



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
1600 E. LAMAR BLVD.  
ARLINGTON, TX 76011-4511

April 24, 2018

Mr. Richard B. Provencher, Manager  
Department of Energy  
Idaho Operations Office  
1955 Fremont Ave., MS 1203  
Idaho Falls, ID 83415

SUBJECT: FORT SAINT VRAIN INDEPENDENT SPENT FUEL STORAGE INSTALLATION  
INSPECTION REPORT 07200009/2017001

Dear Mr. Provencher:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) Region IV inspection conducted on May 23-24, 2017 of the dry cask storage activities associated with your Fort Saint Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI). A preliminary de-brief was held with your staff on May 24, 2017. After discussion with NRC management and continued review of information provided by you related to the Aging Management Program (AMP) sampling requirements, a final exit was conducted on April 3, 2018, with Mr. Scott Ferrara and other members of your staff. The enclosed inspection report documents the details of the inspection.

This inspection was an examination of the Department of Energy's (DOE) activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of observing the performance of an AMP surveillance described in Section 9.8 of the FSV ISFSI Safety Analysis Report (SAR) and verification of ongoing compliance with FSV's site specific ISFSI License SNM-2504 and associated Technical Specifications, the requirements of the SAR, and the regulations in Title 10 of the Code of Federal Regulations (CFR) Parts 20 and 72. Within these areas, the inspection consisted of selected examination of procedures, representative records, observations of activities, and interviews with personnel. No violations of NRC regulations were identified.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice," a copy of this letter, its enclosure, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site, <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact the undersigned at 817-200-1191 or Mr. Eric Simpson at 817-200-1553.

Sincerely,

*/RA/*

Ray Kellar, P.E., Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Docket: 72-09  
License: SNM-2504

Enclosure:  
Inspection Report 7200009/2017001  
w/attachment: Supplemental Information

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Dockets: 07200009

Licenses: SNM-2504

Report Nos.: 07200009/2017001

Licensee: U.S. Department of Energy Idaho Operations Office (DOE-ID)

Facility: Fort Saint Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI)

Location: 16805 Weld County Road 19-1/2  
Platteville, CO 80651

Dates: May 23-24, 2017

Inspectors: Eric J. Simpson, Inspector  
Fuel Cycle and Decommissioning Branch

Accompanying  
Personnel: N/A

Approved By: Ray L. Kellar, P.E., Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Enclosure

## EXECUTIVE SUMMARY

U.S. Department of Energy Idaho Operations Office  
NRC Inspection Report 07200009/2017001

A routine U.S. Nuclear Regulatory Commission (NRC) inspection of the Fort Saint Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI) (Accession No. ML17059C642) conducted in November and December of 2016 found that the licensee was maintaining the ISFSI in good physical condition and conducting activities in compliance with regulatory and license requirements. However, the licensee received a Non-Cited Violation (NCV) because a hydrogen test required by the Safety Analysis Report (SAR) had not been completed by the specified deadline of December 31, 2016. The licensee changed the SAR due date requirement for that hydrogen test through its 10 Code of Federal Regulations (CFR) 72.48 process to be performed by June 2017. This NRC inspection was conducted to surveil the performance of the hydrogen test and perform portions of the safety inspection. The NRC inspector reviewed documentation relevant to ISFSI activities and operations, specifically those related to its Aging Management Program (AMP) and hydrogen sampling. The documentation reviewed included the most recent iteration of the ISFSI SAR and the procedures developed for performing the hydrogen sampling of one fuel storage container (FSC) in each of six fuel storage vaults at the FSV ISFSI. The inspection documented the successful sampling of four out of six FSCs at FSV and the follow-up analyses performed by the licensee.

### Away from Reactor ISFSI Inspection Guidance

- Revisions to the SAR since the last inspection were reviewed. Two official SAR revisions had taken place since the previous NRC inspection. The current FSV ISFSI SAR, Revision 14 was reviewed as was found to be acceptable and had been changed using the requirements of the 10 CFR 72.48 process. (Section 1.2.a)
- The FSV ISFSI license was renewed in 2011. As part of its license renewal, the licensee established an AMP for its ISFSI, which included additional requirements in the Technical Specifications and SAR. During this inspection, the licensee successfully performed the required hydrogen surveillance test in four of six spent fuel storage vaults. The DOE presented the NRC with an evaluation of the hydrogen sampling results and their preferred path forward in December 2017. The NRC will evaluate the DOE's final path forward and supporting documentation and close the NCV in a future routine inspection of the FSV ISFSI. (Section 1.2.b)

### Review of 10 CFR 72.48 Evaluations

- The licensee's required safety screenings and evaluations had been performed in accordance with site procedures and 10 CFR 72.48 requirements and were adequately evaluated. (Section 2.2)

## Report Details

### Summary of Facility Status

The Fort St. Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI) is a modular vault dry storage (MVDS) system developed by Foster Wheeler Energy Corporation. The ISFSI provided storage for the spent fuel from the decommissioned FSV high temperature gas cooled reactor. There were 244 fuel storage containers loaded with spent fuel at the FSV ISFSI. The FSV ISFSI license was transferred from Public Service Company of Colorado to the Department of Energy Idaho Operations Office (DOE-ID) on June 4, 1999. Currently the facility is being maintained by Spectra Tech, Incorporated (STI) as the management and operations contractor for the DOE-ID. At the time of the inspection, the ISFSI was being maintained under site specific License SNM-2504 Amendment 11, and Safety Analysis Report (SAR) Revision 14. A tour of the ISFSI facility confirmed the facility remained in good physical condition.

NRC issued Bulletin 96-04, "Chemical, Galvanic, or Other Reactions in Spent Fuel Storage and Transportation Cask," to its ISFSI licensees to consider the risks of possible hydrogen build-up in their systems. During the license renewal in 2011, the NRC required that an aging management program be established at FSV. In specific, SAR Section 9.8, Aging Management Program (AMP), was established. The AMP called for the one-time test for hydrogen because DOE responded to the NRC Bulletin affirming that there existed a remote possibility that hydrogen could be present in their fuel storage containers (FSCs) due to possible galvanic corrosion reactions. This NRC inspection evaluated the licensee's performance of this SAR required test.

## **1 Away from Reactor ISFSI Inspection Guidance (60858)**

### **1.1 Inspection Scope**

An inspection of the status of the FSV ISFSI was completed to verify compliance with requirements of their specific license, the FSV SAR, and federal regulations. The inspector observed the DOE-ID managing contractor performance of a one-time hydrogen test required by SAR Section 9.8, Aging Management Program.

### **1.2 Observations and Findings**

#### **a. Biennial Update Reports and SAR Revisions**

The FSV's 2017 biennial Safety Analysis Update Report was reviewed. The May 2017, report (Accession No. ML17165A367) provided information related to revisions made during the two-year reporting period to the site Safety Analysis Report and other programs required by license Technical Specifications. Areas that were updated included the site Safety Analysis Report and Changes, Tests, and Experiments. The biennial report reflected changes which culminated in FSV SAR, Revision 14. These included incremental revisions to SAR Chapter 9 to update the deadline for the required hydrogen monitoring test of the FSV ISFSI (see Section 1.2.b, below). The Update Report also documented changes made in the Changes, Tests, and Experiment category related to security aspects of the site that are outside of the safety scope of this inspection report. The 2017 Update Report indicated that no changes were made in the following areas: Technical Specification Bases, Radiological Environmental Monitoring

Program, Training program, Quality Assurance Program, or to the Natural Gas and Oil Infrastructure.

b. Compliance with SAR Requirements

The FSV SAR Section 9.8, Aging Management Program, required that one fuel storage container (FSC) in each of six storage vault modules be sampled for hydrogen gas buildup no later than December 31, 2018. The original SAR requirement was that the hydrogen sampling be conducted no later than June 2016. The DOE-ID requested and received relief from NRC to delay the requirement to June 2017.

During the May 23, 2017 sampling event, the DOE-ID contractor STI successfully accessed three of the six vault locations in the modular vault dry storage (MVDS) system. The MVDS A-, B-, and D-vaults were sampled for hydrogen and the results were negligible. There was no appreciable hydrogen buildup found in any of the accessible FSCs that were sampled. MVDS C-vault was inaccessible due to fitment issues between the shield plug access port plug and the socket wrench.

The MVDS E- and F-vaults provided ready access to the shield plug access port, but the FSC seal plugs could not be removed due to a misalignment of the shield plug and FSC lid near the access port. Technicians from STI were able to insert the access port tool into the access port, but could not successfully access the seal plugs in either vault location.

During the sampling even of May 24, 2017, a different size/type of socket wrench was used to successfully remove the shield plug access port in the C-vault FSC. The seal plug was successfully removed and the hydrogen sampling probe accessed the volume inside the FSC. The C-vault sampling results showed a negligible level of hydrogen in the FSC headspace similar to the previous three sampled FSCs.

At the end of the NRC inspection, the DOE had established an extensive list of next steps, including: (1) determining the as found conditions regarding stack-up alignments and dimensions between the shield plugs and the inaccessible FSC access ports inside the MVDS; (2) performing feeler gauge alignment testing inside the inaccessible shield plugs; (3) evaluation of tooling options and steps to execute proper alignment of the inaccessible shield plugs and access ports; (4) determination of the kind of representation that sampling four out of the required six storage vaults provides in regards to the SAR requirement; (5) evaluating possible changes to the FSV SAR; and (6) initiation of condition reports to track the issue to its final dispositioning.

The NRC closed its May 2017 inspection with an inspector debrief, not an official exit. An official exit was planned at a later date to allow for the DOE to complete its analyses of the sampling event and to decide on a path forward.

On June 22, 2017 the DOE submitted to the NRC correspondence indicating that the DOE had performed a 72.48 screen that supported the revision and extension of the then current SAR commitment date of June 30, 2017 to a new completion date for hydrogen gas sampling of December 31, 2018. The new completion date was stated as being necessary to complete the evaluation and implementation of any additional changes prior to the continuation of hydrogen sampling in the MVDS E- and F-vaults or justification that no further sampling is required.

On December 20, 2017, the DOE submitted to the NRC Division of Spent Fuel Management and Region 4 its evaluation of their aforementioned hydrogen gas sampling event at the FSV ISFSI. The evaluation report included borescope images which showed that only part of the port head was visible due to the misalignment of the shield plug. The images and documentation showed that the shield plug alignment in the two remaining vaults prevented the tool from being able to access the port plugs. The DOE's proposed change and evaluation supported the sampling of four FSCs at the FSV ISFSI vice the SAR required six samples.

On March 1, 2018, the DOE contacted the NRC via email to request approval of their proposed path forward. The path forward proposed that four out of six vaults with negligible hydrogen results was sufficiently conclusive that galvanic corrosion in the FSV ISFSI was not a significant safety concern. In response to this, the NRC initiated a conference call to discuss steps to address the SAR requirement in an appropriate manner. This call took place on March 7, 2018. The NRC and the DOE discussed the possible modification of the SAR requirement from six to four samples based on the negligible amounts of hydrogen found in four samples and provide their evaluation to the NRC for review.

The NRC plans to review the licensee's evaluation and any changes that the licensee makes to the FSV SAR requirements using the 10 CFR 72.48 process once the changes have been made. The NRC will review and close this issue during an upcoming routine ISFSI inspection.

### 1.3 Conclusions

Revisions to the SAR since the last inspection were reviewed. Two official SAR revisions had taken place since the previous NRC inspection. The current FSV ISFSI SAR, Revision 14 was reviewed as was found to have been changed using the requirements of the 10 CFR 72.48 process.

The FSV ISFSI license was renewed in 2011. As part of its license renewal, the licensee established an AMP for its ISFSI, which included additional requirements in the Technical Specifications and SAR. During the inspection, the licensee successfully performed a SAR required hydrogen surveillance test in four of six spent fuel storage vaults. The DOE presented the NRC with an evaluation of the hydrogen sampling results and their preferred path forward in December 2017. The NRC will evaluate the DOE's final path forward and supporting documentation and close the NCV in a future routine inspection of the FSV ISFSI.

## 2 **Review of 10 CFR 72.48 Evaluations (60857)**

### 2.1 Inspection Scope

The licensee's 10 CFR 72.48 screenings and evaluations since the 2016 NRC ISFSI inspection were reviewed to determine compliance with regulatory requirements.

## 2.2 Observations and Findings

The licensee's 10 CFR 72.48 screenings and evaluations since the last NRC routine ISFSI inspection were reviewed to determine compliance with regulatory requirements. The licensee made three notable changes to their ISFSI SAR through the 10 CFR 72.48 process. The SAR changes evaluated by the NRC involved updating SAR Chapter 9 to revise Section 9.8, AMP, to reflect changes in the completion date for hydrogen sampling at FSV. The SAR Revision 13 removed the completion date of June 2015. The SAR Revision 14 reinstated the completion date, but moved it out to June 2017. In June 2017, after successfully sampling four of six FSCs, DOE changed the SAR Section 9.8 requirement completion date to December 31, 2018. The most recent change in completion date was to allow the DOE time to complete their evaluation and implementation of any needed changes prior to additional gas sampling operations or to develop a justification that no further sampling would be necessary. The NRC determined that all SAR related 72.48 screenings and evaluations reviewed were adequately evaluated.

## 2.3 Conclusion

The licensee's required safety screenings and evaluations had been performed in accordance with site procedures and 10 CFR 72.48 requirements and were adequately evaluated.

## 3 **Exit Meeting**

The inspector reviewed the scope and findings of the inspection with Scott Ferrara, Facility Director, and other members of your staff during a final exit conducted telephonically on April 3, 2018.

**SUPPLEMENTAL INSPECTION INFORMATION**

**PARTIAL LIST OF PERSONS CONTACTED**

Licensee Personnel

S. Ferrara, Facility Director, DOE-ID  
E. Ray Bowen, Quality Assurance, DOE  
D. Bland, ISFSI Program Manager, STI  
J. Stalnaker, System Engineer, STI  
J. Newkirk, FSV Safety Officer, WAI

**INSPECTION PROCEDURES USED**

IP 60858      Away-From-Reactor ISFSI Inspection Guidance  
IP 60857      Review of 10 CFR 72.48 Evaluations

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened and Closed

None

Discussed

None

Closed

None

## LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AMP	Aging Management Program
CFR	Code of Federal Regulations
DOE-ID	Department of Energy Idaho Operations Office
DNMS	Division of Nuclear Material Safety
FSC	Fuel Storage Container
FSV	Fort Saint Vrain
ISFSI	Independent Spent Fuel Storage Installation
MVDS	Modular Vault Dry Store system
NCV	non-cited violation
NRC	U.S. Nuclear Regulatory Commission
SAR	Safety Analysis Report
STI	Spectra Tech, Incorporated

FORT SAINT VRAIN INDEPENDENT SPENT FUEL STORAGE INSTALLATION INSPECTION  
 REPORT 07200009/2017001 DATED APRIL 24, 2018

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<input checked="" type="checkbox"/> SUNSI Review By: EJS	ADAMS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sensitive <input checked="" type="checkbox"/> Non-Sensitive	<input type="checkbox"/> Non-Publicly Available <input checked="" type="checkbox"/> Publicly Available	Keyword NRC-002
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