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U.S. Nuclear Regulatory Commission
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Babcock & Wilcox Nuclear Energy, Inc.
Docket Number-PROJ0776
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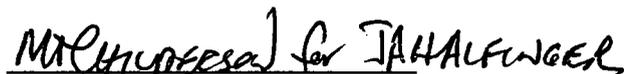
Subject: Response to NRC Regulatory Issue Summary (RIS) 2011-02, "Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs," dated February 2, 2011

Attached please find Babcock & Wilcox Nuclear Energy, Inc. (B&W NE) response to the subject NRC RIS, dated February 2, 2011. This response updates information previously provided to the NRC on April 1, 2010, in our response to RIS 2010-03.

BW NE continues to advance the B&W mPower™ Reactor design with Bechtel Power Corporation's support under the recently formed Generation mPower, LLC, a joint venture between two organizations. Based on our current project schedule, we intend to submit a Design Certification Application (DCA) for the B&W mPower™ Reactor design in 4th quarter of calendar year 2013.

Generation mPower is also supporting the Tennessee Valley Authority's (TVA's) plans to submit a Construction Permit Application (CPA) in the fourth quarter of FY2012 for up to six mPower Reactor modules at the Clinch River site in Roane County, Tennessee, as described in TVA's letter to the NRC dated November 5, 2010, and an addendum dated December 22, 2010.

Questions concerning this submittal may be directed to Jeff Halfinger at 434-316-7507 (email: jahalfinger@babcock.com) or T. J. Kim at 434-382-9791 (email: tjkim@babcock.com).



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JAH/jlr

Attachments: 1: B&W NE Response to NRC RIS 2011-2
2: List of Planned Technical and Topical Report Submittals

cc: Joelle L. Starefos, NRC, TWFN 9-F-27
Stewart L. Magruder, Jr., NRC, TWFN 9-F-27



Attachment 1

B&W NE RESPONSE TO NRC RIS 2011-02

- **When (month and year) are applications planned for design-related applications and what NRC action will be requested (i.e., DC, DA, ML, or COL that does not reference a DC or DA)?**

B&W NE intends to submit a Design Certification Application (DCA) for the mPower™ Reactor design. Our current schedule, which includes support to the TVA Clinch River Construction Permit Application (CPA) submittal under 10 CFR Part 50, reflects our revised plan to submit a DCA to the NRC in the fourth quarter of calendar year (CY) 2013.

- **Will the applicants be organized into DCWGs? If known, what is the membership of the DCWG and which party is the primary point-of-contact designated for each DCWG? Have protocols been developed to provide coordinated responses for RAIs with generic applicability to a design center?**

A formal Design Centered Working Group (DCWG) has not yet been established. However, TVA's CPA is expected to be the lead licensing application for the standard Generation mPower design. TVA and Generation mPower are working to integrate the CPA, DCA and Operating License Application (OLA) activities. Protocols are being developed to ensure that coordinated responses are provided for RAIs with generic applicability to the design center and to maintain configuration management among the applications. Both TVA and Generation mPower believe that this approach is consistent with the intent of the DCWG process, with TVA being the lead applicant. As additional customers are identified, DCWG membership will expand.

A number of electric utility companies have expressed interest in the mPower Reactor design and the design certification process. They have been continuing to participate with B&W NE in the review of the design development via an Industry Advisory Council. Also, certain utilities, including the TVA, First Energy Corporation, and 12 regional generation and transmission companies, represented by the Oglethorpe Power Corporation, have entered into an agreement to form a consortium with B&W NE to support the design certification effort. Within the framework of both the Consortium and the Industry Advisory Council, we have formed several working groups to provide a mechanism to solicit and incorporate the "end user's perspective" during the design phase of the mPower Reactor development program. We anticipate that members of the above groups and other utilities could evolve into a mPower Reactor DCWG at some point in the future.

- **Which applicant that references the design will be designated as the reference COL applicant or, alternatively, how will various applications (e.g., CP, DC, COL) be coordinated to achieve the desired design-centered licensing review approach? When (month and year) will CP, COL, or ESP applications be submitted for review? In addition, what are the design, site location, and number of units at each site?**

TVA has communicated to the NRC that it plans, as the lead applicant for the mPower Reactor design, to submit a CPA in the fourth quarter of FY 2012 for up to six mPower modules at the Clinch River site in Roane County, Tennessee. Further, TVA has stated that it is committed to standardization and expects that a future Operating Licensing stage Final Safety Analysis Report could serve as a template for a reference COL applicant in the future. B&W NE also shares that commitment to standardization for future applications referencing the mPower design under 10 CFR Part 52.

- **Are vendors or consultants assisting in the preparation of the application(s)? If so, please describe roles and responsibilities for the design and licensing activities.**

The following companies are supporting the design and licensing activities associated with the development of an mPower Reactor DCA:

Bechtel Power Corporation-Balance of Plant Design in accordance with the Generation mPower alliance. (Note that Bechtel is also supporting the TVA CPA effort.);

Northrop Grumman-Instrumentation & Control design integration, software quality assurance;

Stern Laboratories, Inc- Critical Heat Flux Testing.

- **What is the current status of the development of the plant design (i.e., conceptual, preliminary, or finalizing)? Has the applicant established a schedule for completing the design? If so, please describe the schedule.**

The conceptual design for the B&W mPower design is complete. Preliminary design development is continuing in parallel with development of the DCA and appropriate design information will be developed as requested to support a potential TVA application for a Construction Permit at the Clinch River site.

- **What is the applicant's current status (i.e., planning, in progress, or complete) for the qualification of fuel and other major systems and components? Has the applicant established a schedule for completing the qualification testing? If so, please describe the schedule.**

A number of test programs are planned to support the design certification process. Some of the test programs will begin in 2011, and are being described in technical report or topical report submittals. In addition, testing programs have been discussed in detail in meetings with NRC staff. Additional qualification test program information and schedules will be shared with NRC staff in future meetings and in separate communications. The following are the planned testing programs to support the DCA:

Control Rod Drive Mechanism Testing;
Critical Heat Flux Correlation Testing;
Fuel Mechanical Design Separate Effects Testing;
Integrated CRDM/Fuel Testing;
Scaled Integrated Systems Testing;
Reactor Coolant Pump Testing;
Emergency Condenser Testing.

- **What is the applicant's status (i.e., planning, in progress, or complete) in developing computer codes and models to perform design and licensing analyses? Has the applicant defined principal design criteria, licensing-basis events, and other fundamental design/licensing relationships? Has the applicant established a schedule for completing the design and licensing analyses? If so, please describe the schedule.**

B&W NE will utilize computer codes such as CASMO/Simulate for the reactor and fuel analyses. In addition, industry standard computer codes such as GOthic, RELAP, and TRACE will be used, as appropriate. Principal design criteria, licensing basis events, and (as appropriate) other fundamental design/licensing relationships will be identified during the ongoing design work and preparation of the DCA. The schedule for completing the design and licensing analyses has been incorporated in the project master integrated resource loaded schedule.

- **What is the applicant's status in designing, constructing, and using thermal-fluidic testing facilities and in using such tests to validate computer models? Has the applicant established a schedule for the construction of testing facilities? If so, please describe the schedule. Has the applicant established a schedule for completing the thermal-fluidic testing? If so, please describe the schedule.**

An integrated systems test facility is being constructed near Lynchburg, VA, and an existing vendor testing facility at Stern Laboratories, Inc., located in Canada, will be utilized for critical heat flux testing. Both the CHF testing and integrated systems testing will begin in 2011. The planned integrated systems testing will be used (as needed) to validate the results of certain computer models for the B&W mPower Reactor.

- **What is the applicant's status in defining system and component suppliers (including fuel), manufacturing processes, and other major factors that could influence design decisions? Has the applicant established a schedule for identifying suppliers and key contractors? If so, please describe the schedule.**

Major primary system components (e.g., integral reactor vessel, steam generator, reactor internals including control rods and drives) will be provided from within the B&W family of companies. Whereas, it is expected that the reactor coolant pumps, the turbine-generator, and an integrated instrumentation and control (I&C) system will be supplied by external entities.

- **What is the applicant's status in the development and implementation of a quality assurance program?**

B&W NE submitted a Quality Assurance Program (Topical Report) to the NRC in March 2010. NRC staff review is nearing completion and a safety evaluation report is pending.

- **What is the applicant's status in the development of probabilistic risk assessment models needed to support applications (e.g., needed for Chapter 19 of safety analysis reports or needed to support risk-informed licensing approaches)? What are the applicants' plans for using the probabilistic risk assessment models in the development of the design?**

B&W NE is planning to prepare both a Level 1 and Level 2 PRA for the mPower Reactor design. Preparation of a subsequent level 3 PRA is under consideration.

- **What is the applicant's status in the development, construction, and use of a control room simulator?**

B&W NE plans to design and develop a simulator for the mPower Reactor. Additional details will be provided at a later date.

- **What are the applicant's current staffing levels (e.g., full-time equivalent staff) for the design and testing of the reactor design? Does the applicant have plans to increase staffing? If so, please describe future staffing plans.**

Currently the total staffing level for B&W NE and Bechtel is approximately 250 full time equivalents (FTEs) with a planned increase of about 50 FTEs during this calendar year.

- **What are the applicant's plans on the submittal of white papers or technical/topical reports related to the features of their design or the resolution of policy or technical issues? Has the applicant established a schedule for submitting such reports? If so, please describe the schedule.**

Please refer to Attachment 2.

- **Describe the desired scope of a possible manufacturing license and what design or licensing process would address the remainder of the proposed nuclear power plant. For example, would the manufacturing license address an essentially complete plant or would it be limited to the primary coolant system basically consisting of the integral reactor vessel and internals?**

B&W NE does not plan to pursue a manufacturing license for the mPower Reactor at this point in time.

Attachment 2

**B&W mPOWER™ REACTOR
PIANNED TECHNICAL/TOPICAL REPORT SUBMITTALS TO THE NRC
As of March 2011**

TOPIC	SUBMITTAL DATE (ACTUAL)	CATEGORY
Quality Assurance Plan for Design Certification	(March 2010)	Topical
Critical Heat Flux Test and Correlation Development Plan	(April 2010)	Technical
Design Overview	(May 2010)	Technical
Integrated Systems Test (Facility Description and Test Plan)	(June 2010)	Technical
Core Nuclear Design Codes and Methods Qualification	(August 2010)	Topical
Control Rod Drive Mechanism Design and Development	(October 2010)	Technical
Quality Assurance Plan for Design Certification (Rev. 1)	(October 2010)	Topical
Instrument Setpoint Methodology	(October 2010)	Topical
Security Design Assessment and Program Plan	(January 2011)	Technical
Quality Assurance Plan for Design Certification (Revision 2)	(January 2011)	Topical
Design Overview (Rev. 1)	June 2011	Technical
IST (Facility Description and Test Plan – Rev. 1)	June 2011	Technical
Physical Security Design	June 2011	Topical
Source Term and Dose Calculations	June 2011	Technical
Accident Analysis Codes and Methodology	August 2011	Technical
Fuel Assembly Mechanical Design Criteria	September 2011	Technical
HFE/HSI Program – Phase 1 (Analysis Plans)	September 2011	Topical
ECCS Design	October 2011	Technical
Reactor Coolant Pump Design and Development Plan	December 2011	Technical
Core Nuclear Design Supplement	February 2012	Topical
Emergency Condenser Test Report	First Quarter 2012	Technical
Digital I&C Platform	Second Quarter 2012	Technical

TOPIC	SUBMITTAL DATE (ACTUAL)	CATEGORY
I&C System Defense-in-Depth and Diversity	Second Quarter 2012	Topical
Core Thermal-Hydraulic Analysis Methodology (VIPRE)	Second Quarter 2012	Topical
Integrated Systems Test (Results)	Second Quarter 2012	Topical
Multi-Module Staffing	Second Quarter 2012	Topical
Cyber Security Program	Third Quarter 2012	Topical
LOCA Accident Analysis Methodology	Fourth Quarter 2012	Topical
Core Operating Limits Methodology	Fourth Quarter 2012	Topical
Fuel Performance Analytical Methodology	Fourth Quarter 2012	Topical
Non-LOCA Accident Analysis Methodology	First Quarter 2013	Topical
I&C Software Quality Assurance and Program Plan (Digital Safety Systems)	First Quarter 2013	Topical
Critical Heat Flux Test and Correlation (Results)	First Quarter 2013	Topical
Pressure-Temperature Limits Methodology	Second Quarter 2013	Topical
Fuel Assembly Mechanical Design Criteria	Third Quarter 2013	Topical
Reactor Coolant Pump Design Test Results	Second Quarter 2013	Technical
Emergency Condenser Test Plan Report	Fourth Quarter 2013	Topical