ENCLOSURE 5

Marked up USAR Section

Calvert Cliffs Nuclear Power Plant
June 29, 2015

13.3.3 SAFETY PROTECTION SYSTEMS

13.3.3.1 General

Section 3.3 discusses the Calvert Cliffs ISFSI design for the safe and secure long-term containment and storage of spent fuel. The NUHOMS-32PHB DSC is designed for storage of spent nuclear fuel as described in Section 3.3.1 and in the following subsections.

13.3.3.2 Protection by Multiple Confinement Barriers and Systems

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The NUHOMS-32PHB DSC provides confinement of the spent fuel similar to the NUHOMS-24P DSC and the NUHOMS-32P DSC. Sealing of the NUHOMS-32PHB DSC is leak tested in accordance with American National Standards Institute (ANSI) N14.5 after loading and sealing the canister, as described in Section 3.3.2. Thus, the NUHOMS-32PHB DSCs are considered to be leak-tight per ANSI N14.5-1997.

Containment of radioactive material associated with spent fuel assemblies is provided by fuel cladding, the DSC stainless steel shell and double seal welded primary and secondary closures. As described in Section 3.3.2, there are no credible events that will breach a DSC to provide a possible leakage path to the environment.

13.3.3.3 Protection by Equipment and Instrumentation Selection

The discussion in Section 3.3.3 is applicable to NUHOMS-32PHB DSC.

The HSM-HBs will be equipped with a temperature monitoring system whereas the current poured in place HSMs are not equipped with a temperature monitoring system. The temperature monitoring system is not important to safety instrumentation and the loss of the system will not impact the safety function of the HSM-HBs to provide passive cooling to the DSCs. The air inlet and outlet vents of the HSM-HB may be visually inspected for obstructions during any interruption of the operability of the HSM-HB temperature monitoring system.

13.3.3.4 Nuclear Criticality Safety

The NUHOMS-32PHB DSC internals are designed to provide nuclear criticality safety during all phases of dry cask storage operations and storage, including wet loading operations and postulated accident conditions. The Calvert Cliffs site-specific NUHOMS-32PHB DSC design

Insert 1

The NUHOMS-32PHB DSC provides leaktight confinement of the spent fuel. The identified confinement boundary, including all base metal components and welded sections, is leak tested to leaktight criteria to verify the integrity of the confinement boundary. The maximum acceptable leakage is 1E-7 atm cc/s He, which is bounded by the maximum acceptable leak rate per American National Standards Institute (ANSI) N14.5, "Radioactive Materials – Leakage Tests on Packages for Shipment." Thus the NUHOMS-32PHB DSC is considered to be leaktight per ANSI 14.5-1997.

The physical design of the confinement boundary for the NUHOMS-32PHB DSC is identified in Transnuclear drawings NUH32PHB-30-1 and NUH32PHB-30-4 as follows:

1. Item 52: Siphon/Vent block (component of top shield plug assembly Item 50)
3. Item 53: Alignment block (component of top shield plug assembly Item 50)
4. Item 54: Top casing plate (component of top shield plug assembly Item 50)
5. Item 58: Lifting lug round bars (component of top shield plug assembly Item 50)
6. Item 2: DSC Shell
7. Item 10: Bottom cover plate

The associated shop and field welds between the above components are also part of the confinement boundary and are constructed to meet the American Society of Mechanical Engineers Section III, Subsection NB requirements.

The O-Rings identified as item 20 on Note 1 of Transnuclear drawing NUH32PHB-30-20 can be seen in detail along with the groove in which they are located on Section B-B of Transnuclear drawing NUH32PHB-30-2. They are located on the siphon tube adaptor and their purpose is to provide a seal between the adapter and the siphon block on the top shield plug to support blowdown of the DSC. They are not part of the confinement boundary, are classified as not important to safety and the siphon tube does not have an intended function for license renewal. They are therefore not subject to aging management.

There are two helium leak tests performed at the fabricator: one on the 32PHB DSC cavity and one on the top shield plug cavity. The 32PHB DSC cavity is helium leak tested following the welding of all circumferential and longitudinal seams of the canister shell and the welding of the inner bottom cover plate. Hence, the entire confinement boundary associated with the canister shell is tested at the fabrication shop. The top shield plug is helium leak tested following the welding of the top casing plate, side casing plate, alignment block, siphon and vent block, and top shield plug lifting plug round bars. Hence, all of the confinement boundary components and welds associated with the top shield plug are helium leak tested. The final helium leak test occurs on site following fuel loading and the welding of the top shield plug to the canister shell.

By the definitions provided by American Society for Non-Destructive Testing (ASNT)-TC-1A, the only individual in a fabrication organization that can develop helium leak test procedures would be the Level III individual. American Society for Non-Destructive Testing (ASNT)-TC-1A 1992, "Personnel Qualification and Certification in Nondestructive Testing," Section 4.3(3) provides the requirements for a Level III individual's training and background. It states, "An NDT Level III individual shall be capable of establishing techniques and procedures; interpreting codes, standards, specifications, and procedures; and designating the particular NDT methods, techniques, and procedures to be used." Exelon uses qualified Level III ASNT personnel to

write the field leakage testing procedures for the 32PHB system. In addition, Exelon also uses qualified Level III ASNT personnel to execute the leakage testing in the field.

The NUHOMS 32PHB DSC was evaluated against various NRC Interim Staff Guidance confinement requirements. Those evaluations are described below.

Interim Staff Guidance (ISG)-5
ISG-5, "Confinement Evaluation," applies to the confinement boundaries which include the confinement vessel (i.e., DSC), its penetrations, valves, seals, welds and closure devices and corresponding information concerning the redundant sealing.

ISG-5 applies to the acceptance criteria associated with confinement analysis and acceptance of "leak tight" testing instead of detailed confinement analysis.

The 32PHB DSC components are designed and tested to be "leak tight," thus complying with ISG-5 requirements by application of the "leak tight criteria" per ANSI N14.5 1997.

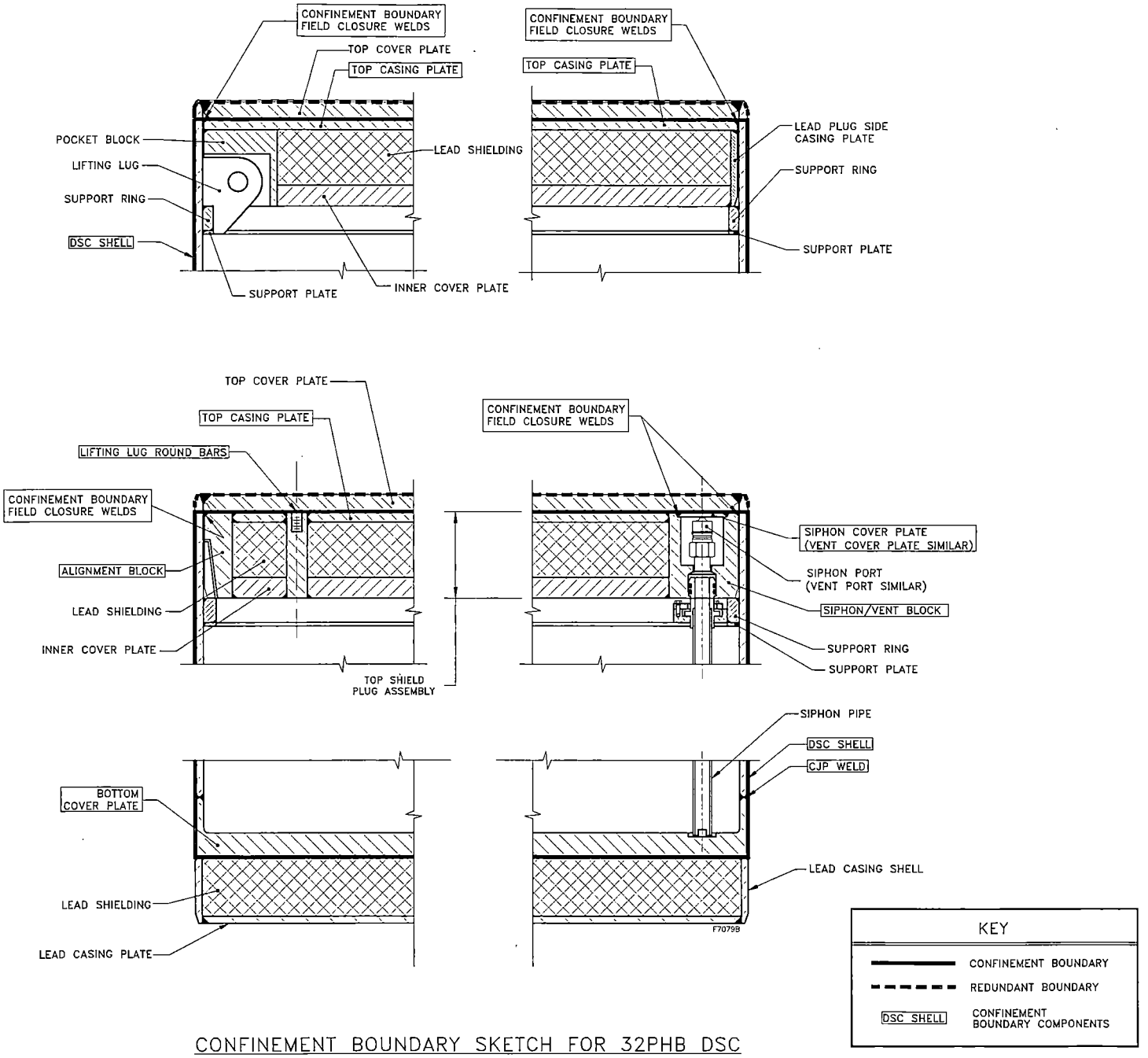
ISG-15
ISG-15, "Material Evaluation," applies to the multi-pass weld that joins the canister shell to the structural lid of the austenitic stainless steel DSC. This multi-pass weld is executed and examined consistent with the guidance provided in ISG-15.

ISG-15 also applies to the volumetric or multi-pass penetrant testing inspection methods for acceptance described in ISG-15, Section X.5.2.3 "Welded Lids," sub-section "Austenitic Stainless and Nickel-Base Alloy Steel Cask Design."

ISG-18
ISG-18, "Design/Testing of Lid Welds," applies to helium leakage test for closure welds; and design and examination criteria to be met before any closure weld may be exempted from the helium leakage test.

"Leakage Testing a Dual Lid Design - Sketch B" of ISG-18 applies to the dual lid design of the 32PHB DSC. The 32PHB DSC top shield plug assembly field closure weld satisfies the helium leakage test to the "leak-tight" requirement of ANSI N14.5, which also demonstrates compliance with 10 CFR 72.236.

ISG-18 applies to the top cover plate of the 32PHB DSC. The 32PHB DSC demonstrates compliance with this provision and with 10 CFR 72.236 by satisfying the conditions identified under "Specific Guidance" as addressed per the Helium Leakage Test - Large Weld Exception Criteria.



CONFINEMENT BOUNDARY SKETCH FOR 32PHB DSC