~~LIMITED OFFICIAL USE ONLY~~

FUTURE APPLICATIONS RISK ANALYSIS

by Jerry N Wilson

Future Application: **Early Site Permits**
Licensing Risk: **Low**
Discussion: Four electric companies (Dominion, Entergy, Exelon, and Southern) are planning on submitting applications for early site permits at existing sites, based on statements by NEI representatives on April 5, 20001, with the first submittal in mid-2002. The proposed sites are next to currently operating nuclear power plants that are owned by the electric companies The NRC's review would be in accordance with Subpart A of Part 52 and would consist of site safety, emergency planning, and environmental impact. Because these proposed sites are next to operating reactors, it is unlikely that there will be any significant licensing issues for either site safety (geology, seismology, hydrology, et al) or emergency planning. However, there are many new environmental regulations that have been issued since the existing sites were originally reviewed (20-30 years ago) and the review approach for some issues, i.e. alternate sites, is outdated for the planned "merchant" plant scenario. Also, it is highly likely that there will be many petitions for invention in an early site permit proceeding.

Future Application: **Design Certification for AP1000**
Licensing Risk: **Moderate**
Discussion: Westinghouse Electric Company is preparing to submit an application for certification of its new AP1000 design, under Subpart B of Part 52, in early-2002. This design is based on the AP600 design, which was certified by the NRC in December 1999, and has the following changes:

- increased size of pressurizer,
- increased size of containment,
- increased size of steam generators,
- increased length and amount of fuel, and
- minimize changes to remainder of the plant

By letter dated August 28, 2000, Westinghouse requested the NRC staff to evaluate the following licensing issues in a pre-application review :

1. Applicability of AP600 Test Program
2. Applicability of AP600 Analysis Codes
3. Use of additional Design Acceptance Criteria
4. Use of AP600 exemptions

Westinghouse has stated that the decision on whether to submit an application for AP1000 will be based on the results of the pre-application review. The NRC has the necessary review skills, criteria, and guidance to perform another design certification review. However, both the ACRS and the staff have concerns regarding the applicability of the AP600 testing, analytical codes, and exemptions to the AP1000 design. The staff plans to submit the results of its pre-application review to the Commission before responding to Westinghouse. Based on past experience, it is unlikely that their will be any hearing requests for the AP1000 application

Future Application: **Construction Permit or Combined License for PBMR**

~~LIMITED OFFICIAL USE ONLY~~

Licensing Risk: **High**
Discussion: Representatives of Exelon Generation Company stated in a meeting on January 31, 2001, that they are planning on building ~ 10 pebble-bed modular reactor (PBMR) plants (each plant = 110 Mwe) at the Clinton site. Exelon representatives stated that they plan to submit the first application for a PBMR power plant in late-2002. However, Exelon has not yet decided whether to request a Construction Permit under the two-step process in Part 50 or a Combined License under Subpart C of Part 52. Exelon is currently partnered with BNFL, ESKOM, and IDC to complete a preliminary PBMR design and feasibility study by June 2001. Exelon will decide on whether to participate in Phase 2 of the PBMR project, which is building a demonstration plant in South Africa, in late 2001.

Exelon requested a pre-application review to help with their decision on whether to proceed with the PBMR project. As part of the pre-application review, the staff would assess the safety of the PBMR design technology and establish the general regulatory framework for licensing. The review would identify licensing criteria which would uniquely apply to an advanced High-Temperature Gas-Cooled reactor (HTGR). HTGRs involve characteristics that make their approach to protecting public health and safety very different from reactor designs currently licensed in the United States For example, among the four basic layers of defense-in-depth for ensuring public health and safety against potential adverse consequences - prevention, protection, mitigation and emergency planning - modular HTGRs typically result in a shift in emphasis from mitigation features to highly reliable protection features. These and other differences between HTGRs and current generation LWRs are expected to lead to a number of safety, technology and policy issues, i.e. high temperature materials performance; the qualification of accident analysis codes and methods; the qualification and performance of the coated particle/fuel spheres, the siting source terms, containment vs. confinement, and the range of postulated events that must be considered The staff plans to submit the results of its pre-application review to the Commission before responding to Exelon.

It appears that Exelon plans to build a new, unproven reactor concept before completion of the final design, demonstration of the performance of new safety features, resolution of the specific safety requirements and issues. This will result in very high financial risks for this licensing scenario and it is likely that there will be intervention in the licensing proceeding.

Future Applications: **GT-MHR, IRIS, and PRISM**
Licensing Risk: **Unknown**
Discussion: There is currently insufficient information about the plans of the applicants for these advanced reactor designs to make a determination on the licensing risks