



Enclosure

**Response to RIS 2011-02, "Licensing Submittal Information  
and Design Development Activities for Small Modular Reactor Designs"**

**Design and Licensing Submittal Information**

- 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)?

Response: As part of our ongoing dialogue with potential clients, Westinghouse is initiating the development of an SMR Design Certification (DC) application that will meet the twin objectives of receipt of an NRC approval of our SMR design and support of client needs for site investigations and licensing/permitting. To meet these objectives, we are evaluating the timing for submittal of a DC application in conjunction with a lead client submittal of an application under either 10 CFR Part 50 or Part 52. Our intent is that the initial application (either a Part 52 DC application by Westinghouse or an application by a client) will be submitted in the 4<sup>th</sup> Q of CY 2012. The timing and nature of the first application is being discussed with potential clients. Additionally, prior to Westinghouse submittal of a DC application, we will engage with the NRC in a formal pre-application program during which we will provide a set of licensing topical/technical reports and white papers that will help resolve key regulatory issues that can significantly impact the application.

- 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?

Response: Westinghouse will be responsible for the overall design and design certification of its SMR nuclear power plant. It is our intent that a design center review approach be organized that will allow for efficiencies in the review of the applications and for coordinated responses for RAIs having generic applicability. The organizational structure and membership of a DCWG centered around a Westinghouse SMR has yet to be established.

- 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?

Response: During discussion with potential clients, the lead applicant will be identified. Similarly, coordination of the various applications will be undertaken to achieve the desired DCWG approach.



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- 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?

**Response:** It is anticipated that one or more CP, COL, or ESP applications will be made in conjunction with NRC's review of a Westinghouse SMR DC application. The design, site location, and numbers of units at each site will be determined as part of the dialogue that Westinghouse is having with potential clients. Specific decisions as to the timing of CP and OL applications, whether separate under 10 CFR Part 50 or combined under 10 CFR Part 52, will be determined by the clients, and will be factored into the overall objective of achieving NRC approval of a standard Westinghouse SMR design. Westinghouse anticipates that, as a minimum, a site application consisting of either a CP or an ESP, will be submitted to the NRC during the pre-application period that precedes the Westinghouse DC application.

- 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.

**Response:** Westinghouse accepts the complete responsibility for the plant design aspects of the license. As with previous plant licensing activities, Westinghouse may involve vendors or consultants who will perform work in support of our licensing effort. These vendors and consultants will work under the approved Westinghouse Appendix B quality program as qualified suppliers and will not have a direct interface with the NRC staff.

### **Design, Testing, and Application Preparation**

- 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.

**Response:** The Westinghouse SMR design will rely extensively on the certified passive technology of the AP600/AP1000® design, thereby making it difficult to describe a status of the SMR design. Many of the design features of the AP1000 in the areas of fuel, I&C, human factors, and passive safety system design will be applied directly or adapted to the SMR design. It is expected that this will enable an accelerated development of the Westinghouse SMR design. A schedule for completion of the design has not yet been established.

- 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.

**Response:** The fuel design for the Westinghouse SMR is a partial height derivative of the 17 x 17 RFA fuel assembly used in the AP1000 reactor. This fuel design is an adaptation of the most proven and widely-used design in the industry. Westinghouse has not yet identified a need for qualification testing for



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fuel, major systems or components. We are currently developing a Phenomena Identification and Ranking Table (PIRT) to help inform us of any potential testing needs in accordance with the Code Scaling, Applicability and Uncertainty (CSAU) methodology used for AP1000. Our design philosophy is to use proven components in our design.

- 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.

**Response:** The Westinghouse SMR is basically an advanced passive PWR that draws significantly from prior designs. Westinghouse intends to use our existing set of computer codes and models to perform the design and licensing analyses, modified, as necessary, to address any new design features. These modifications will be based on the PIRT results and will be submitted to the NRC in time to allow review and approval prior to the submittal of the DC application. Since the Westinghouse SMR is an advanced PWR, the principal design criteria, licensing-basis events, and other fundamental design/licensing relationships will be based predominantly on existing regulatory requirements and guidance. Westinghouse is also participating in industry initiatives (e.g., the development of NEI position papers on SMR issues) to help establish a common understanding for the use of risk-informed and performance-based methods that can help to inform and streamline the licensing process. The schedule for completion of the design and licensing analysis will be compatible with the schedule for submittal of the DC application.

- 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.

**Response:** Westinghouse intends to use the results of the tests used to support the AP600/AP1000 program, plus any new results due to modifications required to address new design features. Test facility modifications, if needed, will be based on the PIRT results and will be submitted to the NRC in time to allow review and feedback prior to the performance of testing specific to the Westinghouse SMR design. The need for any new facility modifications and testing has not yet been established.

- 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.

**Response:** Westinghouse is in the process of identifying potential suppliers for the SMR plant systems and equipment. This supplier identification effort is based largely on our extensive organizational experience in supply chain solutions as proven in the successful AP1000 design and implementation



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effort. Certain critical components, such as fuel, control rod drive mechanisms, reactor internals, core control components and refueling equipment will be manufactured by Westinghouse. For systems and components beyond the SMR integral reactor and containment, use of similar AP1000 equipment and suppliers is being considered for the SMR design.

Manufacturing processes and other factors that could influence design decisions are being systematically evaluated. Examples of such factors include the need to design for modularization, for maximum factory manufacture, and for cost effective and safe transportation.

Westinghouse is developing an integrated project schedule that depends heavily on the licensing schedule and securing of customers for the SMR. The schedule is based on our extensive AP1000 organizational experience and will include events for identifying suppliers and key contractors.

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

**Response:** The existing approved Westinghouse quality assurance program meeting the requirements of 10 CFR 50 Appendix B will be applicable to the design, procurement, fabrication, inspection, and/or testing activities for the Westinghouse SMR project. Activities affecting the quality of items and services for the Westinghouse SMR project will follow the "Westinghouse Electric Corporation – Energy Systems Business Unit, Quality Management System". This Quality Management System (QMS) has been submitted to and accepted by the NRC for use on the AP1000 program.

- 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?

**Response:** Westinghouse will build upon probabilistic risk assessment models that were used for the AP600 and AP1000 programs and will be established consistent with US and international standards such as IAEA. Westinghouse intends to periodically update the PRA throughout the design process to help identify and reduce the impact of dominate risk factors. Westinghouse will provide the NRC with periodic reports on the progress and impact of the PRA on the SMR design process.

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

**Response:** The Westinghouse SMR design effort will utilize to a significant extent the existing infrastructure and training capabilities of the AP1000 control room simulator.

- 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.



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**Response:** The Westinghouse SMR design effort draws from the extensive design and engineering resources that are currently deployed on the AP1000 reactor program. We are in the process of evaluating the future staffing requirements that will be needed for our SMR design and will describe the staffing plans when known.

- What are the applicant's current and future plans for using contractors to support plant design and testing (e.g., how many part-time and full-time contractors does or will the applicant employ)?

**Response:** Westinghouse may involve vendors or consultants with specific expertise to support the plant design and testing efforts. As part of our staffing review we are evaluating the need for any staff augmentation support. These vendors and consultants will work under the approved Westinghouse quality program as qualified suppliers and will not have a direct interface with the NRC staff.

#### **White Papers and Technical/Topical Reports**

- 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.

**Response:** It is anticipated that a Westinghouse SMR design summary report will be available for submittal to the NRC no later than 3Q CY2011. Other technical/topical reports that will be submitted include the PIRT summary and safety analysis Evaluation Model reports. Westinghouse is also participating in NEI's SMR Task Force in the preparation and submittal of a series of position papers related to the resolution of policy issues that impact the commercial development of SMRs.

- For ESP applicants, will the applicant seek approval of either "proposed major features of the emergency plans" in accordance with 10 CFR 52.17(b)(2)(i) or "proposed complete and integrated emergency plans" in accordance with 10 CFR 52.17(b)(2)(ii)?

**Response:** No response.

#### **Manufacturing Licenses**

- Describe possible interest in the use of the provisions in Subpart F, "Manufacturing Licenses," of 10 CFR Part 52 instead of, or in combination with, other licensing approaches (e.g., DC or DA).

**Response:** At this time, Westinghouse intends to pursue the certification of an integral PWR design and does not intend to make use of the provisions in Subpart F, "Manufacturing Licenses," of 10 CFR Part 52.



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- Describe the expected combination of manufacturing, fabrication, and site construction that results in a completed operational nuclear power plant. For example, what systems, structures, and components are being fabricated and delivered; which of these are being assembled on site; and which are being constructed on site?

**Response:** Due to the size of the Westinghouse SMR design, the manufacturing, fabrication, and site construction techniques are expected to be a further enhancement over those employed in the AP1000 program that also employs considerable modular fabrication and construction methods. A significant portion of the systems and components are anticipated to be fabricated in a controlled factory setting, thereby minimizing the amount of on-site fabrication and construction and, thereby, support a significant improvement in site construction and duration.

- 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?

**Response:** No response.