October 29, 2008

Mr. Edward Peschko
18105 Fairhomes Lane
Wayzata, MN 55391

SUBJECT: RESPONSE TO INQUIRIES ON NUSCALE AND HYPERION REACTORS

Dear Mr. Peschko:

On behalf of the Chairman of the U.S. Nuclear Regulatory Commission (NRC), I am responding to your e-mail of September 27, 2008. You asked how the NRC intends to help the industry pursue - and help the NRC regulate effectively - small scale nuclear reactors such as the NuScale and Hyperion power reactors. In your e-mail, you asked several questions concerning the licensing and inspection of these types of reactors. The following are responses to your inquiries:

(1) Is there a way to fast track acceptance of a given reactor design?

Part of the NRC's mission is to ensure adequate protection of public health and safety, and to protect the environment. To accomplish this mission, the NRC regulates the design, siting, construction, and operation of new commercial nuclear power facilities. (For more information, see http://www.nrc.gov/reactors/new-reactors.html.) However, it is the responsibility of the U.S. Department of Energy, not the NRC, to promote America's energy strategies, including those involving nuclear power.

Accordingly, safety is the most important consideration in evaluating license applications, licensee performance, and proposed changes to the regulatory framework. The so-called nuclear renaissance depends on maintaining public confidence that nuclear facilities are and will continue to be operated safely. This confidence is based on the continued safe operation of the current fleet of operating nuclear facilities and comprehensive NRC reviews of new reactor designs. Accelerating the review of a new, unproven design without sufficient analysis and verification testing will not serve the interests of safety or public confidence.

Over the past few years, the NRC has undertaken a number of regulatory infrastructure improvements that provide a foundation for more efficient and effective licensing activities with the intent of streamlining the review process, including the promulgation of alternative licensing processes in Title 10 of the *Code of Federal Regulations*, Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." The revised licensing process includes reviewing a license application and conducting mandatory hearings on a final design before any significant construction begins. This improved licensing approach provides for effective and efficient use of NRC and applicant resources while minimizing licensing risk, and therefore financial risk, to the applicant. Additionally, this process should reduce the amount of work (and therefore, time) necessary to approve operating licenses for standard designs at more than one site. The staff has been applying this revised review process to the combined license (COL) applications for large capacity nuclear reactors that have been recently submitted for staff review.

The NRC strives to review applications submitted to it in a timely manner. However, our ability to conduct reviews within a prescribed time frame or on schedules comparable to those established for existing new light-water reactor (LWR) applications depends on the NRC's familiarity with the technology, the state of development of the design, the amount of testing and operational experience available, and the level of funding provided by Congress.

The NuScale design is based on LWR technology for which there is a great deal of testing and operational experience. The NRC is very familiar with the technology, the reactor physics involved with LWR fuel is well understood, and NuScale has a scaled testing facility for their design. However, the configuration of the NuScale design and the proposed method of operation involve some unique technical, safety, and licensing policy issues that will have to be addressed during the course of a licensing review, which could affect the licensing schedule. NuScale is in the process of developing its design certification (DC) application, and has begun meeting with the NRC staff to discuss some of these key licensing issues in an attempt to resolve these issues before finalizing the application. NuScale has informed the NRC that it intends to submit a DC application in fiscal year (FY) 2010.

On the other hand, the Hyperion Power Reactor is a small, self-regulating hydrogen-moderated and potassium-cooled reactor, which is fueled by powdered uranium hydride. Hyperion Power Generation is in the early stages of development of this design, and very little testing information is available for this design concept. Hyperion Power Generation has indicated that it will submit technical reports to support a pre-application review in late FY 2009. The NRC cannot engage in any meaningful, formal technical interaction with the potential applicant until we receive those reports. Because of the very limited amount of test data and lack of operating experience available for a uranium hydride reactor, the NRC staff anticipates that a licensing review would involve significant technical, safety, and licensing policy issues.

Finally, while the NRC recoups approximately 90 percent of its budget through fees, the NRC's annual expenditures are limited by the funding appropriated by Congress. Consequently, when workload exceeds appropriated funding, the Commission must prioritize its workload and make hard choices. At this time, the NRC is not currently funded to review the design of the NuScale and Hyperion reactors. In a letter dated July 16, 2008, to certain members of the United States Congress (enclosed for your convenience), the NRC stated that reviews of all applications, regardless of vendor or reactor size, are prioritized based upon available NRC resources. As discussed in that letter, the Commission has an established policy to support design certification reviews before a construction permit or COL application has been filed. However, when it is time to execute the budget in a given fiscal year, the staff gives higher priority to applications that are aligned with a COL partner and assigns a lower priority to applications that are not clearly aligned with a COL partner if funding is not approved to review all applications. As of mid-October 2008, the NRC has received 15 applications for COLs for 24 large-capacity LWRs from domestic electric utilities or other U.S.-based entities. Neither NuScale nor Hyperion has a formal commitment from a U.S.-based entity to submit an application for a COL that references their design. Currently, the effort required for the NRC to review the number of licensing applications already submitted exceeds the resources in the FY 2009 budget that the President submitted to Congress. Thus, the NRC currently plans to limit interaction with designers of the small reactors to occasional meetings or other nonresource-intensive activities.

(2) Do you have in place policies for approval of the remote monitoring of totally autonomous reactors, as opposed to site inspections?

Continuous monitoring of reactor operation is the responsibility of the plant operator. The NRC's oversight role includes observation of plant staff, construction activities, operational activities, and maintenance of plant equipment to ensure the safe operation of nuclear reactors. However, the NRC does not have the capability to remotely monitor reactors on a continuous basis. The NRC staff does not foresee changing this approach to oversight in the near future.

(3) Do you have regulators in place that understand the Uranium-Hydride fuel lifecycle?

With respect to Hyperion, while the NRC is aware of the concept, to our knowledge Hyperion Power Generation has not conducted proof-of-concept testing demonstrating that fuel-moderator interactions occur as theorized, nor are we aware of any testing facilities that will be used to support the basic principles on which the Hyperion design is based. Extensive analysis and testing will be necessary to demonstrate that the predicted fuel-moderator interaction and other design aspects will operate as predicted before the NRC issues a license. The NRC staff's expertise in these areas will be developed as the Hyperion design matures. In addition, to supplement the technical expertise of the staff, the NRC may engage the assistance of experts from national laboratories to ensure that we have a well-rounded knowledge base to perform a licensing review of the Hyperion Power Reactor if an application is submitted.

(4) To what extent do you have operators that inspect nuclear component factories?

Licensees have the primary responsibility to ensure that they and their contractors supply components that meet performance specifications and quality assurance requirements. However, the NRC has a vendor inspection program in place to assure adequate oversight of contractors and suppliers to the commercial nuclear industry. The NRC conducts inspections on a sampling basis to verify that licensees are adequately overseeing their contractors. The agency also conducts inspections at a sample of vendor facilities to examine whether vendors comply with the Commission's regulations, and to assess the implementation of the supplier's quality assurance program under which safety-related components and/or services are manufactured and provided to the nuclear industry. In addition, the agency performs focused inspections of nuclear component suppliers when needed to address operational events or concerns raised about product quality. The staff continues to evaluate its vendor and construction inspection programs to refine them to account for the effect of the expected increase in activities within the nuclear industry associated with new reactor plant design and construction.

The staff has received your follow-up e-mail dated October 20, 2008, providing additional suggestions for streamlining and focusing advanced reactor activities. The staff will consider your suggestions as the advanced reactor program evolves and pre-application and application activities for advanced reactor designs progress. You may follow the development and resolution of policy and key technical issues for advanced nuclear reactors as well as other agency activities by periodically checking the following website: http://www.nrc.gov/reading-rm/doc-collections/commission.

In accordance with the agency's objectives regarding openness of communications, this letter and your e-mails will be made publicly available in the Public Electronic Reading Room found on the Internet at http://www.nrc.gov/reading-rm.html. From this site, the public can gain access to the NRC's Agencywide Document Access and Management System. If you have any further questions on this matter, please contact Mr. William Reckley at (301) 415-7490.

Sincerely,

/RA/

Edward T. Baker, Director
Advanced Reactor Program
Office of New Reactors

Project Nos. 758 and 769

Enclosure:
As stated

cc w/encl: See next page

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