December 2, 2008

MEMORANDUM TO: Michael R. Johnson, Director
Office of New Reactors

THROUGH: Patrick M. Madden, Deputy Director */RA/*
Division of New Reactor Licensing
Office of New Reactors

FROM: Stephen Koenick, Senior Project Manager
Organizational Effectiveness and Productivity Branch
Division of New Reactor Licensing
Office of New Reactors

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION FOREIGN TRIP REPORT ON THE TRAINING WORKSHOP – NRC'S REGULATORY REVIEW OF THE AP1000 REACTOR DESIGN PRESENTED IN CHINA OCTOBER 20 – 31, 2008

The enclosed trip report summarizes the U.S. Nuclear Regulatory Commission's (NRC) training workshop on its regulatory review of the AP1000 reactor design which was presented to the staff on the National Nuclear Safety Administration (NNSA) of the People's Republic of China, other affiliated organizations, and Sanmen Nuclear Power Corporation in Beijing, China from October 20 – 31, 2008. This training workshop was the second cooperative activity under the Memorandum of Cooperation (MOC) between the NRC and the NNSA signed in May 2007.

The training workshop focused on the NRC's regulatory review of the AP1000 design certification as documented in NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design." NRC staff with technical assistance provided by Information System Laboratories (ISL), Inc., developed and presented the training workshop materials to the participants. The training workshop materials are available in ADAMS, ML082880211. The training workshop also provided insights related to the NNSA requests for additional information that it asked its AP1000 applicant, the Sanmen Nuclear Power Corporation. The following NRC staff members and consultants participated in this training workshop: Patrick Madden, Office of New Reactors (NRO), Scott Moore, Office of International Programs, Jeffrey Jacobson, NRO, Stephen Koenick, NRO, Scott Newberry, ISL, Jack Rosenthal, ISL, Jack Strosnider, ISL, and Dr. John Bickel, ISL. This report also contains information obtained during discussions with our Chinese counterparts. The release of this information could interfere with our ability to communicate openly in the future.

CONTACT: Stephen Koenick, DNRL/NRO
301-415-1239

Because the MOC agrees to cooperation on the nuclear safety review, the content of this report may be of interest to the Commission and it is recommended that the report be forwarded to the Commission for information.

Enclosure:
NRC Foreign Trip Report

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Enclosure:
NRC Foreign Trip Report

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NAME	SKoenick	PMadden
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NRC FOREIGN TRIP REPORT
UNITED STATES NUCLEAR REGULATORY COMMISSION TRAINING WORKSHOP
REGULATORY REVIEW OF THE AP1000 REACTOR DESIGN

Subject

This trip report summarizes the NRC training workshop on its regulatory review of the AP1000 reactor design which was presented to the staff on the National Nuclear Safety Administration (NNSA) of the People's Republic of China, other affiliated organizations, and Sanmen Nuclear Power Corporation in Beijing, China from October 20 – 31, 2008. This training workshop was the second cooperative activity under the Memorandum of Cooperation (MOC) between the NRC and the NNSA signed in May 2007. The trip report from the first training workshop which occurred in August 2007 can be found in ADAMS, ML072560114. The MOC agrees to cooperation on the nuclear safety review and inspection for the siting, design, manufacturing, construction, commissioning and operation phases of the AP1000.

Prior to this training workshop, the Chairman of the NRC met with NNSA in Beijing. This visit coincided with the first NRC-NNSA Steering Committee on Nuclear Safety Cooperation. On January 7, 2008, the NRC and NNSA signed the "Protocol Between the Nuclear Regulatory Commission of the United States of America and the National Nuclear Safety Administration (NNSA) of the People's Republic of China on Cooperation in Nuclear Safety Matters." (b)(4)

(b)(4)

Exemption 4

(b)(4)

Dates of Travel and Countries/Organizations Visited

October 17 – November 1, 2008, Beijing, China

Author, Title, and Agency Affiliation

Stephen Koenick, Senior Project Manager,
Organizational Effectiveness and Productivity Branch, Division of New Reactor Licensing (DNRL), Office of New Reactors (NRO)

Accompanied by the following NRC managers, staff, and consultants:
Patrick Madden, Deputy Director, DNRL, NRO;
Scott Moore, Deputy Director, Office of International Programs (OIP);
Jeffrey Jacobson (NRO), Acting Technical Assistant for International Activities, NRO,
Scott Newberry, Information Systems Laboratories (ISL), Jack Rosenthal (ISL),
Jack Strosnider (ISL), and Dr. John Bickel (ISL).

Enclosure

Sensitivity

Official Use Only / Non-Public This report contains information obtained during discussions with our Chinese counterparts. Release of this information may inhibit our ability to have similar discussions in the future.

Background/Purpose

The primary purpose of this trip was to conduct a technical training workshop for the Chinese on the NRC's regulatory review of the AP1000 reactor design. This training workshop was the second cooperative activity under the MOC between the NRC and the NNSA signed in May 2007.

Abstract: Summary of Pertinent Points/Issues

NRC staff and their consultants presented a complete overview of the NRC's regulatory review of the AP1000 reactor design as documented in NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design." The NRC's design certification, as promulgated in Appendix D to 10 CFR Part 52, is based on Revision 15 of the Design Certification Document (DCD). Concurrent to this workshop, the NRC is reviewing the AP1000 DCD Revision 16 as part of Westinghouse's design certification amendment request. In addition, NNSA is reviewing the Sanman Construction Permit application for AP1000 reactor design.

Feedback from the workshop participants on the NRC's presentations and technical content was that the presentations are very beneficial and the information presented was very supportive of their ongoing regulatory reviews of the Sanmen application.

Outside of the training workshop, NRC staff held several meetings with NNSA. (b)(4)

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The NRC also held a meeting on October 23, 2008, with NNSA to discuss the scope of regulatory reviews of the Sanmen Construction Permit application as compared to the AP1000 design certification and Bellefonte Combined Licensing application.

Discussion

TRAINING WORKSHOP ON THE NRC'S REGULATORY REVIEW OF THE AP1000 DESIGN CERTIFICATION

The NRC/NNSA training workshop was held at the Grand Epoch Center, located in a southeastern suburb of Beijing, China.

This two-week workshop represented a complete overview of the NRC staff's safety review of the AP1000 DCD, Revision 15 as documented in NUREG-1793. NRC staff with technical assistance provided by Information System Laboratories, Inc., developed and presented the training workshop materials which can be in ADAMS, ML082880211.

The first week focused on systems, reactor performance, radiation protection and operations. The second week focused on engineering and probabilistic risk assessment. The training workshop agenda is attached. Each of the subject matter modules were organized as follows:

1) A brief overview discussion of the review subject area;
2) Applicable regulations and associated acceptance criteria for each subject area;
3) NRC's regulatory review -- highlighting key issues
   a) Discussion of significant requests for additional information (RAI) and subsequent resolution;
   b) Discussion of open items from the safety evaluation report and subsequent resolution;
   c) Identification of items requiring resolution by combined license (COL) applicants or combined license holders (COL information items); and
   d) Risk-informed issues and the regulatory treatment of non-safety systems;
4) Identification of design changes included in Westinghouse DCA; and
5) NRC's findings.

In addition, prior to the workshop, NNSA provided the NRC with RAI that were asked during the Sanmen Construction Permit application review. The discussion leader's addressed these questions throughout their presentations.

The interaction between the NRC staff, its consultants, and the workshop participants was excellent. NNSA is currently reviewing the Sanman AP1000 application and the participants were very familiar with the NRC's regulations, acceptance criteria and safety evaluation report. The NNSA RAIs provided to the NRC in advance of the training workshop and other questions raised during the training workshop are attached. Subject matter discussions between the NRC and the participants usually fit into several categories:

1) Additional insight to staff's conclusions;
2) Clarification of scope and level of detail provided in the DCD and Bellefonte COL application compared to the Sanmen Construction Permit Application;
3) Currently open technical issues being reviewed in the Westinghouse DCA or the Bellefonte COL application;
4) Whether/how NRC would apply recently updated regulatory guidance (e.g., the instructors provided a general discussion of the backfit process), and
5) Differences in regulations – notably radiation protection dose limits.

In addition, the NRC developed and administered an examination at the conclusion of the training workshop to the participants. Closing remarks provided an overview of examination topics and communicated the staff's appreciation for NNSA's hospitality during the staff's visit to China.

There were more than 120 workshop participants the following organizations:

- Beijing Nuclear Safety Review Center
- China Nuclear Power Research and Design Institute
- Department of Nuclear Safety and Radiation Management, NNSA
- Nuclear and Radiation Safety Center, MEP
- Nuclear Components Safety and Reliability Center, Research Institute of Machinery Sciences
- Sanmen Nuclear Power Corporation, Ltd
- Shandong Nuclear Power Company, Ltd
- Shanghai Institute for Nuclear Engineering Research & Design
- Shanghai Regional Office of Nuclear Safety and Radiation Monitoring, MEP
- Shanghai Jiaotong University
- Suzhou Nuclear Safety Center

Feedback from the workshop participants on the NRC's presentations and technical content was that the presentations are very beneficial to support their ongoing regulatory reviews of the Sanmen application.

Consistent with our current training workshop process which allows foreign attendees to return home with NRC course materials, the staff provided the AP1000 Technology Manual to NNSA for interpretation and reproduction prior to the staff's visit.

In addition, to the training workshop materials, the staff provided electronic copies of the following NRC public documents:

- NUREG-1512, "Final Safety Evaluation Report Related to Certification of the AP600 Standard Design"
- NUREG-1793, "Final Safety Evaluation Report Related to the Certification of the AP1000 Standard Design"
- RAIs from the AP600, AP1000, and AP1000 amendment request reviews
- Key SECY papers related to the AP1000

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(b)(4)

October 23, 2008, the NRC staff and NNSA discussed the scope of regulatory reviews of the Sanmen Construction Permit application as compared to the AP1000 design certification and Bellefonte Combined Licensing application.

On October 23, 2008, Mr. Scott Moore, Deputy Director, OIP, Mr. Patrick Madden, Deputy Director for Policy and Infrastructure, Division of New Reactor Licensing (DNRL), NRO, and Mr. Stephen Koenick, DNRL, NRO, met with Mr. Li Jigen, Director, Division 1 of Nuclear Power, NNSA and other representatives of NNSA and the Nuclear and Radiation Safety Center (NSC). The purpose of this meeting was to gain an understanding of NNSA's regulatory review of the Sanmen CP application as compared to the NRC's regulatory review of the AP1000 DC and Bellefonte COL application. A list of attendees is attached.

The scope of NNSA's review of the Sanmen CP includes the preliminary safety analysis report (PSAR), construction quality assurance program and the environmental report. NNSA's regulatory process is a two-step licensing process similar to 10 CFR part 50. Through the discussion, it was apparent that the scope of information provided in the Sanmen PSARs comparable to that of the AP1000 DCD through Revision 16 (the version of the design currently being reviewed as part of Westinghouse's design certification amendment request) and the Bellefonte COL FSAR. In addition, since the NNSA's review is occurring in parallel to the NRC's review of the AP1000 DCA (b)(4)

(b)(4)

NNSA's timeframe for issuance of the CP is one year after submittal or March 2009 for Sanmen. Following construction, concurrent with fuel load, Sanmen will be submitting a request for operating license and accompanying FSAR. NNSA has a schedule for issuance of an operating license within 1 year of receipt of the operating license request.

Given the short timeframe associated with review of the FSAR, NNSA is very interested in the NRC's construction inspection program and the use of inspection, test, analysis, and acceptance criteria (ITAAC) process. This appeared to be an area of future cooperation.

In addition, NNSA discussed the AP1000 and the Sanmen CP in the context of their overall nuclear program which includes the EPR, a two-loop indigenous design, as well as a high temperature, gas cooled reactor (HTGR) Russian design.

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Pending Actions/Planned Next Steps for NRC

NRC and NNSA need to have further dialogue on future areas of cooperation. There are tentative plans for representatives from the Division of Construction Inspection and Operational Programs to visit NNSA to discuss future areas of collaboration.

Points for Commission Consideration/Items of Interest

None

Attachments

1. Training workshop agenda
2. List of Sanmen RAIs and Workshop questions
3. Training workshop examination
4. List of training workshop attendees
5. October 21, 2008, meeting attendees
6. October 28, 2008, meeting attendees

References

- Presentations and Training workshop materials (ML082880211)
- Trip Report – China Training -- August 2007 (ML072560114)
- Protocol between US NRC and NNSA of the People's Republic of China – January 7, 2008 (ML081050289)
- July 9, 2008 Videoconference Meeting Minutes (ML082900473)

"On the Margins"

None