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OCAN011702

January 13, 2017

ATTN: Document Control Desk  
Director, Division of Spent Fuel Storage and Transportation  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Rockville, MD 20555-0001

SUBJECT: Fourth Five-Year Surveillance of the First Ventilated Storage Cask  
Arkansas Nuclear One – Units 1 and 2  
Docket Nos. 50-313, 50-368 and 72-13  
License Nos. DPR-51 and NPF-6

REFERENCES:

1. Entergy Operations, Inc. letter to the NRC, "Five Year Surveillance of the First Ventilated Storage Cask," dated January 10, 2002 (OCAN010202)
2. Entergy Operations, Inc. letter to the NRC, "Five Year Surveillance of the First Ventilated Storage Cask," dated April 30, 2007 (OCAN040703) (ML071240085)
3. Entergy Operations, Inc. letter to the NRC, "Five Year Surveillance of the First Ventilated Storage Cask," dated February 29, 2012 (OCAN021204) (ML12061A220)

Dear Sir or Madam:

In compliance with Section 1.3.3 of the Certificate of Compliance for the Pacific Sierra Nuclear Associates' Final Safety Analysis Report (FSAR) for the Ventilated Storage Cask (VSC-24) System (Docket 72-1007), this letter documents the results of the Five-Year Interior Ventilated Concrete Cask (VCC) surface inspection.

Section 1.3.3 requires that the VCC interior surfaces and the Multi-assembly Sealed Basket (MSB) exterior surfaces of the first VSC-24 unit placed in service at each site shall be inspected to identify potential air flow blockage and material degradation after every five years in service. The results of this inspection shall be documented, and a letter report summarizing the findings shall be submitted within 30 days. This letter transmits a summary report of the fourth five-year inspection of the first VSC-24, cask serial number AVCC-24-01, loaded at Arkansas Nuclear One (ANO). This cask was loaded on December 17, 1996.

On December 16, 2016, the fourth five-year inspection report was prepared. The inspection revealed that the VSC-24 cooling paths were found to be free from air flow blockage. The VCC air inlet and outlet assemblies, the VCC interior, and the MSB exterior which were inspected were found to be in a condition normal for the VSC service environment and specified materials of construction described in the FSAR. The inspection did not identify any degradation mechanisms affecting system performance that were not identified in the FSAR. The inspection provides reasonable assurance that suitable conditions remain in the VCC / MSB annulus. A more detailed description of the inspection is attached.

References 1, 2, and 3 provide the summary reports from the previous inspections of this cask.

If you have any questions concerning this submittal or Entergy Operations' storage of spent fuel at ANO under the general license, please contact me.

Sincerely,

**ORIGINAL SIGNED BY STEPHENIE L. PYLE**

SLP/rwc

Attachment: Summary Report - Fourth Five-Year Inspection of Cask Serial Number AVCC-24-01

cc: Mr. Kriss Kennedy  
Regional Administrator  
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**ATTACHMENT TO**

**OCAN011702**

**Summary Report**

**Fourth Five-Year Inspection of  
Cask Serial Number AVCC-24-01**

## Summary Report

### Fourth Five-Year Inspection of Cask Serial Number AVCC-24-01

#### **Purpose:**

Section 1.3.3 of the Certificate of Compliance (CoC) for the Pacific Sierra Nuclear Associates Final Safety Analysis Report (FSAR) for the Ventilated Storage Cask (VSC-24) System (Docket 72-1007) requires the Ventilated Concrete Cask (VCC) interior surfaces and Multi-assembly Sealed Basket (MSB) exterior surfaces of the first VSC unit placed in service at each site to be inspected every five years of service. This inspection is to identify potential air flow blockage and material degradation. This report summarizes the results of the five-year inspection performed on the first VSC-24 cask placed into service at Arkansas Nuclear One, cask serial number AVCC-24-01.

The Inspection Report for the fourth Five-Year Inspection was complete on December 16, 2016. The loading of this cask was completed on December 17, 1996.

#### **Inspection Equipment:**

The inspection was performed using a video probe with a video controller with a built-in light source. It is a two-way articulating probe with a usable length of approximately 35 feet. A straight, full focus camera lens was utilized for the inspection. A monitor was employed to view the inspection, and the inspection was recorded. In addition, the sides and top of the cask were inspected and photographs were taken using a digital camera.

#### **Inspection Methodology:**

Access for the inspection of the interior of the VCC and exterior of the MSB was provided through the VCC air inlet and outlet ports. The air inlet protective screens were removed and the outlet screens were partially removed to facilitate entry of the video probe. The screens were not left unattended while they were detached.

#### **Inspection Summary of Results:**

VCC Interior Surfaces:

No significant changes were noted during this inspection.

The interior surfaces of the VCC were inspected which includes the air inlet, air outlet, and annulus region. The internal VCC components showed only small amounts of oxidation in localized areas during the inspection. Small areas of light-to-medium oxidation were noted. Some small stalactite deposits were noted on outlet vent area at the edge of the annulus region. Samples of these deposits were taken during the 2001 inspection and were shown to be deposits of primarily calcium carbonate. The source of the material is believed to be moisture seeping through the VCC inner shell joint. The calcium leached from the concrete deposits is very small, does not impede air flow, and is not expected to provide a means of degradation of the materials of the VCC due to size and lack of reactive properties. The design of the air ducts

includes internal ledges. It was identified that debris is forming on some of the inside ledges. The debris was less than 0.25-inch pieces of material. The amount of material has no impact on air flow and does not impact the physical or design relationship of the MSB canister to the VCC.

#### MSB Exterior Surfaces:

No significant changes were noted during this inspection.

Small areas of light-to-medium oxidation were noted on the exterior surface of the MSB. Internally the MSB (the fuel storage basket) is a carbon steel container covered with a zinc-based epoxy coating. Approximately the top three inches and bottom three inches of the cask are now rusting and there are random spots along the side of the cask that are now pitting. This coating is not credited for any safety-related functions. As part of the design there is a rust allowance. The rusting allowance has not been exceeded. The inspection is consistent with the predictions of the corrosion analysis based on the visual inspection where only surface rusting was identified. The ceramic tiles supporting the MSB are performing as designed, and there is no contact between the MSB and the VCC. Again no blockage or large buildups of oxidation were noted in the annulus region between the MSB and VCC.

#### VCC Exterior Surfaces:

No significant changes were noted during this inspection.

The concrete overpack provides structural support, shielding, and natural convection cooling for the MSB. A yearly inspection of the concrete was performed as well in 2016, in accordance with Section 1.3.2 of the CoC. The concrete shell is showing signs of degradation due to thermal cycling and freeze-thaw cycling. None of the cracks currently exceeded the 0.25-inch limit. The cracks and pop-outs have been repaired. There are no signs that the degradation is affecting the shielding capability of the casks. Efflorescent is being deposited out of some of the cracks, and there are now signs of rebar rusting. The initial rusting is small and does not compromise the integrity of the rebar in localized areas.

The VSC-24 license holder has been contacted and updated with the condition of the cask. The vendor has reviewed the results of the five-year inspections and concluded that the operability of the casks has not been compromised.

#### **Conclusion:**

The VSC cooling paths were found to be free from air flow blockage. The VCC air inlet and outlet assemblies, the VCC interior, and the MSB exterior which were inspected were found to be in a condition normal for the VSC service environment and specified materials of construction described in the SAR. The inspection did not identify any degradation mechanisms affecting system performance that were not previously identified in the FSAR. The inspection provides reasonable assurance that suitable conditions remain in the VCC / MSB annulus.