

July 26, 2010

Mr. Jim Kinsey
Director, Regulatory Affairs
Next Generation Nuclear Plant Project
Idaho National Laboratory
P.O. Box 1625
2525 North Fremont Ave
Idaho Falls, ID 83415

SUBJECT: NEXT GENERATION NUCLEAR PLANT (NGNP) - REQUEST FOR
ADDITIONAL INFORMATION LETTER NO. 001 REGARDING DEFENSE-IN-
DEPTH

Dear Mr. Kinsey:

By letter dated December 9, 2009, Idaho National Laboratory, Next Generation Nuclear Plant Project, submitted white paper, INL/EXT-09-17139, "Next Generation Nuclear Plant – Defense-in-Depth Approach," requesting that the Nuclear Regulatory Commission (NRC) staff review of this document in order to facilitate resolution of key design, safety, and licensing issues.

The staff has identified that additional information is needed to continue portions of the review and the request for additional information (RAI) is contained in the enclosure to this letter. Because of the close relationship between defense-in-depth and other pending NGNP submittals, it is likely that additional questions on defense-in-depth and those related topics will be generated once NRC staff has received and conducted its initial review of those pending submittals.

Should you have questions, please contact me at (301) 415-1470 or Joseph.Williams@nrc.gov.

Sincerely,

/RA/

Joseph F. Williams, Sr. Project Manager
Advanced Reactor Branch 1
Advanced Reactor Program
Office of New Reactors

Project No.: 0748

Enclosure:
Request for Additional Information

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Director, Regulatory Affairs
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Enclosure:
Request for Additional Information

Distribution:
JWilliams, NRO
TKevern, NRO
NRO_ARP_ARB1

E-RAI Tracking Nos.: 4805, 4807, 4811, 4814, and 4815

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NRO-002

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DATE	07/26/10	07/26/10

*Approval captured electronically in the electronic RAI system.

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Request for Additional Information No. 4805 Revision 0 (December 2009)

6/11/2010

Next Generation Nuclear Plant Pre-Application Activities
Department of Energy - Idaho National Laboratory
Docket No. PROJ 0748
SRP Section: ARP DD - Defense in Depth
Application Section: INL/EXT-09-17139 Section 3.1.1

QUESTIONS for Advanced Reactor Branch 1 (ARB1)

ARP DD-2

The footnote on page 19 in section 3.1.1 states that "It is expected that intermediate design performance or reliability metrics will be used to establish the special treatment requirements." Clarify what is meant by this statement. What are "intermediate design performance or reliability metrics?" Why are intermediate metrics adequate for definition of special treatment, as opposed to final design parameters?

Enclosure 1

Request for Additional Information No. 4807 Revision 0 (December 2009)

6/11/2010

Next Generation Nuclear Plant Pre-Application Activities
Department of Energy - Idaho National Laboratory
Docket No. PROJ 0748
SRP Section: ARP DD - Defense in Depth
Application Section: INL/EXT-09-17139 Section 3.3.1.4

QUESTIONS for Advanced Reactor Branch 1 (ARB1)

ARP DD-3

In section 3.3.1.4, the statement that there is a "low level of excess reactivity and on-line refueling capability for the PBMR based NGNP design" only addresses a single design concept. Provide a discussion of reactivity accidents for prismatic designs.

ARP DD-4

In section 3.3.1.4, justify the claim that there are no significant reactivity addition accidents, given the presence of steam generators.

Enclosure 2

Request for Additional Information No. 4811 Revision 0 (December 2009)

6/11/2010

Next Generation Nuclear Plant Pre-Application Activities
Department of Energy - Idaho National Laboratory
Docket No. PROJ 0748
SRP Section: ARP DD - Defense in Depth
Application Section: 3.2.2

QUESTIONS for Advanced Reactor Branch 1 (ARB1)

ARP DD-5

In section 3.2.2, explain how siting is considered plant capability defense-in-depth.

Enclosure 3

Request for Additional Information No. 4814 Revision 0 (December 2009)

6/11/2010

Next Generation Nuclear Plant Pre-Application Activities
Department of Energy - Idaho National Laboratory
Docket No. PROJ 0748
SRP Section: ARP DD - Defense in Depth
Application Section: Programmatic DID

QUESTIONS for Advanced Reactor Branch 1 (ARB1)

ARP DD-6

Basic LWR strategies for managing catastrophic events call for covering the core with water. This action serves to terminate melt progression and reduce fission product releases. In modern HTGR designs, the corresponding challenge would be to terminate and mitigate a postulated severe graphite oxidation event involving massive and sustained air ingress. (For the MHTGR design, the Commission called out such events in the Staff Requirements Memorandum for SECY-93-092; see top of page 2).

Describe how programmatic DiD would establish and evaluate appropriate strategies for managing the progression and consequences of postulated severe air ingress events with massive graphite oxidation.

Enclosure 4

Request for Additional Information No. 4815 Revision 0 (December 2009)

6/11/2010

Next Generation Nuclear Plant Pre-Application Activities
Department of Energy - Idaho National Laboratory
Docket No. PROJ 0748
SRP Section: ARP DD - Defense in Depth
Application Section: NGNP Licensing Strategy

QUESTIONS for Advanced Reactor Branch 1 (ARB1)

ARP DD-7

Provide a discussion of how the proposed DID approach is consistent with the NGNP Licensing Strategy Report plan for a risk-informed and performance-based licensing approach, using deterministic engineering judgment and analysis, complemented by design-specific PRA information.

Enclosure 5