

"Designated Original," per PM
Arlin Costa

2/12/13
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U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Your ref: ML12319A181

Our ref: SMR_NRC_000001 / ALNRC 00059

February 12, 2013

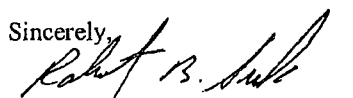
Subject: Response regarding the Westinghouse Small Modular Reactor to NRC Regulatory Issue Summary (RIS) 2012-12, "Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs"

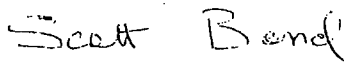
Attached please find the combined Ameren Missouri/Westinghouse Electric Company LLC ("Westinghouse") response to the subject NRC Regulatory Issue Summary (RIS) 2012-12, *Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs*, dated December 28, 2012.

Ameren Missouri and Westinghouse view the Small Modular Reactor (SMR) plant design as both an important technical advancement for the electric power industry and a way to stimulate future economic growth. Our responses to the subject RIS include status of the on-going design, engineering, and licensing needs that comprise the Westinghouse SMR design project's essential foundation. As additional information becomes available, we will update the NRC on the status of our activities and the regulatory planning needs that are this RIS' subject.

If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,


Robert B. Sisk
Acting Director Licensing,
Small Modular Reactors
Westinghouse Electric Company
(412)-374-6206


Scott M. Bond
Director, Nuclear Development
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Enclosure (9 pages)

cc:

M.E. Mayfield
A. Bradford
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(NRC)
(NRC)
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Received @ DPC
on 6/6/13

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NRC

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**Response regarding the Westinghouse Small Modular Reactor to
RIS 2012-12, "Licensing Submittal Information and Design Development Activities for
Small Modular Reactor Designs"**

Design and Licensing Submittal Information

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

Response:

Westinghouse plans to submit a Design Certification Application (DCA) in accordance with 10 CFR Part 52 in []^hc and will request that the NRC review said application before finally ruling on and issuing the Westinghouse SMR design design certification.

2. *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?*

Response:

Yes. Westinghouse and Ameren Missouri fully support – and plan to use – the design-centered working group (DCWG) approach described in RIS 2006-06, *New Reactor Standardization Needed to Support the Design-Centered Licensing Review Approach*. Westinghouse will submit an SMR plant design DCA and Ameren Missouri –depending on establishing necessary agreements to move the project forward– plans to submit the Reference Combined Operating License (R-COL) application with the intent of applying for multiple SMR units. Current DCWG members are Westinghouse as the design vendor, and Ameren Missouri as the R-COL applicant. Additional Subsequent COL (S-COL) applicants – who desire to license the Westinghouse SMR at their locations – will be added to the DCWG as they are identified. Westinghouse is the primary DCWG point of contact.

3. *Have protocols been developed to provide coordinated responses for requests for additional information with generic applicability to a design center?*

Response:

Yes. The request for additional information (RAI) process used for the AP1000® plant design certification is being updated to coordinate RAI responses for SMR applications (including DCWG review). RAIs will be reviewed to determine if they are either *generic* or *site-specific* COL items. If the RAI(s) are generic, the R-COL applicant will answer the issue, with the S-COL applicants taking an "also applies to me" approach.

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4. *Which applicant that references the design will be designated as the reference COL applicant, or, alternatively, how will various applications (e.g., CP, DC, or COL applications) be coordinated to achieve the desired design-centered licensing review approach?*

Response:

Ameren Missouri plans to be the R-COL applicant for the Westinghouse SMR plant design.

5. *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:

Ameren Missouri intends to submit an application – in accordance with 10 CFR Part 52 – to the NRC requesting combined licenses for multiple Westinghouse SMR units no earlier than []^{a,c} The submittal schedule depends on establishing necessary agreements to complete the R-COL application. Said units will be located at the existing Callaway Plant, Unit 1, site in Missouri.

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

Response:

Yes.

Vendors are being strategically used to supplement the Westinghouse-led plant design and construction efforts. Vendors were chosen for their specific expertise and ability to support the DCA design development and delivery. Said vendors are identified on the Westinghouse qualified vendor list and have prior experience with nuclear projects. Westinghouse will provide some Nuclear Steam Supply System (NSSS) components, such as the nuclear fuel.

Vendors and consultants will be contracted to research, analyze, and write:

- Portions of the Environmental Report
- Various site-specific sections of the Safety Analysis Report
- Other combined operating license application (COLA) sections for Ameren Missouri (possibly)

Vendors will also be used to design various site-specific Structures, Systems, and Components (SSCs), such as non-safety-related support systems necessary for plant operation and support facilities. Ameren Missouri will retain overall responsibility for SMR R-COL application licensing activities. Ameren Missouri will conduct activities related to developing the SMR application in accordance with applicable Callaway Plant Unit 1 Operating Quality Assurance Manual (OQAM) controls. This approved quality assurance (QA) program implements 10 CFR 50 Appendix B

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requirements. Vendors, consultants, or suppliers contracted to perform safety-related activities will be qualified and maintained under existing Callaway Plant Unit 1 OQAM procedures and controls.

7. *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:

Westinghouse is using a management strategy that focuses on completing parallel design tasks to mitigate potential emergent or challenging issues that could threaten completing the Westinghouse SMR plant design. [

] ^{a,c} The design is sufficient to support preparing and submitting the DCA. Design work will continue in parallel with the design certification (DC) preparation and application. To implement this management approach, an integrated project schedule is being used. Said schedule covers the entire design process. Rolling wave planning is being used – in which detailed activities are planned for the near-term two-year period, and major activities are planned for following years. This approach is being used to efficiently plan and address necessary details at the appropriate time.

8. *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:

For design simplification and licensing ease, Westinghouse chose to fuel the Westinghouse SMR with a shorter version of the highly successful 17x17 Robust Fuel Assembly (RFA) design. Said design was chosen because of its significant operating experience and excellent performance. The fuel itself will be manufactured and tested at Westinghouse's fuel plant in Columbia, South Carolina. Said assemblies are similar to the fuel assemblies that power many operating reactors – as well as the AP1000[®] reactor – but are shorter in overall length, with an 8-foot active fuel height versus the AP1000[®] reactor assemblies' 14-foot height. The fuel design also includes optimized ZIRLO[®] cladding for corrosion resistance, and other features that mitigate debris-related failures.

Westinghouse is highly confident that this fuel will provide the expected Westinghouse SMR fuel lifetime, while minimizing unanticipated outages and fuel failures, and their associated costs. The fuel management strategy includes effective use of uranium; average assembly discharge burnup is approximately [^{a,c}], which is consistent with Westinghouse experience. [

extension to use [^{a,c} Westinghouse will be seeking an ^{a,c}.

The Control Rod Drive Mechanisms (CRDMs) that will operate within the primary system's internal environment will be based on proven AP1000[®] plant technology. [^{a,c}

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9. *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 and licensing relationships? Has the applicant established a schedule for completing the design and licensing analyses? If so, please describe the schedule.*

Response:

Computer codes used to model the Westinghouse SMR are []^{a,c}. Said codes are being confirmed to apply to the Westinghouse SMR design. [

] ^{a,c}

10. *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:

[

] ^{a,c}

11. *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.*

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February 12, 2013Response:

Westinghouse has a proven nuclear component supply chain that will be used to both deliver the Westinghouse SMR plant design to market and ensure that the necessary support services are available to Westinghouse SMR customers after startup. Westinghouse has identified U.S. manufacturers as suppliers for all Westinghouse SMR components. Additionally, Westinghouse will manufacture and deliver [

Qualified suppliers were also identified for the []^{a,c} located throughout the U.S. []^{a,c} a key component in the Westinghouse SMR. Furthermore, qualified suppliers who can factory manufacture the []^{a,c} were identified.

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

Response:

To comply with regulatory, industry, statutory, and customer quality requirements imposed by customers or regulatory agencies, Westinghouse produces items and services under the Westinghouse Quality Management System (QMS). The QMS describes Westinghouse commitments to the quality assurance (QA) requirements of:

- ISO 9001
- ISO 90003
- 10CFR50, Appendix B
- ASME NQA-1-1994 Edition
- Other national/international regulatory requirements

The U.S. NRC reviewed and approved the Westinghouse QMS.

Ameren Missouri will conduct activities related to developing the SMR application in accordance with applicable Callaway Plant Unit 1 Operating Quality Assurance Manual (OQAM) controls. This approved QA program implements 10 CFR 50 Appendix B requirements. Suppliers delegated to perform safety-related activities will be qualified and maintained under existing Callaway Plant Unit 1 OQAM procedures and controls. Ameren Missouri previously prepared and implemented a QA program to support the Callaway Plant Unit 2 U.S. EPR COLA project. When appropriate, said QA program will be revised and updated to support the SMR project.

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13. *What is the applicant's status in the development of probabilistic risk assessment (PRA) models needed to support applications (e.g., needed for Chapter 19 of safety analysis reports or needed to support risk-informed licensing approaches)? Does the applicant plan to use the PRA for any risk-informed applications (i.e., risk-informed technical specifications, risk-informed inservice inspection, risk-informed categorization and treatment, risk-informed inservice testing, etc.). What are the applicant's plans for using the PRA models in the development of the design? At what level will the PRA be prepared, and when will it be submitted in the application process?*

Response:

Westinghouse SMR PRA development is underway. [

]^{a,c}

Westinghouse plans to document the PRA when []^{a,c}.

As recommended in Regulatory Issue Summary 2012-08, *Developing Inservice Testing and Inservice Inspection Programs Under 10 CFR Part 52*: Ameren Missouri does not plan to submit – as part of the COL application – a request for risk-informed in-service inspection (ISI) or in-service testing (IST) programs. RIS 2012-08 recommends establishing conventional ISI or IST programs before preparing a risk-informed ISI or IST program. Said recommendation is based on:

- Existing design certification applications
- The Standard Review Plan acceptance criteria
- Applicable NUREG documents
- That COL applications conform to the idea that conventional ISI/IST programs were developed before a risk-informed program

Similarly – for the same reasons described above– there are no plans to submit a request for risk-informed technical specifications, categorization and treatment, or fire protection programs. Any request for risk-informed applications will be submitted after the COL application is approved.

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

Response:

Westinghouse has extensively tested and delivered six simulators to its AP1000® plant customers and [

]^{a,c}

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15. *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.*

Response:

The Westinghouse SMR development program is staffed to [

] ^{a,c}

16. *What are the applicant's plans on the submittal of white papers or technical and topical reports related to the features of its design or the resolution of policy or technical issues?*

Response:

Currently Westinghouse does not plan to submit any topical reports supporting the Westinghouse SMR design certification.

Westinghouse will discuss technical reports [

] ^{a,c} with the NRC before they are submitted.

Westinghouse expects to support the SMR DCA with a limited number of technical reports, like those listed above.

17. *Has the applicant established a schedule for submitting such reports? If so, please describe the schedule.*

Response:

[

] ^{a,c}

18. *Will ESP applicants 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:

Not applicable because Ameren Missouri does not plan to pursue an early site permit.

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19. *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:

The Westinghouse SMR will follow the 10 CFR Part 52 approach. Westinghouse is not interested in implementing the provisions in Subpart F for "Manufacturing Licenses."

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

Response:

The Westinghouse SMR will follow the 10 CFR Part 52 approach without implementing the provisions in Subpart F for "Manufacturing Licenses."

21. *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 onsite? Which of these are being constructed onsite?*

Response:

The Westinghouse approach to Westinghouse SMR modules is both evolutionary and revolutionary. It is evolutionary because it extends Westinghouse's unique experience in designing and constructing the current AP1000® plants. [

]a,c

Westinghouse expects [

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J^{a,c}

Some non-safety-related support systems necessary for plant operation will be site-specific and constructed at the plant site.