket No.: PROJ0785

Enclosure:
1. Agenda
2. Attendance List
3. NRC Comments

cc w/encl: DC B&W mPower Mailing List

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- After the final TVA Workshop, TVA will update the Regulatory Framework Document to include comments by NRC staff during workshop meetings. This document will then be submitted to the NRC on the docket. TVA will continue to update the framework as needed during future technical discussions with the NRC staff, and as the mPower design develops.
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Please direct any inquiries to Jan Mazza at 301-415-0498, jan.mazza@nrc.gov, or me at 301-415-6091, joelle.starefos@NRC.gov.

Sincerely,

/RA/

Joelle L. Starefos, Senior Project Manager
Advanced Projects Branch
Division of Advanced Reactors and Rulemaking
Office of New Reactors

Docket No.: PROJ0785

Enclosure:
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2. Attendance List
3. NRC Comments

cc w/encl: DC B&W mPower Mailing List

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NAME	JMazza	JStarefos
DATE	1/19/12	1/23/12

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AGENDA

TENNESSEE VALLEY AUTHORITY (TVA) THIRD REGULATORY WORKSHOP

NOVEMBER 30, 2011

Time	Topic		Lead
9:00am - 10:10am	Opening Remarks & Introductions		NRC
	Framework Approach and Process		TVA
	Chapter 4	Reactor	TVA/NRC
	SRP Section 5.1-5.2	Integrity of the Reactor Coolant System Boundary Compliance with the Codes and Code Cases Overpressure Protection Reactor Coolant Pressure Boundary Materials Inservice Inspection and Testing of the Reactor Coolant Pressure Boundary Reactor Coolant Pressure Boundary Leakage Detection	TVA/NRC
10:10am - 10:20am	**Public Comment**		NRC
10:20am - 10:30am	**Break**		All
10:30am -11:45am	SRP Section 5.4	Reactor Coolant Pumps Steam Generator Reactor Coolant System Piping and Valves Main team Line Flow Restrictions Pressurizer Automatic Depressurization System Valves Reactor Coolant Inventory and Purification System (RCIPS) Reactor Water Cleanup System Reactor Coolant System Pressure Relief Devices Reactor Coolant System Component Supports Pressurizer Relief Discharge System Reactor Coolant System High Point Vents Emergency Boration Tank Emergency Condensers	TVA/NRC
	Chapter 15	Transient and Accident Analysis	TVA/NRC
11:45am - 12:00pm	**Public Comment**		NRC
12:00pm - 1:00pm	**Lunch Break**		All
1:00pm - 2:30pm	Chapter 6	Engineered Safety Features	TVA/NRC
	Chapter 16	Technical Specifications	

Enclosure

2:30pm - 2:40pm	**Public Comment**		NRC
2:40pm - 2:50pm	**Break**		All
2:50pm - 4:20pm	Section 9.4	Control Room Area Ventilation System Spent Fuel Pool Area Ventilation System Reactor Service Building HVAC Systems Turbine Area Ventilation System Engineered Safety Feature Ventilation System Containment HVAC System Diesel Generator Room Ventilation Systems Technical Support Center HVAC System	TVA/NRC
	Section 9.5.1	Fire Protection Program	
	Chapter 10	Steam and Power Conversion System	TVA/NRC
4:20pm - 4:30pm	**Public Comment**		NRC
4:30pm	Adjourn		All

ATTENDANCE LIST

TENNESSEE VALLEY AUTHORITY (TVA) MEETING WITH THE U.S. NUCLEAR REGULATORY COMMISSION (NRC)

NOVEMBER 30, 2011

Name	Affiliation
Allen Atwood	Bechtel
Altheia Wyche	Bechtel
Angelo Stubas	NRC
Bob Davis	NRC
Bob Nicholas	Burn & Roe
Bob Schaff	NRC
Bruce McDowell	PNNL
Carl Weber	NRC
Chang-Yang Li	NRC
Chestes Poslusny	B&W NE
Chris Kaplan	Bechtel
Cynthian Lin	DOE
David Nieman	GmP
Dipak J Patel	Bechtel
Edward Burns	Westinghouse
Eileen McKenna	NRC
Frank Helin	GmP
George Thomas	NRC
Greg Cranston	NRC
Hanry Wagage	NRC
Hien Le	NRC
Hulbert Li	NRC
Ian Tseng	NRC
James Gilmer	NRC
Jan A McCombie	Bechtel
Jan Mazza	NRC
Jason Tokey	DOE-NE

Enclosure 2

Jean-Claude Dehmel	NRC
Jessie Muir	NRC
Jim Saldarini	Bechtel
Joe Williams	NRC
Joel Jenkins	NRC
Joelle Starefos	NRC
John Budzynski	NRC
John Gantnier	Bechtel
John Honcharik	NRC
John McKirgan	NRC
John Nicholas	Burn & Roe
John Wu	NRC
Kahtan Jabbour	
Kaihwa Hsu	NRC
Ken Beatty	B&W NE
Maria Szczyglowska	DOE
Mark D. Notich	NRC
Mark Reimnitz	Bechtel
Michelle Hart	NRC
Mike Edwards	B&W NE
Peters Hastings	GmP
Rachel Vaucher	NRC
Raj Goel	NRC
Raw Tammara	NRC
Richard McRally	NRC
Robert Espey	GmP
Russ Bell	NEI
Scott Bussey	NRC/TTC
Shanla Lu	NRC
Steve Love	TVA
Steven Kline	Bechtel
Steven Mirsky	NuScale Power
Steven Pope	B&W NE
Susan Vrahoretis	NRC

Syed I Haider	NRC
Tarico Stubas	NRC
Thomas Kendzia	NRC
Thomas Lotz	B&W NE
Tim Beville	DOE
Tom Bilovski	B&W NE
Tom Spink	TVA
Vince Bilovski	B&W NE
Yanely Malave	NRC

Comments from the U.S. Nuclear Regulatory Commission (NRC) Staff

Section 4.5 - Reactor Materials

1. Consider adding SRP section 5.2.3 to the Related Sections; and RG 1.37 to the Regulatory Basis.

2. With regards to the regulatory guidance for control rod drive mechanism (CRDM) materials consider: AP1000 FSER – NUREG 1793 Supplement 2- 5.4.1.3 Heat Exchanger Design - OI 5.4.1.

3. Consider EPRI Report “Degradation and Void Swelling” in industry guidance.

Section 5.2.1- Compliance with Codes and Code Cases

1. Consider ASME section XI and O&M code with regards to Industry Guidance.

2. Consider code cases 1.84 Section III, 1.147 Section XI, and 1.192 O&M Industry Guidance.

Section 5.2.3 - Reactor Coolant Pressure Boundary Materials

1. Consider 5.3.1 “RPV Material” as an additional related section.

Section 5.2.5 - Reactor Coolant Pressure Bound Leakage Detection

1. Consider the following with regards to NRC and industry guidance: RIS 2009-02 Rev.1, IN 2005-24, and TSTF-513, Rev. 1, for PWRs.

2. Consider the following with regards to related SRP sections: 9.3.2, 14.2 initial test program (ITP) test acceptance criteria for radiation monitoring system (RMS), and 11.5 on dedicated RMS used to detect Tech. Spec. limit of 1 gpm leakage rate.

3. With respect to RMS detection sensitivity, the P/FSAR should provide sufficient information for the staff to conduct an independent evaluation of the type of RMS selected and underlying assumptions. The information can either be presented in P/FSAR Section 5.2.5 or 11.5, with appropriate cross-referencing.

4. While the PSAR implies that some design features and operating characteristics of the radiation monitoring and sampling system cannot be defined at this stage, there is a need to alert the applicant of important considerations in differentiating the development of supporting information between a Part 50 applicant and the Part 52 design certification process. As a result, the applicant is urged to identify such information early to provide plant-specific information describing how the installation and implementation of operating procedures for this system will address compliance with the RCPB operational TS leakage rate of one gpm.

In confirming that the selected monitoring method, instrumentation, and sampling system can detect and operate over the stated design certification dynamic range, the applicant should consider:

a. radiation detection method and detection efficiencies for radionuclide distributions, as stated in the design certification or alternate set of surrogate radionuclides,
b. the representativeness of the chosen sampling or monitoring location (ambient containment, ventilation ductwork, or process stream),
c. consider expected particle size distributions and determine the need for isokinetic sampling when extracting aerosol samples from ductwork,
d. design features that minimize sample line losses and correction for line losses from the sampling location to the point of collection and measurement,
e. type of filter media and collection or retention efficiency for expected radionuclide physical and chemical properties,
f. considerations in selecting fixed or moving filter system and associated sampling flow rates, including detector to filter media geometry dependencies, fixed particulate filter replacement frequency, and equilibrium conditions of moving particulate filter system in detecting airborne radioactivity corresponding to the RCS operational TS leakage rate.
g. placement of radiation monitoring instrumentation in plant areas that minimize interferences from ambient external radiation levels.

Section 5.4.2 - Steam Generators

1. The Technical Specification references for Steam Generators do not appear to be consistent with the references in Chapter 16.

2. Consider adding GDC 32 to this section.

3. BTP-5.3 is related to the reactor vessel. Consider removing this reference.

4. Consider addressing design specificities of the mPower steam generator design vs. the design of current operating reactors (e.g., vibrations due to the presence of reactor coolant pumps on the top of the tube bundle or the presence of the riser inside the tube bundle, etc.). The text of section 5.4.2 is unclear on this topic.

5. Consider adding information on steam generator tube supports in this section (tube support plates etc.)

Section 5.4.7 – Reactor Coolant Inventory and Purification System (RCIPS)

1. This section is currently the Residual Heat Removal (RHR) System in NUREG-0800. NRC staff has included RCIPS in the renamed Section 9.3.4 of the mPower DSRS. TVA should consider changing this section to match the DSRS.

Sections - 5.4.13 and 5.4.14

1. Section 5.4.13 has been renamed from the current SRP and 5.4.14 is a new section designated by TVA. TVA should stay up to date with the mPower DSRS structure as the NRC staff issues sections for public comment.

Chapter 6.2 – Containment Systems

1. Consider the following with regards to related SRP sections: 9.3.2, 14.2 (ITP test acceptance criteria for RMS), and 11.5 on dedicated RMS used to monitor radioactivity levels and inclusion of automatic control features.

2. Consider including RG 1.26 in the current listing of regulatory guidance.

3. The staff proposed that GL 2004-02 related to GSI 191 should be considered in the list of guidance documents.

4. With respect to the design and operation of the system, consideration should be given to 10 CFR Part 20.1406 and relevant NRC and industry guidance, including RG 4.21, ISG-06, NEI 08-08A, and ANS N42.18-2004.

5. The PSAR outline for ultimate heat sink (UHS) system includes a "description and preliminary design basis of the UHS system, including provisions for maintaining adequate cooling water inventory at an acceptable temperature for 7 days without makeup." The staff communicated its need for information on how the UHS system would cool the containment in the long-term beyond 7 days, what additional systems will be used, and whether they are characterized as regulatory treatment of non-safety systems, in order to make its safety determination.

6. The PSAR outline for the UHS system includes a "proposed approach to demonstrate how the system will function as the emergency core cooling system (ECCS) heat sink during design basis events." The NRC staff communicated that this UHS is a system that it had not reviewed before and asked for clarification whether TVA was planning to provide a test plan or test results in the PSAR. The staff expectation is for the PSAR to include "Descriptions of the experience, tests at simulated accident conditions, or conservative extrapolations from existing knowledge that supports the concept selection upon which the operation of the feature is based" (Regulatory Guide 1.70).

7. The PSAR Section 6.2 includes the description and preliminary design basis of the UHS system, including provisions for maintaining adequate cooling water inventory at an acceptable temperature for 7 days without makeup. The staff raised the concern that SRP Section 9.2.5 additionally requires that UHS should be able to dissipate the maximum possible heat load for a minimum of 30 days without makeup, unless acceptable makeup capabilities can be demonstrated, and asked how TVA planned to follow the guidance while making a commitment for "7 days without makeup" in PSAR Section 6.2.

8. The staff communicated that the topics discussed under the UHS system should include discussions on gas accumulation in ECCS condenser and hydrogen and oxygen accumulation in ECCS condenser in the PSAR because these topics were not included in the PSAR Section 6.2 outline.

Section 6.4 - Habitability Systems

1. PSAR Section 6.4 outline states that design features will be provided to demonstrate the control room envelope habitability during the design basis accidents in the mPower design control document (DCD). The DCD outline includes maintaining the control room space temperature at a comfortable level by designing the control room envelope area walls, floor, and ceiling to act as passive heat sinks when active cooling is unavailable. The staff pointed out that a commitment for the control room temperature and humidity control was not explicitly made in PSAR Section 6.4 outline.

2. The staff asked how TVA planned to meet Part 50, Appendix A, GDC 19 requirements and SRP Section 6.4 and Section 9.4 guidance on control room habitability against a toxic gas release nearby or the carbon dioxide build-up inside the control room, during the design basis accident.

3. The staff communicated that SRP Section 6.4 expects self-contained breathing apparatus to be made available for at least five control room operators. The staff asked for the number of control room operators that TVA was planning to include in the application.

Section 9.4 - HVAC and Building Ventilation Exhaust Systems

1. For plant areas characterized as radiologically controlled, the following NRC regulations should be considered: Part 20.1101(b) and Part 20.1406; and provisions of Part 50, App. I, Section II.D in supporting system design basis and descriptions presented in P/FSAR Sections 11.2 to 11.4.

2. Given the relative location of the Turbine Building (TB) from the Reactor Building and Reactor Service Building complex, consider expanding the description of the TB ventilation exhaust systems servicing radiologically controlled areas since the exhaust system for the TB is not expected to be connected to that of the Reactor Service Building. The P/FSAR should also discuss and describe the approach used in controlling and monitoring gaseous effluents when multiple units are planned. Would each TB have totally separated and independently operated and monitored building and process vents?

3. If the TB is to be equipped with its own ventilation system and stack/vent, the associated regulatory requirements should be considered: Part 20.1101(b), 20.1301, 20.1301(e), 20.1302, and 20.1406; Part 20, App. B, Table 2, Col. 1 ECLs and unity rule; GDC 60 and

64; 50.34(f)(2) TMI requirements; Part 50.34a and 50.36a; provisions of Part 50, App. I, Sections II.B and II.C on design objectives; and Part 50, App. I, Section II.D ALARA provisions in supporting system design basis and descriptions presented in P/FSAR Sections 11.3 and 11.5.

4. With respect to monitoring airborne radioactive releases from the TB, regulatory requirements should consider GL 89-01 and NUREG-1301 on RAD effluent tech specs and Offsite Dose Calculation Manual (ODCM) in support of the proposed approach described in P/FSAR Section 11.5.

5. For plant areas characterized as radiologically controlled, consider adding the following SRP sections: 9.3.2, 14.2 (ITP test acceptance criteria for associated RMS), 11.4, and 11.5 for dedicated RMS used to divert process flows to HEPA/Charcoal filtration units or terminate effluent releases. With respect to the ITP, the test abstracts should describe or list test acceptance criteria, or refer to other P/FSAR sections where supporting information is presented, such as in FSAR Sections 9.3.2 and 11.5.

6. Consider the following to the NRC and industry guidance: RG 4.21, ISG-06, NEI 08-08A, ANS N42.18-2004, ANSI/HPS 13.1-1999, and ANSI/ANS 55.4-1993 (R2007).

7. Consider expanding the description of the Reactor Service Building ventilation exhaust systems servicing radiologically controlled systems (such as collection of gases from tanks, power cycle waste offgas, and vessels and process radwaste processing equipment) and connection into the exhaust system and stack.

8. For the Diesel generator room ventilation system, confirm whether SRP Section 11.3 is relevant to its design.

Section 9.5.1 - Fire Protection Program

1. In recognition of the guidance presented in RG 1.189, the discussion should acknowledge the requirements of Part 20.1101(b), 20.1301 and 20.1302; and Part 20, App. B, Table 2, Col. 1 ECLs and unity rule in the fire hazards analysis addressing combustible radioactive materials. Such materials include compactable dry active wastes, solid wastes, spent resins, spent HEPA and charcoal filters, and bulk spent charcoals.

2. The fire hazards analysis should identify such potential combustible materials, their locations in the plant, potential source terms, and describe the methodology used in demonstrating compliance with NRC guidance and RG 1.189 acceptance criteria. The supporting information on waste volume and radioactivity inventories should be included in P/FSAR Section 11.4. The P/FSAR should provide sufficient information for the staff to conduct an independent evaluation of analytical methods, assumptions, and results and conclusions presented in the fire hazards analysis.

Section 10.2 - Turbine Generator

1. RG 1.115 applies to section 10.2 not section 10.3 as noted in the framework document.

2. According to B&W TR-08-00000341 B&W Reactor Design Overview, the turbine will operate at 3600 rpm. RG1.115 requires that any deviation from 1800 rpm must be described in more detail.

Section 10.3 - Main Steam Supply System

1. Consider 10CFR 20.1406 for water hammer.

Section 10.4 – Auxiliary Steam Systems

1. For the main condenser evacuation system, turbine gland sealing system, condensate cleanup system, and steam generator blowdown system characterized as radiologically controlled, the following SRP sections: 9.3.2, 14.2 (ITP test acceptance criteria for associated RMS), 11.4 for the management of contaminated spent resins, and 11.5 for dedicated RMS used to divert process flows or terminate effluent releases.

2. With respect to the ITP, the test abstracts should describe or list test acceptance criteria, or refer to other P/FSAR sections where supporting information is presented, such as in FSAR Sections 9.3.2 and 11.5.

3. Given the relative location of the Turbine Building from the Reactor Service Building, there is a need to expand the description of auxiliary steam subsystems whenever not connected to the liquid waste management system (LWMS) and solid waste management system (SWMS) located in the Reactor Service Building. If the TB is to be equipped with its own equipment and floor drainage systems, the following regulatory requirements should be considered and included in supporting the design basis of auxiliary steam subsystems located in the TB: Part 20.1101(b), 20.1301, 20.1301(e), 20.1302, and 20.1406; Part 20, App. B, Table 2, Col. 1 ECLs and unity rule; GDC 60 and 64; 50.34(f)(2) TMI requirements; Part 50.34a and 50.36a; provisions of Part 50, App. I, Sections II.B and II.C on design objectives; and Part 50, App. I, Section II.D ALARA provisions in supporting system design basis and descriptions presented in P/FSAR Sections 11.2 and 11.5. Relevant NRC and industry guidance include RG 8.8, 8.10, 4.21, ISG-06, NEI 08-08A, and ANS N42.18-2004.

4. With respect to monitoring liquid radioactive releases from the TB, regulatory requirements section should consider GL 89-01 and NUREG-1301 on rad effluent tech specs and ODCM in support of the proposed approach described in P/FSAR Section 11.5.

Section 10.4.5 – Circulating Water System

1. Consider including site specific evaluation of flooding for the circulating water system. For example could a circulating water pipe break at the cooling tower cause blowback to the plant?

2. Consider evaluating how site flooding could affect outdoor tanks (floating).

Section 15.7 - Radioactive Releases from Subsystems or Components

1. Regarding the evaluation of radioactive releases noted in P/FSAR Sections 15.7.1, 15.7.2, and 15.7.3, the presentation of these analyses, depending on the consequences, should be relocated in P/SFAR Section 11 given the restructuring of SRP Sections 11.2 and 11.3 and RG 1.206. The evaluation of Section 15.7.1 should be presented in Section 11.3 – see BTP 11-5. The evaluation of Sections 15.7.2 and 15.7.3 should be presented in Section 11.2 (see BTP 11-6 and ISG-013, 2012 revision) with supporting information drawn from Section 2.4.13.

Section 16.1 – Technical Specifications

1. In the PSAR listing of bullets, consider adding to the last one: GL 89-01 on the relocation of elements of RAD effluent technical specifications (TS) and include references to associated NEI templates for operational programs, and NEI 07-09A for the ODCM and NEI 07-10A for the PCP.

2. The outline states that "PSAR Section 16.1 provides the preliminary technical specifications and associated TS Bases consistent with the format and content of NUREG-1430, "Standard Technical Specifications Babcock and Wilcox Plants," and applicable approved changes provided in Technical Specifications Task Force (TSTF) Travelers." Noting that NUREG-1430 and approved changes provided in TSTF Travelers may not include UHS system, the staff asked TVA to include UHS system in the preliminary TS.

cc:

Mr. Lionel Batty
Nuclear Business Team
Graftech
12300 Snow Road
Parma, OH 44130

Russell Bell
Nuclear Energy Institute
1776 I Street, NW
Suite 400
Washington, DC 20006-3708

Mr. Ian M. Grant
Canadian Nuclear Safety Commission
280 Slater Street, Station B
P.O. Box 1046
Ottawa, Ontario
K1P 5S9

Mr. Eugene S. Grecheck
Vice President
Nuclear Support Services
Dominion Energy, Inc.
5000 Dominion Blvd.
Glen Allen, VA 23060

Michael L. Hammond
Technological Hazards Program Office
Radiological Emergency Preparedness
Program, Region X
U.S. Department of Homeland Security
130 228th Street, SW
Bothell, WA 98021

Mr. Brendan Hoffman
Research Associate on Nuclear Energy
Public Citizens Critical Mass Energy and
Environmental Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

Mr. Dobie McArthur
Director, Washington Operations
General Atomics
1899 Pennsylvania Avenue, NW
Suite 300
Washington, DC 20006

Mr. David Repka
Winston & Strawn LLP
1700 K. Street, NW
Washington, DC 20006-3817

Carlos Sisco
Senior Paralegal
Winston & Strawn LLP
1700 K Street NW
Washington, DC 20006

Mr. Robert E. Sweeney
IBEX ESI
4641 Montgomery Avenue
Suite 350
Bethesda, MD 20814

Email

Alan.Levin@areva.com (Alan Levin)
APH@NEI.org (Adrian Heymer)
asi@ornl.gov (Anita Benn)
awc@nei.org (Anne Cottingham)
badwan@lanl.gov (Faris Badwan)
bevans@enercon.com (Bob Evans)
BrinkmCB@westinghouse.com (Charles Brinkman)
cee@nei.org
charles.bagnal@ge.com (Charles Bagnal)
collinlj@westinghouse.com (Leslie Collins)
curtisslaw@gmail.com (Jim Curtiss)
david.hinds@ge.com (David Hinds)
david.lewis@pillsburylaw.com (David Lewis)
deborah@hyperionpowergeneration.com (Deborah Ann Blackwell)
don.tormey@iub.iowa.gov
dsafer@comcast.net (Don Safer)
duane.fournier@iub.iowa.gov
ed.burns@earthlink.net (Ed Burns)
elyman@ucsusa.org (Ed Lyman)
erg-xl@cox.net (Eddie R. Grant)
ewallace@nuscalepower.com (Ed Wallace)
F.Shahrokhi@AREVA.Com (Farshid Shahrokhi)
flowerspa@ornl.gov (Paula Flowers)
frank.bodine@oca.iowa.gov (Frank Bodine)
gcesare@enercon.com (Guy Cesare)
gmorg50@hotmail.com (Garry Morgan)
jahalfinger@babcock.com (Jeff Halfinger)
james.beard@gene.ge.com (James Beard)
jason.parker@pillsburylaw.com (Jason Parker)
jason.tokey@nuclear.energy.gov (Jason Tokey)
jcsaldar@bechtel.com (James Saldarini)
jerald.head@ge.com (Jerald G. Head)
Jim.Kinsey@inl.gov (James Kinsey)
jim.riccio@wdc.greenpeace.org (James Riccio)
jim.sundermeyer@iub.iowa.gov
JNR@NuScalePower.com (Jose N. Reyes)
kerri.johannsen@iub.iowa.gov
klingcl@westinghouse.com (Charles King)
kouhestani@msn.com (Amir Kouhestani)
KSutton@morganlewis.com (Kathryn M. Sutton)
Kwelter@NuScalePower.com (Kent Welter)
larry.shi@oca.iowa.gov (Larry Shi)
larry.stevens@iub.iowa.gov
lchandler@morganlewis.com (Lawrence J. Chandler)

lgorenflo@gmail.com (L. Gorenflo)
libby.jacobs@iub.iowa.gov
mack.thompson@iub.iowa.gov
maria.webb@pillsburylaw.com (Maria Webb)
mark.a.giles@dom.com (Mark Giles)
mark.beaumont@wsms.com (Mark Beaumont)
mark.holbrook@inl.gov (Mark Holbrook)
mark@npva.net
matias.travieso-diaz@pillsburylaw.com (Matias Travieso-Diaz)
murawski@newsobserver.com (John Murawski)
parveen.baig@iub.iowa.gov
patriciaL.campbell@ge.com (Patricia L. Campbell)
Paul@beyondnuclear.org (Paul Gunter)
PLorenzini@NuScalePower.com (Paul Lorenzini)
poorewpiiI@ornl.gov (Willis P. Poore III)
rbarrett@astminc.com (Richard Barrett)
rereimels@babcock.com (R.E. Reimels)
rnicholas@ge.com (Robert Nicholas)
ronald.polle@oca.iowa.gov
RSnuggerud@NuScalePower.com (Ross Snuggerud)
sandra.sloan@areva.com (Sandra Sloan)
sfrantz@morganlewis.com (Stephen P. Frantz)
shobbs@enercon.com (Sam Hobbs)
spellmandj@ornl.gov (Donald J. Spellman)
stan.wolf@iub.iowa.gov
stephan.moen@ge.com (Stephan Moen)
steven.hucik@ge.com (Steven Hucik)
steven.m.mirsky@saic.com (Steve Mirsky)
Tansel.Selekler@nuclear.energy.gov (Tansel Selekler)
tfeigenb@bechtel.com (Ted Feigenbaum)
tgado@roe.com (Burns & Roe)
timothy.beville@nuclear.energy.gov (Timothy Beville)
TJKim@babcock.com (T.J. Kim)
tom.miller@hq.doe.gov (Tom Miller)
tom.miller@nuclear.energy.gov (Thomas P. Miller)
TomClements329@cs.com (Tom Clements)
tommy_pe2001@yahoo.com (Tommy Le)
trsmith@winston.com (Tyson Smith)
Vanessa.quinn@dhs.gov (Vanessa Quinn)
whorin@winston.com (W. Horin)