NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Chairman Gregory B. Jaczko

SUBJECT: SECY-11-0002 – PROPOSED RULE: AP1000 DESIGN CERTIFICATION AMENDMENT (RIN 3150-AI81)

Approved __X__ Disapproved _____ Abstain _____

Not Participating _____

COMMENTS: Below ___ Attached _X__ None ___

SIGNATURE

1/25/11

DATE

Entered on "STARS" Yes _x_ No ___

Chairman Jaczko's Comments on SECY-11-0002,
"Proposed Rule: AP1000 Design Certification Amendment"

I continue to believe that certification of reactor designs through rulemaking is important to promoting design standardization, ensuring safety and security through rigorous independent technical and engineering reviews, promoting early resolution of technical and regulatory issues, and providing greater regulatory certainty and efficiencies to applicants seeking combined licenses. I approve the staff's recommendation to publish the proposed rule that will amend the AP1000 Design Certification Rule subject to my comments below.

The amendment to the AP1000 Design Certification Rule is a substantial improvement over the AP1000 design previously approved by the Commission. Many significant changes have been made by Westinghouse to resolve issues previously deferred to the combined license applicants referencing the AP1000 standard design, to resolve design acceptance criteria, to increase the detail of the design, to address a number of technical issues, and to address the aircraft impact issues. The review elicited a number of differing views from the staff in several non-concurrences. These differences are a visible example of how the staff exhibits the NRC's Organizational Values, in particular by their consistent commitment to our mission and their abiding respect for differing views. I applaud the staff for the professional manner in which they dealt with these issues. Most importantly, I applaud the staff for ensuring their review was focused on the protection of public health and safety in the face of persistent schedule pressures. The commitment and respect demonstrated by the staff and ACRS during this process furthers the type of open collaborative work environment that is key to our success as an agency.

There are many technical areas of importance reviewed by the staff in preparation of the proposed rule for the design certification amendment. I want to comment on the most significant continued point of disagreement among members of the staff, the ability of the shield building to meet the agency's requirements for seismic loads. This is an area of technical complexity, but the staff presented a clear explanation in the documents related to the non-concurrence. As with so many of the issues we deal with as an agency, even matters of technical complexity often come down to subjective judgments and interpretations of regulations, guidance, codes, and standards.

As I understand the issue, the disagreement rests on the necessity of the structural elements of the shield building to perform in a ductile manner. In revising the shield building design to satisfy staff concerns, Westinghouse proposed two types of modules to comprise the bulk of the shield building. Since these modules represent a new type of steel-concrete composite structure previously unused in the nuclear context in the United States, the staff required Westinghouse to confirm many of the structural properties of these modules through a series of tests. One of these modules, which would be used in approximately 60 percent of the shield building, was unable to satisfy the experimental protocol developed by Westinghouse and agreed to by the staff. In particular, this structural module failed the out of plane shear test in a brittle manner and therefore failed to exhibit ductile behavior. As I understand the issue, had the second module type satisfied the test protocols, there would be no disagreement among the staff. (This was in fact the case for the first module type used in the areas of the shield building which are expected to experience higher loads during the design basis event.)

The point of contention appears to me to be whether this is necessary to comply with the agency's regulations. The staff believes it does not because the forces that the shield building

would experience in the regions where these modules would be used would be much lower than the loads that would lead to failure of the module, in other words the module is strong enough. This has been determined by Westinghouse through simulation and reviewed and approved by the staff. As a result, the *overall structure* would exhibit ductile behavior because the second module type would not be expected to suffer significant deformation. In addition, the areas of the shield building in which the energy dissipation are concentrated would involve the first module type, which did exhibit ductile failure in experimental tests. Moreover the staff believes that the most relevant code here American Concrete Institute (ACI)-349 does not *require* ductility of all elements of the structure.

The non-concurrer, however, believes this does matter, because the most relevant code ACI-349-approved by the staff as an acceptable code for demonstrating compliance with seismic and structural regulations requires each element of the structure to demonstrate ductile failure *even for loads* which exceed the expected design loads of the design basis event, namely the safe shutdown earthquake. As I understand the position of the non-concurrer, the ductility requirement is a defense in depth measure to account for the inability to predict all the possible loads on a structure, but still ensure that there is not a catastrophic collapse if actual forces during an earthquake or other event are different than the forces analyzed by Westinghouse and the staff. Moreover ductility is an inherent property of the material determined by a test protocol which subjects the material to forces several times the forces necessary to deform steel. As a result, the ductility property is independent of the specific forces of any specific scenario.

Many individuals have reviewed this disagreement, including the Advisory Committee on Reactor Safeguards, and have found the approach taken by the staff acceptable. Based on the information, I have seen at this point there appears to be no one technically correct judgment in this case. Rather, the many reviewers of the shield building have different philosophical approaches to acceptable design. I applaud the non-concurrer for pursuing his view of the most appropriate manner in which to provide reasonable assurance of adequate protection.

I am not convinced at this time, however, that the design as presented does not comply with the Commission's regulations. While it is clear that the use of a ductile material in all areas of the shield building would provide an additional enhancement to safety, I am not convinced that there is a clear case that such a design requirement exists in the most relevant ACI code or any of the other codes referenced by Westinghouse and the staff and therefore would be seen as a necessary condition for approval by the staff. I suspect stakeholders will comment on this issue during the proposed rule stage and I encourage the Commission to specifically develop one or more questions to frame the issue and guide stakeholders to comment in the most productive manner for the Commission's consideration of the final rule for the design certification.

As part of their review, the staff effectively developed a standard for steel-concrete composite structures; however, I believe it would be more effective to develop such an approach apart from any specific design review. It is clear from the staff's safety evaluation that one of the challenges that they faced in reviewing the AP1000 shield building was the lack of a directly acceptable design and construction consensus standard. The lack of a directly applicable standard necessitated the reliance on portions of closely related standards produced by ACI, American Institute of Steel Construction, Japan Electric Association Code, and Federal Emergency Management Agency. If this type of construction is to be continued in the United States for facilities regulated by the NRC, it would be advantageous to have such a detailed standard developed independent of any specific design approval. Therefore, I also encourage the staff to aid in any effort by the ACI or other consensus standard organization to develop a

standard that covers the proper design and construction of steel-concrete composite structure that form part of a nuclear power plant and that has nuclear safety-related functions.

As the staff evaluates comments on this proposed rule, I am confident that the staff will continue to demonstrate their commitment to public health and safety and respect for differing views by their thoughtful consideration of the public comments that may be submitted on the proposed rule and the technical changes to the AP1000 standard design, specifically, the shield building and instrumentation and controls.

1/31/11

Gregory B. Jaczko Date