

William D. Magwood, IV
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MEMORANDUM TO: Joseph W. Shea, Chief
Regional Operations and Program Management Staff
Office of the Executive Director for Operations

FROM: Marsha Gamberoni, Deputy Director
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

SUBJECT: VISIT BY WILLIAM D. MAGWOOD, IV, DOE, WITH CHAIRMAN
MESERVE

On October 29, 2002, Mr. William D. Magwood, IV, Director, Office of Nuclear Energy, Science and Technology, U.S. Department of Energy (DOE) will meet with Chairman Meserve.

This meeting is to discuss new reactor licensing issues, including Near Term Deployment by 2010 and potential combined license (COL) applications. Attached is a background briefing package in preparation for the meeting to include:

- Briefing Sheet
- New Reactor Licensing Projects Schedule

Should you require any additional information, please contact Amy Cabbage at 415-2875.

Attachments: As stated

cc w/atts: S. Collins/J. Johnson
W. Borchardt
J. Lyons
M. Case
F. Eltawila
J. Flack
T. Bergman

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DROP IN VISIT BRIEFING PACKAGE FOR

Mr. William D. Magwood, IV, DOE

Visiting Official: Mr. William D. Magwood, IV, Director,
Office of Nuclear Energy, Science and Technology,
U.S. Department of Energy (DOE)

Date of Visit: October 29, 2002

Project: New Reactor Licensing Topics

BACKGROUND

In response to renewed interest licensing nuclear power plants, the Office of Nuclear Reactor Regulation (NRR) established the New Reactor Licensing Projects Office (NRLPO), and the Office of Research established the Advanced Reactor Group (ARG). NRLPO is managing activities related to advanced light water reactor (ALWR) design certification and pre-application reviews, early site permit (ESP) pre-application reviews, and regulatory infrastructure assessment and development. The ARG is managing pre-application reviews for high temperature gas-cooled reactor (HTGR) designs and activities related to advanced technology infrastructure development.

EXPECTED TOPICS FOR DISCUSSION ON APRIL 16, 2001

- A status report on DOE's activities regarding near term deployment of new nuclear power plants.
- A discussion of potential combined license (COL) applications
- A discussion of the NRC's new reactor licensing activities and schedules

CURRENT ISSUES:

Outside
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AP1000 Design Certification:

Westinghouse applied for design certification of the AP1000 design on March 28, 2002, after completing a pre-application review phase that lasted approximately 18 months. The Westinghouse AP1000 passive advanced light-water reactor design is based on the AP600 design, which was certified in December 1999. The AP1000 is a larger version of the AP600 and is an approximately 1100 megawatt electric pressurized water reactor plant design in which passive safety systems are used for the ultimate safety protection of the plant. (The "1000" designation is the projected cost (\$/kW) of the nth operating plant.) Based on the similarities in designs of the AP600 and AP1000, Westinghouse and the NRC staff expect efficiencies to be gained during the design certification review (as compared to a generic design certification review). The staff expects to complete the final design approval in October 2004 and the associated rulemaking in December 2005. As of October 1, 2002, the staff has completed its acceptance review and issued the requests for additional information (700 total) in accordance with the schedule.

Pre-Application Reviews:

ESBWR

The General Electric (GE) ESBWR is a 1390 MWe reactor, using natural circulation for normal operation, with passive safety features. This design is based on the certified Advanced BWR (ABWR) and the Simplified BWR (SBWR) designs. The request for a pre-application review of the ESBWR was received on April 18, 2002. The scope of the pre-application review includes an assessment of the technology basis for passive safety systems and the analysis methodology for transients and accidents. Topical reports in support of the pre-application review were submitted by GE on August 30, 2002 for NRC review. Additional submittals are expected by the end of October 2002. The staff plans to complete the pre-application review in the fall of 2003 and expects GE to submit an application for design certification in early 2004.

ACR-700

The Advanced CANDU Reactor (ACR-700) is a 731 MWe light-water-cooled reactor with two steam generators and four heat transport pumps. Similar to previous CANDU designs, the ACR-700 utilizes a heavy water moderator. However, this is the first reactor design in the CANDU series to have a negative void reactivity coefficient. The ACR-700 also uses slightly enriched uranium fuel, light water coolant, a separate heavy water moderator, computer-controlled operation and on-power refueling. A public meeting with Atomic Energy of Canada Limited (AECL) was held on July 24, 2002, to discuss the ACR-700

design and the proposed pre-application review. A public meeting was held on September 25 - 26, 2002, which included a series of technical presentations by AECL. At this meeting, AECL provided a proposed review plan which is currently being evaluated by the staff. In addition the staff is working on developing an approach regarding the appropriate level of coordination between the NRC, the Canadian Nuclear Safety Commission (CNSC), and the Nuclear Installations Inspectorate (NII) as the three regulatory agencies will be performing a simultaneous licensing of the design.

SWR-1000

The SWR-1000 is a Framatome ANP 1000 MWe boiling water reactor that uses passive safety features. The design is based on a Siemens concept (now Framatome ANP). The request for an SWR-1000 pre-application review was received on May 31, 2002. Framatome intends to submit materials for a pre-application review in mid-2004 and to submit an application for design certification by the end of 2005. Prior to the submittal of the pre-application material, Framatome expects to hold several meetings with the staff to identify and clarify issues related to the certification process and on matters of particular importance to the SWR-1000 design. For example, in an August 15, 2002, meeting, Framatome ANP discussed the adequacy of the research and testing already completed and currently planned to support the SWR-1000. The staff plans to visit principal test facilities in FY 2003 that were used, and will be used, to conduct testing to support the application. The facilities are mainly in Germany.

GT-MHR

The Gas Turbine-Modular Helium Reactor (GT-MHR) design is a 300-MWe helium reactor design based on the high temperature gas-cooled reactor (HTGR) technology. The GT-MHR design uses helium as the coolant and employs refractory fuel. The ceramic-coated particles in the GT-MHR design are contained in fuel compacts that are inserted in graphite fuel elements. The current design allows for up to four 300 MWe modules per common control room. The design is currently being jointly developed by the U.S. and the Russian Federation (under DOE sponsorship) for disposition of weapons grade plutonium. The pre-application review has begun and is expected to last approximately 22 months. General Atomics plans to discuss the issue of source term during the first technical meeting which is tentatively planned for December 2002.

IRIS

The International Reactor Innovative and Secure (IRIS) is a 100-335 MWe integral light water reactor with all reactor coolant piping and heat transport systems located inside the reactor vessel. The IRIS design emphasizes proliferation resistance and enhanced safety. The request for IRIS pre-application review was received on July 11, 2002, and Westinghouse had an initial meeting with the NRC in October to cover the IRIS design as

well as the proposed scope of the pre-application review. The current Westinghouse schedule calls for the preliminary design to be completed at the end of 2002 and the design certification application to be submitted in 2007, following conclusion of the AP1000 design certification.

PBMR

The Pebble Bed Modular Reactor (PBMR) is a modular HTGR that uses helium as its coolant. In December 2000, Exelon requested a pre-application review of the PBMR design. During 2001 and early 2002, the staff conducted a series of public meetings with Exelon to discuss topics related to the pre-application review. Topics of discussion included legal and financial issues, Exelon's proposed risk-informed licensing approach, and issues related to the PBMR design, such as containment vs. confinement, source term, fuel quality, and high temperature materials. In April 2002, Exelon decided not to continue with the pre-application review of its PBMR design. The South African company PBMR Pty., which is developing the PBMR design, has recently expressed interest in restarting pre-application activities with the NRC. In August and October, PBMR Pty. Discussed its future plans for a certification review of the PBMR with NRC management. PBMR Pty. indicated that they plan to request a pre-application review of the design to begin as early as 2004, and submit a design certification application in 2006. PBMR Pty. also discussed several major design differences that have evolved, including an eight-module configuration instead of 10, an increase in power to 165 MWe per module, 10 years storage of spent fuel in the plant (with additional storage capability in onsite concrete silos), and a fixed central reflector column. PBMR Pty. expects to start the construction of the South African demonstration unit in November 2005 and to complete construction in October 2007.

Early Site Permits (ESPs)

Three utilities have indicated they will apply for early site permits in 2003.

<u>Utility</u>	<u>Site</u>	<u>Date</u>
Exelon	Clinton	June 2003
Entergy	Grand Gulf	June 2003
Dominion	North Anna	September 2003

The staff has met monthly with the three prospective applicants and NEI to address generic issues related to the early site permit applications and reviews. The prospective applicants have informed the staff of the activities they are undertaking at the sites. The staff has conducted site visits to observe some of these activities in order to identify if there are any problems with the data gathering approach. In addition, the staff will hold public meetings in the vicinity of each site to explain the early site permit process and to inform the public how they can be involved in the process. The staff is also currently developing an Early Site Permit Review Standard to ensure a rigorous and consistent review is performed on any early site

permit application submitted. This Review Standard, which is intended to make optimum use of existing NRC guidance on subjects related to an early site permit, is scheduled to be released for public comment and interim use by the end of 2002. The final Review Standard is scheduled for release by the end of 2003.

Construction Inspection Program

The staff is developing a construction inspection program for the COL process. A construction inspection team, consisting of representatives from NRR and each Regional Office, has been developing inspection guidance for early site permits, granting of a combined license, construction activities associated with a combined license, and the transition from construction activities to the reactor oversight process.

Rulemaking

The staff has proposed revisions to 10 CFR Part 52 that are before the Commission. The staff is developing the technical bases for revising 10 CFR Parts 51 to account for higher burnup fuels in current and new reactors. The staff is also considering changes to the ALARA requirements and operator staffing to address new reactor licensing issues.

Research Activities:

In response to SECY-01-0188, "Future Licensing and Inspection Readiness Assessment [FLIRA]," dated October 12, 2001, the staff performed an infrastructure assessment to identify technology gaps, and means to fill the gaps in the form of methods, tools, data, and expertise. The Commission had been forwarded a draft copy of the assessment and a memorandum dated July 22, 2002, that identified primary research areas and cooperative efforts to address and resolve key technical issues associated with advanced reactors. A final copy will be forwarded to the Commission in November 2002. The staff will continue to interact with applicants, vendors, and others as the technologies evolve, to set priorities so that the NRC will be well prepared to respond effectively and efficiently to industry's request to license advanced reactor designs.

Additionally, on October 10, 2002, RES gave a presentation to the ACRS on the Technical Related Policy Issues for Future Non-Light Water Reactors. The objective of the briefing was to discuss the schedule and options for the resolution of the seven policy issues identified in SECY-02-0139, "Plan for Resolving Policy Issues Related to Licensing Non-Light Water Reactor Designs". The issues identified in the SECY and discussed at the ACRS briefing were: (1) expectations for safety, (2) defense-in-depth, (3) use of international codes and standards, (4) event selection, (5) source term, (6) containment vs. confinement, and (7) emergency preparedness. A public workshop addressing these seven issues was held on October 22-23 at the Double Tree Hotel in Rockville, MD. These issues will be discussed further at an ACRS Subcommittee meeting to be held later this year. RES plans to send a paper summarizing staff recommendations on each issue to the Commission in December.

NEW REACTOR LICENSING SCHEDULE

ID	Task Name	2002				2003				2004				2005				2006				
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
1	Early Site Permits																					
2	Exelon																					
3	Entergy																					
4	Dominion																					
5	Design Certifications																					
6	AP1000 Certification																					
7	Application submitted																					
8	Request for Additional Information																					
9	Draft Safety Evaluation Report																					
10	Final Safety Evaluation Report																					
11	Final Design Approval																					
12	Rulemaking completed																					
13	ESBWR pre-application																					
14	kickoff meeting																					
15	Phase 1 completed																					
16	Request for Additional Information																					
17	Draft Safety Evaluation Report																					
18	Phase 2 complete																					
19	ESBWR Design Certification Applic.																					
20	ACR-700 pre-application review																					
21	SWR-1000 pre-application review																					
22	GT-MHR pre-application review																					
23	IRIS pre-application review																					
24	PBMR pre-application review																					