

April 12, 2010

Mr. Kenneth R. Whitham
Licensing Manager
Department of Energy, Idaho Operations Office
1955 Fremont Avenue
Idaho Falls, ID 83415

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR REVIEW OF
RENEWAL TO THE FORT ST. VRAIN INDEPENDENT SPENT
FUEL STORAGE INSTALLATION SITE SPECIFIC LICENSE,
DOCKET NO. 72-09

Dear Mr. Whitham:

By letter dated November 10, 2009, you submitted an application for renewal of the Fort St. Vrain Independent Spent Fuel Storage Installation Site Specific License for a period of 20 years. The license currently will expire on November 30, 2011. Our established schedule provides for a license renewal date of September 13, 2010.

In connection with the staff's review, we need the information identified in the enclosure to this letter. We request that you provide this information by June 11, 2010, or earlier if possible. Inform us at your earliest convenience, but no later than May 28, 2010, if you are not able to provide the information by that date. To assist us in re-scheduling your review, you should include a new proposed submittal date and the reasons for the delay.

Please reference Docket No. 72-09 in future correspondence related to this request. The staff is available to meet to discuss your proposed responses. If you have any questions regarding this matter, I may be contacted at (301) 492-3394 or you may contact Chris Staab of my staff at (301) 492-3321.

Sincerely,

/RA/

Eric Benner, Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material Safety
and Safeguards

Docket No. 72-09

Enclosure: Request for Additional Information

cc: E. Redmond, Nuclear Energy Institute

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Department of Energy, Idaho Operations Office
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DOE-IDAHO OPERATIONS OFFICE

DOCKET NO. 72-09

REQUEST FOR ADDITIONAL INFORMATION

RENEWAL TO THE FORT ST. VRAIN INDEPENDENT SPENT FUEL STORAGE

INSTALLATION SITE SPECIFIC LICENSE

By letter dated November 10, 2009, you submitted an application for renewal of the Fort St. Vrain Independent Spent Fuel Storage Installation Site Specific License for a period of 20 years. The license currently will expire on November 30, 2011. This Request for Additional Information (RAI) identifies information needed by the U.S. Nuclear Regulatory Commission (NRC) staff in connection with its review of the application. Each individual RAI describes information needed by the staff for it to complete its review of the application to determine whether the applicant has demonstrated compliance with the regulatory requirements.

1-1 Provide digital copies of the following referenced documents:

- GEC Alsthom Technical Specification Fort St. Vrain Maintenance, Inspection and Monitoring Requirements, Revision C
- Engineering Design File EDF-8612, FSV ISFSI MVDS Fuel Storage Container and Support Stool Aging Management Review, current revision
- PSCo Engineering Evaluation EE-DEC-0031, Corrosion Issues Related to the Interior of the ISFSI Storage Canisters
- PSCo letter dated August 19, 1996 (P-96071), Crawford to Travers; Subject: NRC Bulletin 96-04
- PLN-2974, FSV ISFSI Maintenance Program, current revision
- Engineering Design File EDF-8710, FSV ISFSI MVDS Standby Storage Well Aging Management Review, current revision
- Design Calculation A4-2.11.4, Calculation Number 4, SSW Tube Corrosion Allowance, GEC Alsthom Engineering Systems Ltd, March 14, 1990
- PSCo Engineering Evaluation EE-DEC-0031, Corrosion Issues Related to the Interior of the ISFSI Storage Canisters
- Design Calculation A4-2.3.4, Calculation Number 6, FSC Corrosion Allowance, GEC Alsthom Engineering Systems Ltd, March 5, 1990.
- Engineering Design File EDF-9194, FSV ISFSI MVDS Standby Storage Well Time Limited Aging Analysis, current revision

Enclosure

- Engineering Design File EDF-8348, Aging Management Review of the FSV ISFSI Container Handling Machine Raise and Lower Mechanism, current revision
- Engineering Design File EDF-8529, Aging Management Review of the FSV ISFSI Container Handling
- EDF-8519, FSV ISFSI Aging Management Review of Charge Face Structure Structural Steel, current revision
- Engineering Design File EDF-8672, FSV ISFSI MVDS Concrete Aging Management Review, current revision
- TPR-5589, Inspection of the FSV ISFSI MVDS Building, current revision
- Engineering Design File EDF-8556, FSV ISFSI Modular Vault Dry Store Concrete and Steel Inspection, current revision
- Engineering Design File EDF-8520, FSV ISFSI Aging Management Review of Concrete Fill Inside the Charge Face Structure, current revision
- Engineering Design File EDF-8176, Aging Management Review of the Fuel in Storage at the FSV ISFSI, current revision
- PLN-2974, Fort St. Vrain Independent Spent Fuel Storage Installation Maintenance Program, current revision
- Fort St. Vrain Independent Spent Fuel Storage Installation Materials License No. SNM-2504, Amendment 9, June 14, 2001, Appendix A (Technical Specifications)
- TPR-5589, Inspection of FSV ISFSI MVDS Building, current revision
- Engineering Design File EDF-8556, FSV ISFSI Modular Vault Dry Store Concrete and Steel Inspection, current revision
- Fort St. Vrain Independent Spent Fuel Storage Installation Safety Analysis Report, Chapter 11, as amended
- Engineering Design File EDF-9194, FSV ISFSI MVDS Standby Storage Well Time Limited Aging Analysis, current revision

This information is needed to determine compliance with 10 CFR 72.122.

- 1-2 Provide the nominal thickness of the aluminum flame sprayed coatings on the Fuel Storage canisters (FSCs) when the coatings were first applied.

The applicant stated in section 3.2.1 "All exterior surfaces of the FSCs are flame sprayed with aluminum to prevent corrosion of the exterior."

The corrosion aluminum in a rural atmosphere is extremely slow, ~ 0.1 microns per year. The thickness of the flame sprayed coating is not directly stated in the Safety Analysis Report, however.

This information is needed to determine compliance with 10 CFR 72.120.

- 1-3 Provide the basis of the five (5)-year frequency and selection process for testing six Fuel Storage Canisters (FSCs) O-rings.

Section 3.2.1 of the application states “A sealable O-ring inter-space tapping allows container sealing to be confirmed every five years at six storage locations.”

This information is needed to determine compliance with 10 CFR 72.168.

- 1-4 Justify that the conditions of long-term storage cannot lead to a sudden release of strain energy in the irradiated graphite via the Wigner effect. Provide references, the neutron flux seen by the graphite fuel elements, and (if necessary) calculations in the response.

At low-temperatures, neutron bombardment creates defects in the crystal lattice of graphite.¹ These defects accumulate until an initiating event causes the sudden release of strain energy. It is unclear to the staff if the long-term storage under conditions seen in the Modular Vault Dry Store (MVDS) could lead to such a sudden release of energy.

This information is needed to determine compliance with 10 CFR 72.122.

¹ Section 3.1.1 of IAEA-TECDOC-1521, “Characterization, Treatment and Conditioning of Radioactive Graphite from Decommissioning of Nuclear Reactors” provides a brief overview of the Wigner effect in graphite.

- 1-5 Estimate the quantity of tritium produced in the Fuel Storage Canisters (FSCs) due to the neutron irradiation² of nitrogen in the air of the FSCs and lithium-6 impurities in the graphite moderators. Determine if over the period of proposed storage the accumulation of tritium in the FSCs could degrade or embrittle the carbon steel FSC.

² The production of tritium in graphitic spent fuel is described in Section 3.3.2 of IAEA-TECDOC-1521, “Characterization, Treatment and Conditioning of Radioactive Graphite from Decommissioning of Nuclear Reactors.”

This information is needed to determine compliance with 10 CFR 72.120.

- 1-6 Discuss whether or not the moisture from the ambient air could induce corrosion in the interior of the Fuel Storage Canisters (FSCs).

Section 3.2.4 of the application states that the temperature of the fuel blocks is less than 200°F. Section 3.11.4 states that the measured leak rate from the FSCs is lower than 1×10^{-3} cc/s, which is not “leaktight” under ANSI N14.5, suggesting that water could intrude into the FSC.

This information is needed to determine compliance with 10 CFR 72.120.

- 1-7 Clarify the first sentence of Section 3.3.2, "FSC SS Materials Evaluated".

It is not clear which corrosion barrier (flame sprayed aluminum, zinc plating, or grout coating) if any, is being applied to the different components of the Fuel Container Support Stools (FSC SSs).

This information is needed to determine compliance with 10 CFR 72.120.

- 1-8 Clarify if all the Stand by Storage Wells (SSWs) will be sealed with O-rings.

Section 3.4.5 of the license renewal recommends that the O-rings be installed on the SSWs. It is not clear, however, if these recommendations translate into a mandatory practice of sealing the SSWs with O-rings.

This information is needed to determine compliance with 10 CFR 72.120.

- 1-9 Clarify the materials of construction in Table 3.5-1 of the application.

The materials of construction for the Canister Handling Machine (CHM) are steel, carbon steel, and copper alloy. The difference from steel and carbon steel is unclear and appears to be an editorial error.

The response should be consistent with Section 4.2.1.3 of the FSV ISFSI SAR.

This information is needed to determine compliance with 10 CFR 72.120.

- 1-10 Clarify the operation time of the Container Handling Machine (CHM) and CHM Fuel Storage Container (FSC) grapple.

Section 3.5.3 and Section 3.6.3 of the application states the operating time of the CHM and CHM FSC grapple were 321 and 660 hours, respectively. It is unclear to the staff how the operating time of the CHM FSC grapple can be more than twice that of the CHM itself.

The operation times of the equipment appear to be a typographical error.

This information is needed to determine compliance with 10 CFR 72.120.

- 1-11 Clarify the materials of construction in Section 3.6.2 and Table 3.6-1.

The materials of construction for the Canister Handling Machine (CHM) Fuel Storage Canister grapple are listed as "steel," "carbon steel," and "alloy steel." The latter two steels are traditionally classified as subsets of steel, so the statements in Section 3.6.2 and Table 3.6-1 are unclear.

The response should be consistent with Section 4.2.1.3 of the FSV ISFSI SAR.

This information is needed to determine compliance with 10 CFR 72.120.

- 1-12 Clarify how a loss of mechanical properties in the structural concrete of the Modular Vault Dry Storage (MVDS) building from irradiation are measured and/or estimated. Has the

structural integrity of the MVDS been reevaluated based on the loss of material properties? Has any system, structure and component (SSC) meeting the requirements of scoping criteria been reevaluated based on the degradation mechanisms cited in Section 3.9.4?

The applicant states in Section 3.9.4 “The potential loss of material from scaling, spalling, rust staining, pitting, and erosion, and *loss of mechanical properties* from irradiation are the aging effects that have been considered.”

This information is needed to determine compliance with 10 CFR 72.120.

- 1-13 Provide the basis of the five-year inspection frequency, rather than real-time monitoring of identified cracks in the structural concrete of the Modular Vault Dry Storage building.

The applicant stated in Section A2.4 “.....accessible concrete and steel is primarily a visual examination performed by qualified personnel on a 5-year frequency.”

This information is needed to determine compliance with 10 CFR 72.168.

- 1-14 Clarify if the concrete exterior to the Modular Vault Dry Store (MVDS) building, at an elevated height is considered accessible, and how often it is inspected.

In Section A.2.3 of the license renewal amendment requires routine inspection of accessible concrete. It is not clear, however, if above ground concrete at an elevated height was/will be inspected. The response should include specific mention of the outlet vents or “chimneys” of the MVDS building.

This information is needed to determine compliance with 10 CFR 72.120.

- 1-15 Provide a summary of all change(s) to the Fort St. Vrain Independent Spent Fuel Storage Installation made under 10 CFR 72.48.

This information is needed to determine compliance with 10 CFR 72.48.

- 1-16 Clarify what method is used for the routine leak testing performed on the Fuel Storage Canisters (FSCs). Also clarify the frequency of the leak rate testing, and the acceptance criteria for the tests.

This information is needed to determine compliance with 10 CFR 72.122.

- 1-17 Provide a detailed description of the “baseline inspection” in Appendix 2.4, “Detection of Aging Effects.”

Appendix 2.4 of the application states, “A baseline inspection was performed in 2006 and repeated in 2009....”

The staff notes that baseline inspections are performed on newly installed and/or replaced Systems Structures of Components (SSCs). The “baseline inspection” should not be interpreted as “inspection(s) to establish the current condition.” The difference between the “baseline inspection” and “follow-up periodic inspections” is that the “baseline inspection” includes significant pre-inspection efforts to obtain data documents

and drawings, which enable the activity to update and confirm current facility construction and to establish accurate facility documentation prior to the start of a service (as built condition). Once accurate drawings and data are on file, many of the documented tasks during the “baseline inspections” need to be repeated in the follow-up inspections to establish current conditions.

This information is needed to determine compliance with 10 CFR 72.122.

- 1-18 Provide details of concrete inspection results which identified portions of the concrete as being “Satisfactory” or “Poor,” as described in Appendix 2.6, “Acceptance Criteria.” Include the inspection results of the damaged 2” x 5” area mentioned in Section 3.9.4 of the application.

This information is needed to determine compliance with 10 CFR 72.122.

- 1-19 Has any of the embedded reinforcing steel of the Modular Vault Dry Store (MVDS) ever been exposed to the environment due to degradation of the concrete?

This information is needed to determine compliance with 10 CFR 72.122.

- 1-20 Provide a drawing with the dimensions and materials of construction for the Fuel Storage Canisters (FSC), including the closure system (bolts, O-ring, lid, etc.)

The staff must perform a security assessment for the impact of a blunt object onto the containment boundary lid and closure system. A drawing of the FSC accompanied by a Bill of Materials is necessary to complete this portion of the staff’s review.

This information is needed to determine compliance with 10 CFR 72.122.

- 1-21 Provide a corrosion assessment of zinc plating on the Fuel Storage Canister Support Stools (FSC SS).

Portions of the FSC SS are zinc plated, however no corrosion assessment is provided in the application.

This information is needed to determine compliance with 10 CFR 72.120.

- 1-22 Clarify if any of the structural steel components are either uncoated or not covered in grout, and exposed to the outside atmosphere, and what measures are in place to monitor the corrosion of these components.

It is unclear to the staff if any of the structural steel components in the Modular Vault Dry Store are exposed to the atmosphere without a protective coating. For example, Table 3.7-1 states that the Charge Face Structural Steel is exposed to outdoor air and condensation, but there is no mention of a coating on this particular steel.

This information is needed to determine compliance with 10 CFR 72.120.

1-23 Provide details of a confirmatory inspection of the Fuel Storage Canister vault.

The second paragraph of Appendix E, "Component-Specific Guidance" of Draft NUREG-1927, "Standard Review Plan for Renewal of Independent Spent Fuel Storage Installation Licenses and Dry Cask Storage System Certificates of Compliance," specifically states examination of areas that are not normally accessible or observable are required as part of the license renewal.

This information is needed to determine compliance with 10 CFR 72.120.