

January 31, 2011

Mr. Jack A. Bailey, Vice President  
Nuclear Generation Development  
and Construction  
Tennessee Valley Authority  
1101 Market Street, LP 5A  
Chattanooga, TN 37402-2801

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION STAFF RESPONSE TO THE TENNESSEE VALLEY AUTHORITY KEY ASSUMPTIONS LETTERS, DATED NOVEMBER 5, 2010, AND DECEMBER 22, 2010, FOR THE POSSIBLE LICENSING AND CONSTRUCTION OF SMALL MODULAR REACTOR MODULES AT THE CLINCH RIVER SITE

Dear Mr. Bailey,

This letter is in response to the Tennessee Valley Authority (TVA's) letters dated November 5, 2010, and December 22, 2010, on TVA's key licensing assumptions to support the licensing and construction of mPower™ small modular reactor (SMR) modules at the Clinch River site in Roane County, TN, under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities" (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML103120558 and ML103630573). The U.S. Nuclear Regulatory Commission (NRC) staff considered TVA's six key assumptions and provided questions to TVA in a letter dated December 1, 2010 (ADAMS Accession No. ML103340034). Additionally, on December 14, 2010, the NRC staff and representatives from TVA, Babcock & Wilcox, and Bechtel met to discuss the TVA proposal and NRC questions in more detail (ADAMS Accession Nos. ML103360316 and ML110140436).

The staff has considered the information presented by TVA and has developed the following responses to each key licensing assumption.

TVA Assumption 1: *Use of the 10 CFR Part 50 licensing process.*

Consistent with Title 10 of the Code of Federal Regulations, there is no prohibition against the use of Part 50 for the licensing of a new nuclear facility. TVA stated in its December 22, 2010, letter that TVA is currently assessing the feasibility of licensing up to six modules to be deployed at the Clinch River site. Depending on the outcome of TVA's assessment, TVA would submit a Part 50 construction permit application for an initial group of modules, but for future additional deployments of modules at the Clinch River site or other sites, TVA would use Part 52. To maintain standardization of all modules at the Clinch River site, whether licensed under Part 50 or Part 52, NRC would expect that the licensing and design basis for a module would be the same, regardless of the process under which it was licensed.

TVA Assumption 2: *TVA would develop a preliminary safety analysis report using Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," Revision 3, issued November 1978, and would include an evaluation of the facility against the Standard Review Plan (SRP) revision in effect 6 months before it applies for the construction permits (CPs). The application would include an environmental report that addresses the environmental SRP guidance in NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan," issued March 2000.*

As described in your letter dated December 22, 2010, the level of detail that TVA provides during the CP review will be consistent with the standard content guidance defined in Regulatory Guide 1.70. TVA will use its regulatory framework process to identify and resolve gaps that exist between regulatory guidance, associated with 10 CFR Part 50 licensing of a new nuclear facility, and the regulatory requirements found in Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." As applicable, TVA must provide specific content in its construction permit application under Part 50 which addresses the requirements in 10 CFR Part 52 to support this licensing proposal.

In its December 22, 2010, letter, TVA also stated, "For the first-of-class deployment at the Clinch River site, TVA would provide the methodology and criteria for developing the severe accident management design alternatives (SAMDA) during the construction permit phase of the project and provide the detailed description and analysis for the mitigation and prevention approaches during the operating license/design certification application phase of the project. The development of a probabilistic risk assessment (PRA) would also occur during the operating license/design certification application phase of the project." The staff finds TVA's proposal for the timing of the SAMDA submittal to be acceptable. Although the NRC does not require the licensee to submit a PRA with a CP application, the staff finds that early and frequent interactions on the design-specific PRA have been beneficial in the staff's review of combined license (COL) applications.

TVA Assumption 3: *The utilization of a "One Design – One Review" NRC license review process.*

The staff supports TVA's "One Design – One Review" proposal. However, for the proposal to work, the design certification (DC) application must be complete and contain the level of detail the staff needs to accept the application and establish a schedule. In addition, to support CP issuance and the staff's acceptance review of the operating license final safety analysis report, the DC must not contain conflicting information. The NRC also expects the DC application to bound all site-specific considerations for the CP at the Clinch River site. Introducing changes to the Clinch River site-specific design-basis information that affect the DC application may cause uncertainties in the review timeline. In addition, if changes are not managed appropriately, the review will require more resources and the review schedule may become more uncertain and less efficient.

TVA Assumption 4: *The license applications under 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material"; 10 CFR Part 40, "Domestic Licensing of Source Material"; 10 CFR Part 50; and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," would be combined.*

The staff notes that TVA withdrew this fourth key assumption in a letter dated December 22, 2010.

TVA Assumption 5: *The NRC would inspect Generation mPower as a vendor (major portions of the plant to be fabricated in controlled manufacturing environments).*

As the CP and operating license applicant, TVA is responsible for the quality of the construction and fabrication of a facility built on or for the Clinch River site including the oversight of vendors. The NRC would perform independent inspections of construction activities, including inspections of TVA's oversight of vendor activities and direct inspection of selected vendor activities. In light of the currently proposed methods of manufacture and construction of mPower™ SMR modules at the Clinch River site, the staff recognizes that the NRC programs and implementing procedures would need to be reevaluated and enhanced to provide effective oversight of the assembled components and systems, prior to final installation at a construction site. In addition, due to the increase in activities that is expected to be performed at the vendor site, the number and comprehensiveness of the staff's inspections would need to be reassessed. Envisioned enhancements include the identification of key program areas and components for inspection, in a manner similar to that provided currently by inspections, tests, analyses, and acceptance criteria (ITAAC) and the recently developed new reactor construction inspection program.

TVA Assumption 6: *The scope of the inspection and enforcement program along with the initial test program will inform and demonstrate successful execution of future ITAAC that may be specified in the DC or COL applications.*

The December 14, 2010, presentation noted that TVA will perform all required testing and inspections using 10 CFR Part 50 processes such as that described in Regulatory Guide 1.68, "Initial Test Programs for Water-Cooled Nuclear Power Plants," and that it would not develop or use ITAAC for the modules constructed under the 10 CFR Part 50 licensing process. However, as described in its December 22, 2010, letter, TVA will provide a method of informing the ITAAC that would be developed as a part of the DC application. The NRC would review the proposed ITAAC for acceptability as part of the DC application and future COL applications.

J. Bailey

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If you have any questions, please contact Joelle Starefos by telephone at (301) 415-6091, or by email at [joelle.starefos@nrc.gov](mailto:joelle.starefos@nrc.gov).

Sincerely,

*/RA/*

Michael R. Johnson, Director  
Office of New Reactors

Project Nos.: PROJ0785 and PROJ0776

cc: Design Certification Babcock & Wilcox mPower Mailing List

J. Bailey

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**ADAMS Accession No.: ML110120676**

**\*via e-mail**

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OFFICE	PM:NRO/ARP/ARB2	BC:NRO/ARP/ARB2	D:NRR/DORL*
NAME	JStarefos /dlj	SMagruder	JGiitter (AHowe for)
DATE	1/18/11	1/18/11	1/21/11
OFFICE	DD:NRO/DCIP	RII/DRAC*	D:OGC/NLO*
NAME	JTappert	CCasto	MZobler
DATE	1/19/11	1/19/11	1/19/11
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NAME	KAzariah-Kribbs	MMayfield	MJohnson
DATE	1/20/11	1/21/11	1/31/11

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DC B&W mPower  
cc:

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

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

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

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

Anne W. Cottingham  
Assistant General Counsel  
Nuclear Energy Institute  
1776 I Street, NW, Suite 400  
Washington, DC 20006

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

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

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

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

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

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

DC B&W mPower

Email

Alan.Levin@areva.com (Alan Levin)  
APH@NEI.org (Adrian Heymer)  
asi@ornl.gov (Anita Benn)  
badwan@lanl.gov (Faris Badwan)  
bevans@enercon.com (Bob Evans)  
BrinkmCB@westinghouse.com (Charles Brinkman)  
cee@nei.org  
charles.bagnal@ge.com  
chris.maslak@ge.com (Chris Maslak)  
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)  
ed.burns@earthlink.net (Ed Burns)  
elyman@ucsusa.org  
erg-xl@cox.net (Eddie R. Grant)  
ewallace@nuscalepower.com (Ed Wallace)  
F.Shahrokhi@AREVA.Com (Farshid Shahrokhi)  
flowerspa@ornl.gov (Paula Flowers)  
gcesare@enercon.com (Guy Cesare)  
jahalfinger@babcock.com (Jeff Halfinger)  
james.beard@gene.ge.com (James Beard)  
jcsaldar@bechtel.com (James Saldarini)  
jerald.head@ge.com (Jerald G. Head)  
jgutierrez@morganlewis.com (Jay M. Gutierrez)  
Jim.Kinsey@inl.gov (James Kinsey)  
jim.riccio@wdc.greenpeace.org (James Riccio)  
JNR@NuScalePower.com (Jose N. Reyes)  
klingscl@westinghouse.com (Charles King)  
kouhestani@msn.com (Amir Kouhestani)  
KSutton@morganlewis.com (Kathryn M. Sutton)  
Kwelter@NuScalePower.com (Kent Welter)  
lchandler@morganlewis.com (Lawrence J. Chandler)  
maria.webb@pillsburylaw.com (Maria Webb)  
mark.beaumont@wsms.com (Mark Beaumont)  
mark.holbrook@inl.gov (Mark Holbrook)  
mark@npva.net  
matias.travieso-diaz@pillsburylaw.com (Matias Travieso-Diaz)  
mgiles@entergy.com (M. Giles)  
murawski@newsobserver.com (John Murawski)  
mwetterhahn@winston.com (M. Wetterhahn)  
patriciaL.campbell@ge.com (Patricia L. Campbell)  
Paul@beyondnuclear.org (Paul Gunter)

DC B&W mPower

PLorenzini@NuScalePower.com (Paul Lorenzini)  
pshastings@duke-energy.com (Peter Hastings)  
rbarrett@astminc.com (Richard Barrett)  
rereimels@babcock.com (R.E. Reimels)  
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)  
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 Selekle)  
tfeigenb@bechtel.com (Ted Feigenbaum)  
tgado@roe.com (Burns & Roe)  
TJKim@babcock.com (T.J. Kim)  
tom.miller@hq.doe.gov (Tom Miller)  
tom.miller@nuclear.energy.gov (Thomas P. Miller)  
trsmith@winston.com (Tyson Smith)  
Vanessa.quinn@dhs.gov (Vanessa Quinn)  
whorin@winston.com (W. Horin)