February 9, 2012 CCN 226542

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

NRC Project #0748

SUBJECT: Contract No. DE-AC07-051D14517 – Next Generation Nuclear Plant Project Submittal – (NRC Project #0748) – Voluntary Response to Nuclear Regulatory Commission Regulatory Issue Summary 2011-02, Revision 1

On December 27, 2011, the U.S. Nuclear Regulatory Commission (NRC) published Regulatory Issue Summary (RIS) 2011-02, Revision 1, "Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs" (Reference a). The RIS seeks voluntary information regarding the content and schedule information for construction permit (CP), early site permit (ESP), 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 10 CFR 50 or 10 CFR 52. For purposes of this 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. This RIS is a follow-on to RIS 2011-02, "Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs," dated February 2, 2011, which sought similar information.

Enclosed is the "Next Generation Nuclear Plant Submittal (NRC Project #0748), Voluntary Response to Nuclear Regulatory Commission, RIS 2011-02, Revision 1." The information provided in the enclosure updates the information provided in NGNP response to RIS 2011-02 (Reference b). The purpose of this response is to make NRC staff aware of planned NGNP licensing activities that will support the future Combined License (COL) application for plant construction and operation.

The August 2008 NGNP Licensing Strategy Report to Congress (Reference c) provides the overview of the recommended licensing strategy for satisfying the Energy Policy Act of 2005. The Licensing Strategy was jointly developed by NRC and the Department of Energy (DOE), and provides a high-level strategy for the research and development, licensing, construction, and deployment of a high temperature gas-cooled reactor (HTGR) via the adaptation of existing light water reactor regulations. NGNP then developed a more detailed description of the actions to be taken to implement the Licensing Strategy. This description is contained in the NGNP Licensing Plan (Reference d), which was issued in June 2009. In April 2010, DOE submitted a report to Congress (Reference e) which stated that the COL application submittal schedule would be re-evaluated in conjunction with conceptual design activities and would be revised as needed, reflecting the 2011 Secretarial decision.

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As stated in the October 17, 2011, letter to Congress (Reference f), NGNP will continue to focus on high temperature reactor research and development activities and interactions with NRC to develop a licensing framework. Given current fiscal constraints, competing priorities, projected cost of the prototype, and inability to reach agreement with industry on cost share, DOE will not proceed with the Phase 2 design activities at this time.

NGNP will continue to maintain regular dialogue with NRC regarding future submittal schedule adjustments if any are identified. In addition, it is noted that the NGNP Industry Alliance Limited (Alliance) is submitting a related, but separate response to this RIS that provides NRC with an initial summary of Alliance plans for design and licensing activities associated with the deployment of a high temperature gas-cooled reactor. It is recognized that the HTGR licensing framework development activities currently being led by DOE/INL via the NGNP Project will transition to the future license applicant. The details and timing of that transition will be the subject of future interactions with NRC. In the interim, the DOE/INL NGNP team plans to continue to work with NRC to address key HTGR policy and technical issues, as discussed in Reference f, so that key portions of the licensing framework can be established. NGNP is currently awaiting NRC feedback on a number of key licensing framework development topics, as noted in the responses provided in the enclosure. Resolution of NRC open issues related to the licensing of HTGRs that may be identified in that feedback will support the establishment of a licensing framework.

If you have any questions, please contact me at (208) 526-7735 or James Kinsey, Director of NGNP Regulatory Affairs, at (208) 569-6751.

Sincerely,

David A. Petti, Director
VHTR Technology Development Office

JK:DES

Enclosure

References:

a. NRC Regulatory Issue Summary 2011-02, Revision 1, Licensing Submittal Information and Design Development Activities for Small Modular Reactor Designs, dated December 27, 2011

b. Next Generation Nuclear Plant Project Submittal - (NRC Project #0748) – Voluntary Response to Nuclear Regulatory Commission Regulatory Issue Summary 2011-02, dated March 21, 2011
c. Next Generation Nuclear Plant Licensing Strategy, A Report to Congress, dated August 2008
d. Next Generation Nuclear Plant Licensing Plan, PLN-3202, dated June 26, 2009
e. Next Generation Nuclear Plant, A Report to Congress, dated April 2010
f. Letter from DOE Secretary Chu to Congress, dated October 17, 2011

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Uniform File Code: 8406
Disposition Authority: RD1-A-3
Retention Schedule: Cutoff after program/project completion, cancellation, or termination. Destroy 10 years after termination of project/program.

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Enclosure 1
(CCN 226542)

Next Generation Nuclear Plant Submittal
(NRC Project #0748)
Voluntary Response to Nuclear Regulatory Commission RIS 2011-02, Rev. 1

NGNP's Voluntary Response to NRC RIS 2011-02, Rev. 1

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., DC, DA, ML, or a COL that does not reference a DC or DA)?***

   RESPONSE: The Energy Policy Act of 2005 formally authorized the Next Generation Nuclear Plant Project (NGNP). Sections 641 through 645 of the Energy Policy Act of 2005 established expectations for research, development, design, construction, and operation of a prototype nuclear plant that would provide electricity and/or hydrogen.

   The provisions of the Energy Policy Act of 2005 establish two distinct phases for the project. Phase 1 is the phase that covers selecting and validating the appropriate technology, carrying out enabling research, development and demonstration activities, determining whether it is appropriate to combine electricity generation and hydrogen production in a single prototype nuclear reactor and plant, and carrying out initial design activities for a demonstration reactor and plant, including development of design and safety analytical methods and studies.

   Phase 2 is the phase that covers development of a final design for the demonstration nuclear reactor and plant, application for a Nuclear Regulatory Commission (NRC) license to construct and operate the demonstration nuclear facility, and construction and operation for the demonstration nuclear reactor and its associated electricity, process heat, and/or hydrogen production facilities.

   The August 2008 *NGNP Licensing Strategy Report to Congress* (Reference c) provides the overview of the recommended licensing strategy for satisfying the Energy Policy Act of 2005. The Licensing Strategy was jointly developed by the NRC and the Department of Energy (DOE), and provides a high level strategy for the research and development, licensing, construction, and deployment of a high temperature gas-cooled reactor (HTGR) via the adaptation of existing light water reactor regulations. The April 2010 *Report to Congress* (Reference e) provided an update to the Combined License (COL) submittal schedule contained in the August 2008 *NGNP Licensing Strategy Report to Congress*. As stated in the October 17, 2011 letter to Congress (Reference f), the NGNP public-private partnership once formed will provide an update to the schedule and milestones contained in the April 2010 *Report to Congress*.

   The October 2011 letter to Congress also stated that NGNP will continue to focus on high temperature reactor research and development activities, interactions with the NRC to develop a licensing framework, and establishment of a public-private partnership until conditions warrant a change in direction. Given current fiscal constraints, competing priorities, projected cost of the prototype, and inability to reach agreement with industry on cost share, the DOE will not proceed with the Phase 2 design activities at this time.

   NGNP will continue to maintain regular dialogue with the NRC regarding future submittal schedule adjustments, if any are identified. In the interim, NGNP plans to continue to

work with the NRC to address key HTGR policy and technical issues, so that these integral portions of the licensing framework can be established.

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

   RESPONSE: The Idaho National Laboratory (INL), working under contract with the DOE, is the lead nuclear energy research and development laboratory for DOE in support of HTGR deployment. In this role, NGNP at INL has been, and continues to work closely with the potential HTGR suppliers in addressing and resolving priority HTGR licensing and policy issues. The INL NGNP is the primary point of contact for early development activities related to NRC licensing submittals that are applicable to the HTGR designs. In addition to this role, NGNP has engaged with other industry organizations and committees (e.g., American Nuclear Society (ANS), Nuclear Energy Institute (NEI), American Society of Mechanical Engineers (ASME), etc.) to develop resolutions for selected regulatory policy issues that are generic to advanced reactor technologies, and are applicable to HTGR licensing. These coordination activities are expected to become the responsibility of a future applicant. In the interim as stated in response to Item 1 above, NGNP will continue to work with NRC to develop a licensing framework for HTGRs.

   These activities are supportive of a Design-Centered Working Group (DCWG) concept and are intended to promote the "one issue, one review, one position," strategy advanced by NRC Regulatory Issue Summary (RIS) 2006-06, "New Reactor Standardization Needed to Support the Design-Centered Licensing Review Approach."

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

   RESPONSE: The plant design for NGNP is being conducted in phases as stated in Item 1 above. No COL applicant has been identified at this time.

4. ***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: The DOE will not proceed with the Phase 2 design activities at this time and there is no current schedule for a COL application submittal. As stated in the October 2011 letter to Congress, the NGNP public-private partnership once formed will provide an update to the schedule and milestones contained in the April 2010 Report to Congress. NGNP will continue interactions with the NRC to ensure that a licensing framework is in place to support the eventual submittal of an NGNP license application.

5. ***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: NGNP consists of the research, development, and licensing associated with the demonstration plant, including a nuclear reactor that is based on research and development (R&D) activities supported through the Office of Gas Cooled Reactor Technologies within the Department of Energy's Office of Nuclear Energy. Three (3) primary reactor suppliers that provide HTGR technology have been involved with the development of NGNP pre-licensing white papers and the related responses to NRC requests for additional information. They are: AREVA, General Atomics, and Westinghouse. In addition, NGNP is engaged with various national laboratories, universities, and international advanced reactor communities in R&D activities that support the Generation IV reactor concepts. NGNP also subcontracts with Entergy for ongoing project support in order to bring the insights of a commercial nuclear plant owner-operator to project licensing activities.

Design, Testing, and Application Preparation

6. ***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: A portion of the necessary conceptual design work was completed in December 2010. The additional design work necessary to develop and complete the COL application was to be completed in Phase 2 of the project. Given current fiscal constraints, competing priorities, projected cost of the prototype, and inability to reach agreement with industry on cost share, the DOE will not proceed with the Phase 2 design activities at this time.

7. ***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: Qualification of major systems and components is an integral activity that has been in progress since the early stages of NGNP. Several research, development, and qualification activities are underway in support of HTGR design, licensing, and plant operation. These activities are intended to focus on many of the qualification issues that are also addressed in the High Temperature Gas-Cooled Reactor (HTGR) "NRC Research Plan" (March, 2010), which describes NRC activities related to the development of confirmatory tools to be used during the HTGR license application review process.

   As an example, the fuel qualification program for NGNP has been ongoing for a number of years, and details of the schedule and plan are discussed in the INL's Advanced Gas

Reactor (AGR) Fuel Development and Qualification Program Plan, which was provided to the NRC in December 2010. The objective of the AGR Fuel Development and Qualification Program is to qualify TRISO (tristructural-isotropic)-coated particle fuel for use in HTGRs. Both pebble bed and prismatic block reactors employ TRISO fuel particles, which consist of a microsphere (i.e., kernel) of nuclear material encapsulated by multiple layers of pyrocarbon and a silicon carbide layer.

There are five elements in the AGR Fuel Development and Qualification Program: fuel manufacture, fuel irradiation, post-irradiation examination (PIE) and safety testing, fuel performance modeling, and fission product transport and source term. The *NGNP Fuel Qualification White Paper* (INL/EXT-10-18610) covering the proposed fuel qualification process was submitted for NRC review on July 21, 2010. In addition, the *HTGR Mechanistic Source Terms White Paper* (INL/EXT-10-17997) was submitted for NRC review on July 21, 2010. NGNP is expecting a NRC staff assessment paper regarding these white papers in the near term. It is expected that open issues identified in this assessment paper will be addressed in a timely manner to support the establishment of a licensing framework, which would significantly reduce existing design and licensing uncertainty.

8. ***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: NGNP is engaged in the design, construction, and operation of thermal-fluidic testing facilities to validate system and computational fluid dynamics software being developed for high temperature gas reactor safety analysis and design. See the response to Item 9 below for additional details. The *Next Generation Nuclear Plant Licensing Basis Event Selection White Paper* (INL/EXT-10-19521) covering the topic of licensing basis event selection was submitted for NRC review on September 16, 2010. NGNP understands that the NRC staff is currently developing an assessment paper regarding the status of its review of the licensing basis event white paper. It is expected that open issues identified will be addressed in a timely manner to support the establishment of a licensing framework, which would significantly reduce existing design and licensing uncertainty. There currently is no schedule for completing the design and licensing analyses.

9. ***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: NGNP is engaged in the design, construction, and operation of thermal fluidic testing facilities. The main objective of this work is the validation of system and

computational fluid dynamics software used for high temperature gas reactor safety analysis and design. These facilities and experiments cover a range of separate effects and integral phenomena that have been identified in the NGNP Phenomena Identification and Ranking Table (PIRT) as having a significant impact on one or more safety or performance parameters and possessing a high degree of uncertainty. The PIRT process provides an expert panel assessment of safety-relevant phenomena and identifies R&D needs. The detailed PIRT exercises have been documented in NUREG/CR-6844 (July 2004) and NUREG/CR-6944 (March 2008). These data are further analyzed and reduced to an actionable level in the *Next Generation Nuclear Plant Gap Analysis Report* (ORNL/TM-2007/228, July 2008).

The two major integral test facilities are: 1) the High Temperature Test Facility (HTTF) being constructed at Oregon State University, and 2) the Natural Circulation Shutdown Test Facility (NSTF) being refurbished at Argonne National Laboratory. The HTTF will be used to study the fluid flow behavior and heat transfer within and out of a scaled very high temperature gas-cooled reactor vessel under steady state and severe loss of forced cooling conditions. The NSTF will be used to simulate and study vessel cooling and ex-core heat transfer phenomena. Data from these facilities will be used to validate developed computer models. Both the HTTF and the NSTF are expected to be available in FY-2012. The HTTF will proceed with its test program in the latter part of 2012. NGNP is working closely with the NRC on both HTTF and the NSTF to ensure that these facilities will support the licensing of HTGRs.

10. 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: NGNP has implemented the Technology Readiness Level (TRL) process, which is a tool used by National Aeronautics and Space Administration and Department of Defense projects as part of the overall project risk management program. The reactor design suppliers have identified those Structures, Systems, and Components (SSCs) that have development needs with the potential to impact NGNP. Plans and preliminary schedules to progress through the TRL maturity levels for those SSCs have been developed and documented as Technology Development Roadmaps (TDRMs) and associated Test Plans. The TDRMs and Test Plans, along with various technology development studies, also performed by the suppliers, such as for heat transport system and power conversion system alternatives, provide a preliminary overview of the current international status of large equipment suppliers, such as circulators and steam generators, and forging vendors to support the NGNP. This process may be utilized by a future COL applicant for making down-selections and selecting components, suppliers, and key contractors. Additionally, NGNP performed a comprehensive infrastructure readiness assessment to review the current infrastructure capabilities of the nuclear industry, with focus on component suppliers and key contractors, to support the deployment of a demonstration plant HTGR module. This assessment was completed in February 2011 and summarized in report *NGNP Infrastructure Readiness Assessment: Consolidation Report* (INL/EXT-11-20973). The infrastructure assessment reinforces the TDRM indications that, currently, the primary technical challenges to the deployment of

an HTGR appear to be qualification of fuel and graphite, and delivery of high temperature heat exchangers. The qualification of the fuel is being addressed via the INL's AGR Fuel Development and Qualification Program. The qualification of graphite is being addressed via the INL's graphite program. Challenges associated with other major system and components, such as for large forgings and circulators, should be manageable if procurement activities are initiated early during the detailed design phase.

NGNP is continuing to support the development and codifying of high temperature materials and manufacturing processes, such as diffusion bonding for heat exchangers. This work is being performed in conjunction with, and within the overall goals of, the ASME as identified in their draft "Roadmap for the Development of ASME Code Rules for High Temperature Gas Reactors." In support of this activity, NGNP submitted a white paper for NRC review entitled *NGNP High Temperature Materials* (INL/EXT-09-17187) on June 25, 2010. The scope of this paper is to review the existing policies, regulations, and guidance associated with acceptance of materials for nuclear reactor applications and to assess the bases for their implementation in the system components of the HTGR. NGNP understands that the NRC staff is currently developing an assessment paper regarding the status of its review of the high temperature materials white paper. It is expected that open issues identified in this assessment paper will be addressed in a timely manner to support the establishment of a licensing framework.

Reactor fuel manufacturing and supply/acquisition issues are addressed by various elements of the Advanced Gas Reactor Fuel Development and Qualification Program, the latest version of which was provided to the NRC staff in December 2010.

Final decisions on systems and component suppliers will be made by the COL applicant when identified.

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

RESPONSE: As part of the early licensing phase of NGNP, PDD-172, Revision 0, *Next Generation Nuclear Project Quality Assurance Program Description,* (QAPD) was submitted for initial NRC review and feedback on August 10, 2010. NRC feedback on the NGNP QAPD was received by letter dated November 10, 2010. This feedback was intended to facilitate resolution of a small set of initially identified issues. Based on this NRC feedback, NGNP submitted Revision 3 to the QAPD for formal NRC review and approval on May 19, 2011.

The NGNP QAPD, Revision 3, provides a description of the QA requirements that are applicable to all aspects of NGNP. The scope of activities being performed by NGNP is currently limited to the technology development that is associated with the Very High Temperature Reactor (VHTR) Technology Development Office (TDO), which was created to perform required R&D activities in support of NGNP. The QAPD, Revision 3, is based on Regulatory Guide 1.28, Rev. 4, June 2010, "Quality Assurance Requirements (Design and Construction)," and on Regulatory Guide 1.33, Rev. 2, February 1978, "Quality Assurance Program Requirements (Operation)." Regulatory Guide 1.28, Revision 4 states that Part I and Part II requirements of NQA-1-2008, 1a-

2009, "Quality Assurance Requirements for Nuclear Facility Applications," provide an adequate basis for complying with the requirements of 10 CFR Part 50, Appendix B, subject to the additions and modifications identified therein. The QAPD is based on the requirements and guidance of American Society of Mechanical Engineer's NQA-1-2008, 1a-2009, Parts I and II, with specific reference to selected sections of Parts III and IV as identified in the document. Also, it should be noted that the reference to the NEI 11-04 in the QAPD indicates that the NEI 11-04 was used as a template for the development of the NGNP QAPD, but the future NRC endorsement of the NEI document is not relied on for NGNP QAPD implementation.

NRC staff provided RAIs regarding the QAPD, Revision 3 in October 2011. In a letter dated December 21, 2011, NGNP provided responses to these NRC RAIs. NGNP is currently awaiting NRC feedback and approval of the QAPD.

12. ***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)? What are the applicants' 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: Information on the use of PRA in support of NGNP design and licensing efforts was provided to the NRC in the white paper, *NGNP Probabilistic Risk Assessment White Paper*, (INL/EXT-11-21270) submitted in September 2011. As discussed in this paper, the PRA approach that will be used to support the NGNP license application will first be applied to a single reactor module plant, with the capability to extend later to multi-module designs to be certified for a range of sites. The PRA will be introduced at an early stage in the design, and will be upgraded at various design and licensing stages as the design matures and the design details are defined. This will provide an opportunity to optimize the design relative to safety and licensing by using the PRA to define the required capability and reliability of SSCs to prevent and to mitigate accidents. The NGNP COL application will include an HTGR design-specific PRA.

NGNP understands that the NRC staff is currently developing an assessment paper regarding the status of its review of the overall risk-informed performance based approach, which includes the use of PRA It is expected that open issues identified in this assessment paper will be addressed in a timely manner to support the establishment of a licensing framework.

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

RESPONSE: Currently, NGNP design is not at a sufficient stage of maturity to support simulator design and construction. Therefore, there is currently no schedule for developing a control room simulator.

14. 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: See the response to Items 1 and 5 above for current overall NGNP status. Future staffing levels will be better defined when the license applicant is identified.

15. 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: To provide additional detail regarding plans for implementing the NGNP licensing strategy described in Item 1 above, the INL issued the *NGNP Licensing Plan* (PLN-3202) in June, 2009 (Reference d). The plan identifies those highest priority licensing topics that were deemed necessary for early interaction with the NRC staff to identify and resolve policy, regulatory, and key technical issues related to NGNP that are critical to the establishment of the licensing framework. The Plan also describes a process to be used for addressing those topics with the NRC, via a series of licensing white paper submittals, NRC public meetings, and NRC disposition of the identified issues. NGNP has completed a series of those white papers and submitted them to the NRC for review, as summarized below. There are no additional white papers currently under development, although additional papers may be transmitted in the future, as needed to support the establishment of additional portions of the licensing framework.

White Paper	Submittal Date	NRC Public Meeting
Next Generation Nuclear Plant Defense-in-Depth Approach INL/EXT-09-17139	December 9, 2009	March 8, 2010
High Temperature Materials White Paper INL/EXT-09-17187	June 25, 2010	September 1, 2010
NGNP Fuel Qualification White Paper INL/EXT-10-18610 Revision 1	July 21, 2010	September 2, 2010 October 19, 2011
HTGR Mechanistic Source Terms White Paper INL/EXT-10-17997	July 21, 2010	September 2, 2010 October 19, 2011
Licensing Structure for Multi- Module Facilities INL/EXT-10-18178	August 10, 2010	None
Next Generation Nuclear Plant Licensing Basis Event Selection White Paper INL/EXT-10-19521	September 16, 2010	November 2, 2010
Next Generation Nuclear Plant Structures, Systems, and Components Safety Classification White Paper INL/EXT-10-19509	September 21, 2010	November 2, 2010
Determining the Appropriate Emergency Planning Zone Size and Emergency Planning Attributes for an HTGR INL/MIS-10-19799	October 28, 2010	January 26, 2011
NGNP Nuclear-Industrial Facility and Design Certification Boundaries INL/EXT-11-21605	July 22, 2011	None
Next Generation Nuclear Plant Probabilistic Risk Assessment White Paper INL/EXT-11-21270	September 20, 2011	None
Modular HTGR Safety Basis and Approach INL/EXT-11-22708 (submitted for information only)	September 6, 2011	None

Additionally in September 2011, NGNP provided to the NRC the results summary of a comprehensive regulatory gap analysis for HTGRs that evaluated potentially applicable existing regulatory requirements and guidance against the design characteristics specific to a generic modular HTGR.

NGNP understands that the NRC staff is currently developing assessment papers regarding the status of its review of some of these white papers. It is expected that open issues identified in these assessment papers will be addressed in a timely manner to support the establishment of a licensing framework. The knowledge and resolution of identified issues will aid in future design and licensing activities.

Topical reports, which will form a portion of the COL application, are expected to be submitted to the NRC once a license applicant is identified.

16. ***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 DOE does not currently plan for the submittal of an Early Site Permit (ESP) application associated with the demonstration plant site, although the ESP application option may be reconsidered by the COL applicant. The plan, schedule, and scope for the ESP application would be communicated to the NRC staff at that time. Also, see the response to Item 4 above.

17. ***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: Because a reactor vendor and license applicant have not been designated at this time, specifics regarding modular fabrication are not currently available.

18. ***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 item 17.

19. 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 on site?

RESPONSE: See response to item 17.