

July 17, 2013

Mr. Marvin Lewis
3133 Fairfield Street
Philadelphia, PA 19136

SUBJECT: AP1000 STEEL CONTAINMENT DESIGN

Dear Mr. Lewis:

I am responding to your June 27, 2013, email about the AP1000 steel containment system and potential corrosion. The issue you raise was evaluated for the AP1000 as part of the AP1000 design certification review as well as the combined license reviews for the Vogtle Electric Generating Plant, Units 3 and 4 (Vogtle) and Virgil C. Summer Nuclear Station, Units 2 and 3 (Summer) applications. The U. S. Nuclear Regulatory Commission (NRC) staff, Advisory Committee on Reactor Safeguards (ACRS), and the Commission have reviewed, evaluated and/or concurred on the safety aspects of the (1) AP1000 standard design including its steel containment and (2) license applications for the Vogtle and Summer sites. This issue is addressed by the design of the Westinghouse Electric Company AP1000 steel containment (material, thickness and protective coating), its adequate construction which will be verified by NRC inspectors, as well as an adequate inspection program of the steel containment that will be carried out by the licensees and that meets NRC quality assurance program requirements. In addition, any AP1000 licensed facility is subject to NRC inspection throughout the life of the plant. In the following paragraphs I will be addressing key features of the AP1000 primary containment that will explain staff's confidence in the design and subsequent certification.

NRC Staff Response

The NRC staff completed its review of the AP1000 Design Control Document (DCD), Revision 19 on August 5, 2011, "NUREG-1793, Supplement 2 to the Final Safety Evaluation Report for Revision 19 to the AP1000 Standard Design Certification," was issued in September 2011. A formal letter from the ACRS to then Chairman of the NRC, Gregory B. Jaczko, concluded that changes proposed in the AP1000 DCD amendment, including those made in Revision 19, maintain the robustness of the previously certified design and that the revised design can be built and operated without undue risk to the health and safety of the public.

On December 30, 2011, the AP1000 DCD Amendment final rule was published in the *Federal Register*.

The AP1000 primary containment vessel prevents the uncontrolled release of radioactivity to the environment. It consists of a cylindrical steel shell with ellipsoidal upper and lower heads (see DCD Figure 3.8.2-1 under Agencywide Documents Access and Management System (ADAMS) Accession No. ML11171A431). The containment vessel wall thickness in most of the cylinder is 1.75 inches. The steel thickness is increased in the transition region to 1.875 inches where the

cylindrical shell enters the foundation concrete to provide additional margin in consideration of corrosion.

Safety-related coatings are applied to both the interior and exterior surfaces of the containment vessel. These coatings have several functions. For the exterior surface, the corrosion-resistant paint or coating for the containment vessel is specified to enhance surface wetability and film formation, as well as for corrosion protection. The exterior of the containment vessel provides a surface for evaporative film cooling and works in conjunction with the natural draft airflow created by the shield building baffle and chimney arrangement to reduce the pressure and temperature of the containment atmosphere in the event that post-accident cooling of the containment would be necessary. As written in the AP1000 final safety evaluation report (see ADAMS Accession No. ML112061231, page 6-91) the licensee is required to develop a program for containment vessel pre-service and in-service inspection. Additional discussion on the exterior safety-related coating program for the containment vessel can be found under ADAMS Accession No. ML110140366, "ACRS Subcommittee Transcript."

As stated in NUREG-2124, Volume 1, "Final Safety Evaluation Report Related to the Combined Licenses for Vogtle Electric Generating Plant, Units 3 and 4," (see ADAMS Accession No. ML12271A045, Section 6.1.2.4), During the operations phase, the coatings program is administratively controlled in accordance with the quality assurance program implemented to satisfy 10 CFR Part 50, Appendix B, and 10 CFR Part 52 requirements. The coatings program provides direction for the procurement, application, inspection, and monitoring of safety related coating systems. Prior to initial fuel loading, a consolidated plant coatings program will be in place to address procurement, application, and monitoring (maintenance) of those coating system(s) for the life of the plant.

From the information provided above, as reviewed by the ACRS and agreed upon by the NRC Commission, staff addressed your concern during the review of the AP1000 design. As noted, the corrosion-resistant, 1.75 inch thick steel containment (1.875 inches where the cylindrical shell enters the foundation concrete) coupled with the requirement for pre-service and in-service inspection, provides a high level of assurance against any undetected corrosion condition.

I trust that the above information will be beneficial to you. If you have any questions regarding this response, please contact me at (301) 415-8076 or at Lawrence.Burkhart@nrc.gov.

Sincerely,

/RA/

Lawrence Burkhart, Chief
Licensing Branch 4
Division of New Reactor Licensing
Office of New Reactors

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