Industry Alliance
Clean Sustainable Energy for the 21st Century

PROJ 0776

CNRO-2014-00001

January 3, 2014

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: NGNP Industry Alliance Response to NRC Regulatory Issue Summary 2013–18, "Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs"

References: NRC Regulatory Issue Summary 2013–18; "Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs," dated November 15, 2013 (ML13263A227)

On November 15, 2013, the U.S. Nuclear Regulatory Commission (NRC) published Regulatory Issue Summary (RIS) 2013-18, "Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs." The RIS seeks voluntary information regarding the content and schedule information for construction permit (CP), early site permit (ESP), combined license (COL), standard design certification (DC), standard design approval (DA), or manufacturing license (ML) for a nuclear power plant that references a small modular reactor (SMR) design under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," or 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." For the purpose of this regulatory issue summary (RIS), SMRs are defined using the International Atomic Energy Agency definition of small- and medium-sized reactors with an electrical output of less than 700 megawatts.

The NGNP Industry Alliance Limited (Alliance) was established with the primary purpose to promote the development and commercialization of the modular High-Temperature Gas-Cooled Reactor (HTGR) technologies. Our alliance represents the interests and views of our members that intend to mutually support and direct project plans to design, build, operate and use the modular HTGR technology. Further information about the Alliance and its members can be obtained at http://www.ngnpalliance.org/.

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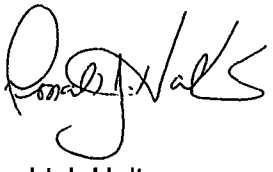
This letter provides the voluntary response to NRC RIS 2013-18 for the Alliance. The purpose of this response is to make the NRC staff aware of planned activities that will support the future commercialization of the modular HTGR technology.

In 2012, we communicated that we had selected the AREVA prismatic core modular HTGR in a steam supply configuration for initial applications for co-generation of process heat and electricity. Our business plans for commercialization were documented and formalized. In 2013, we updated our business plans and committed to seek funding for the development of the steam cycle modular HTGR. We are confident that the actions we have taken over the past year move us toward our mission and ultimate goal for commercialization.

If you have any questions concerning our plans, direction or responses, please contact me and any one of our Alliance officers.

Sincerely,



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ATTACHMENT 1

Response to RIS 2013-18
Specific Questions

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: The Alliance updated its business plan during 2013. Currently the Alliance is targeting between 2017 and 2018 for submittal of a Construction Permit application. The Alliance is continuing to evaluate the licensing options of 10 CFR Part 50 and 10 CFR Part 52 or a combination thereof in order to select the optimum licensing strategy for the selected HTGR design and site.

2. ***Will the applicants be organized into design center working groups (DCWGs)? If known, what is the membership of the DCWG, and which party is the primary point-of-contact designated for each DCWG?***

   RESPONSE: The Alliance supports the DCWG concept; however, while the Alliance currently does not anticipate initial multiple parallel license applications, it supports the DCWG concept and will work with the NRC to establish such a process should future information on potential applications necessitate a DCWG. The Alliance will continue to coordinate its efforts and work with the Department of Energy (DOE)-Idaho National Laboratory (INL) and supporting laboratories for advanced reactor activities that are currently in progress.

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

   RESPONSE: Protocols have not been established. See response to Question #2.

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

   RESPONSE: The Alliance has not identified an applicant for designation as the reference COL applicant. The Alliance currently does not anticipate initial multiple parallel license applications requiring the coordination of a DCWG.

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: Currently the Alliance is targeting between 2017 and 2018 for submittal of an application. Although preliminary siting studies were conducted in 2011, a final site location has not been selected. The Alliance anticipates the initial licensing activities would support construction and operation of a single unit at a multiple modules plant at the selected site.

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: Application preparation has not commenced. The Alliance has selected the AREVA prismatic core modular high temperature gas-cooled reactor (HTGR) in process steam supply configuration for considerations in the initial applications of modular HTGR technology for co-generation of process heat and electricity. The industrial end-user requirements have been the primary consideration for making this technology selection. AREVA is the lead designer supported by other Alliance members for needed technical competencies. A utility member of the Alliance will be responsible for Alliance licensing activities.

Design, Testing, and Application Preparation

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: Some conceptual design work has been completed through the DOE-INL NGNP Project. AREVA-specific design work will commence following initial capitalization of the design development venture of the Alliance business plan. We expect the Alliance development venture to commence in early 2014. The current completion schedule is as follows:

Conceptual design: 2.5 years
Preliminary design: 2 years
Final design: 3 years

During the conceptual design phase the specifics of the Alliance HTGR initial plant nuclear safety case are defined, the systems that are considered safety related or important to safe plant operations are designed, the plant licensing strategy is established, and the remaining plant systems, structures, and components will be further defined. The conceptual design phase includes many other activities including: a) convergence on main design requirements, general plant functions, configuration, and layout, b) key trade studies to settle major design features, c) definition of functions and main requirements for all plant systems, d) selection of the governing design codes and establishment of relevant required code cases, e) Specify R&D needs and develop R&D plans by interacting with the DOE-INL NGNP Project and, if needed, with other R&D partners, f) complete detailed calculations for main systems, g) complete analysis methods development, and h) identify key suppliers.

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: TRISO fuel qualification plans are complete. Fuel irradiation and characterization is underway at Idaho National Lab. TRISO fuel qualification testing plans are described in NGNP Fuel Qualification white paper INL-EXT-17686. This document has been submitted to the NRC.

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: AREVA HTGR computer codes and HTGR models are being evaluated for licensing work in the USA. Principal design criteria, licensing-basis events, and other fundamental design/licensing relationships will be defined as part of the normal conceptual design process. The schedule for completing the design and licensing analyses will be confirmed during the conceptual design in interaction with the DOE-INL and, if needed, with other R&D partners.

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: As part of the conceptual design phase the need for testing will be identified and facilities necessary for such testing will be identified if available or built and utilized. AREVA has extensive experience in designing, constructing and operating thermal-fluidic testing facilities in its Technical Centers and has designed HTGR dedicated helium facilities for HTGR Thermal-hydraulic testing in its own HTGR program, ANTARES, as well as for the needs of the INL advanced reactor program.

11. ***What is the applicant's status in defining system and component suppliers (including fuel suppliers), 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: Some suppliers for TRISO fuel and graphite core components are known commercial vendor currently supplying materials to the INL and would be considered for suppliers for the FOAK plant. Several graphite suppliers are involved in support of nuclear-grade graphite testing and are strong candidates for procurement contacts. Alliance member organizations have some capabilities and commercial relationships for construction and manufacture, but it is too early in the development venture to be definitive on a supply chain for systems and components. Major suppliers will be identified during the conceptual design.

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

    RESPONSE: Design work will be performed under the AREVA Quality Assurance (QA) program. Once the design activities get underway a project specific QA manual will be developed for the subsequent phases of the design. The owner/operator Quality Assurance Program will be developed prior to development of the licensing

application. Fuel qualification activities are being conducted in accordance with the quality requirements in the INL AGR Fuel Development and Qualification Program (See response to Question #8).

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: PRA will be central to the Risk Informed Performance Based design of the HTGR. A design phase PRA will be prepared and maintained during the conceptual design. This PRA evolves as the design matures. Insights from the PRA will be factored into the design decisions during the Preliminary Design phase, prior to completing the PSAR. The PRA will continue to be maintained as the detailed design is finalized, allowing risk insights to continue to guide the design process.

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

    RESPONSE: Due to early stage of the design, development plans of a control room simulator have not been started and a schedule has not been established.

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 Alliance will employ a multi-organization support model that draws on the experience and staff available to the full project team. Staffing levels will vary significantly as appropriate for each stage of the conceptual, preliminary, and detailed design project.

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: The Alliance applicant will utilize topical and technical reports to obtain resolutions to specific technical or policy issues.

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

    RESPONSE: At this early stage of the design the topics and a schedule for submittal have not been prepared. The applicant will start from the whitepapers already developed by the DOE-INL NGNP activities. The Alliance encourages the completion of the NRC review of the current DOE-INL NGNP whitepapers and the finalization of

the NRC staff positions on these important technical and policy issues which will aid in establishing the direction taken in conjunction with a formal licensing application.

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: The decision for preparation of an ESP is pending the identification of the site for the initial plant location. Also, see response to Question #1.

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

    RESPONSE: At this time the Alliance does not have an interest in use of the provisions in Subpart F, "Manufacturing Licenses," of 10 CFR 52.

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: See response to Question #18.

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 on site? Which of these are being constructed onsite?***

    RESPONSE: As part of the design process and modular design, the Alliance will evaluate the fabrication and construction model suitable for completing an operational nuclear power plant.