

**Annual Radiological Environmental Monitoring  
Program Report for the Fort St. Vrain  
Independent Spent Fuel Storage Installation**

**STI-NLF-RPT-017**

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US Department of Energy  
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NRC Licensed Facilities

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**ABSTRACT**

This report presents the results of the 2016 Radiological Environmental Monitoring Program conducted in accordance with 10 CFR 72.44 for the Fort St. Vrain Independent Spent Fuel Storage Installation. A description of the facility and the monitoring program is provided. The results of monitoring the predominant radiation exposure pathway, direct radiation exposure, indicate the facility operation has not contributed to any increase in the estimated maximum potential dose commitment to the general public.

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## SUMMARY

The purpose of this report is to present the results of the Radiological Environmental Monitoring Program (REMP) conducted during 2016 for the Fort St. Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI). The results of the dosimetry network did not indicate an increase in radiation levels above post-loading ambient background attributed to the facility operation. The monitoring program results support the conclusion reached in the Safety Analysis Report that operation of the facility will not result in a significant dose commitment greater than 0.15 mrem/y to the nearest resident.

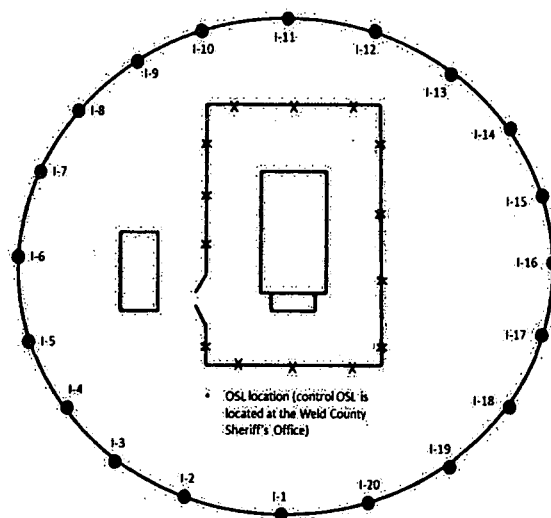
## 1.0 Introduction

The Fort St. Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI) is a spent fuel dry storage facility located near Platteville, Colorado. The FSV ISFSI is operated by Spectra Tech, Inc. - NRC Licensed Facilities (STI-NLF) for the Department of Energy (DOE). The FSV ISFSI is licensed (SNM-2504) by the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 72 for authorization to store spent nuclear fuel from the Fort St. Vrain Nuclear Generating Station.<sup>1</sup> Spent fuel from the FSV reactor was transferred to the FSV ISFSI between December 26, 1991 and June 10, 1992. The FSV ISFSI license was transferred from Public Service Company of Colorado (PSCO) to the U.S. Department of Energy, Idaho Operations Office (DOE-ID) on June 4, 1999. A Radiological Environmental Monitoring Program (REMP) has been implemented for the FSV ISFSI in accordance with 10 CFR 72.44. This report presents the REMP results for 2016.

## 2.0 Program Description

The REMP is designed to monitor the predominant radiation exposure pathway inherent with the facility design: direct radiation. The direct radiation exposure pathway is monitored using Optically Stimulated Luminescent (OSL) dosimetry located along the Controlled Area Boundary (perimeter) fence of the FSV ISFSI. Monitoring locations are identified in Figure 1. A control station is located at the Weld County Sheriff Office in Greeley, Colorado, approximately 18 miles NNE from the FSV ISFSI. Twenty dosimeters are located around the perimeter fence to monitor direct radiation from the FSV ISFSI. One third of the dosimeters are changed out and processed each month. The control station dosimeter is changed out and processed each month.

**Figure 1.** FSV ISFSI Radiological Environmental Monitoring Locations



### 3.0 Results

Dosimetry results for the FSV ISFSI are presented in Table 1 in units of mR/d. The mean exposure rate of 0.33 +/- 0.04 mR/d measured at the ISFSI perimeter fence is comparable to the pre-operational background exposure rate of 0.34 +/- 0.03 mR/d and is consistent with the five-year historical operation mean exposure rate of 0.39 +/- 0.05 mR/d. Additionally, the control station exposure rate (0.29 +/- 0.08 mR/d) is consistent with historical values associated with the control station. Therefore, both the perimeter fence and control dosimeter responses are consistent with historical values.

**Table 1. FSV ISFSI Exposure Rates (mR/d)**

Location	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Mean
I-1	0.30			0.30			0.39			0.32			0.33
I-2		0.30			0.34			0.34			0.36		0.34
I-3			0.27			0.37			0.32			0.32	0.32
I-4	0.29			0.27			0.37			0.33			0.32
I-5		0.24			0.31			0.40			0.32		0.32
I-6			0.33			0.36			0.33			0.39	0.35
I-7	0.28			0.30			0.37			0.34			0.32
I-8		0.30			0.33			0.39			0.39		0.35
I-9			0.30			0.36			0.29			0.38	0.33
I-10	0.29			0.34			0.32			0.32			0.32
I-11		0.28			0.38			0.28			0.31		0.31
I-12			0.29			0.34			0.28			0.37	0.32
I-13	0.27			0.30			0.30			0.39			0.32
I-14		0.27			0.36			0.40			0.26		0.32
I-15			0.33			0.39			0.34			0.39	0.36
I-16	0.30			0.26			0.38			0.30			0.31
I-17		0.33			0.37			0.33			0.37		0.35
I-18			0.27			0.37			0.34			0.36	0.34
I-19	0.28			0.28			0.38			0.32			0.32
I-20		0.31			0.37			0.33			0.33		0.34
Mean	0.29	0.29	0.30	0.29	0.35	0.37	0.36	0.35	0.32	0.33	0.33	0.37	0.33
Control	0.29	0.26	0.26	0.41		0.31	0.38	0.33	0.19	0.39	0.13	0.28	0.29

### 4.0 Discussion

The FSV ISFSI REMP was successfully implemented during 2016. The May control station dosimeter was missing so no results for that dosimeter are reported. As a result, the control station dosimeter was relocated to a more secure location approximately one (1) mile further from the facility. Results at the new location were consistent with historical values at the previous location. There were no deviations from the established sampling schedule. The radiation dosimetry results indicate there has been no measurable increase in ambient background radiation levels at or beyond the FSV ISFSI perimeter fence attributed to storage of the FSV fuel. The OSLs produce a response approximately 15% lower than the previously used TLDs. There were no radioactive liquid effluents released from the facility, hence no radionuclides to report. There are no sources of radioactive material that may become airborne during normal operations, hence no radionuclides to report.

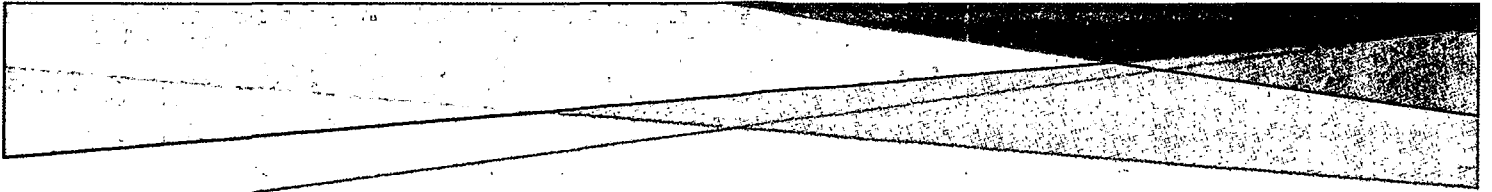
## 5.0 Conclusion

Direct radiation exposure from the facility during 2016 did not contribute to any increase in the maximum potential dose commitment (0.15 mrem/y) to the nearest resident (located 797 meters from the ISFSI) projected in the FSV ISFSI Safety Analysis Report.<sup>2</sup>

## 6.0 References

1. 10 CFR 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste," *Code of Federal Regulations*, Office of the Federal Register, August 1988.
2. Fort St. Vrain Independent Spent Fuel Storage Installation Safety Analysis Report, Section 7.5, Estimated Offsite Collective Dose Assessment.





**Addendum to the 2015  
Annual Radiological Environmental Monitoring  
Program Report for the Fort St. Vrain  
Independent Spent Fuel Storage Installation**

**STI-NLF-RPT-018**

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**ABSTRACT**

This report presents the results of the 2015 Radiological Environmental Monitoring Program conducted in accordance with 10 CFR 72.44 for the Fort St. Vrain Independent Spent Fuel Storage Installation. A description of the facility and the monitoring program is provided. The results of monitoring the predominant radiation exposure pathway, direct radiation exposure, indicate the facility operation has not contributed to any increase in the estimated maximum potential dose commitment to the general public.

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## SUMMARY

The purpose of this report is to present the results of the Radiological Environmental Monitoring Program (REMP) conducted during 2016 for the Fort St. Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI). The results of the dosimetry network did not indicate an increase in radiation levels above post-loading ambient background attributed to the facility operation. The monitoring program results support the conclusion reached in the Safety Analysis Report that operation of the facility will not result in a significant dose commitment greater than 0.15 mrem/y to the nearest resident.

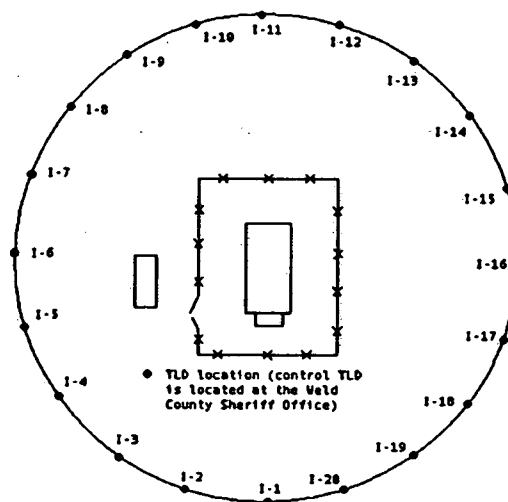
## 1.0 Introduction

The Fort St. Vrain (FSV) Independent Spent Fuel Storage Installation (ISFSI) is a spent fuel dry storage facility located near Platteville, Colorado. During the monitoring period, the FSV ISFSI was operated by CH2M - WG Idaho, LLC (CWI) for the Department of Energy (DOE). The FSV ISFSI is licensed (SNM-2504) by the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 72 for authorization to store spent nuclear fuel from the Fort St. Vrain Nuclear Generating Station.<sup>1</sup> Spent fuel from the FSV reactor was transferred to the FSV ISFSI between December 26, 1991 and June 10, 1992. The FSV ISFSI license was transferred from Public Service Company of Colorado (PSCO) to the U.S. Department of Energy, Idaho Operations Office (DOE-ID) on June 4, 1999. A Radiological Environmental Monitoring Program (REMP) has been implemented for the FSV ISFSI in accordance with 10 CFR 72.44. This report presents the REMP results for 2015.

## 2.0 Program Description

The REMP is designed to monitor the predominant radiation exposure pathway inherent with the facility design: direct radiation. The direct radiation exposure pathway is monitored using dosimetry located along the Controlled Area Boundary (perimeter) fence of the FSV ISFSI. Monitoring locations are identified in Figure 1. A control station is located at the Weld County Sheriff Office in Greeley, Colorado, approximately 17 miles NNE from the FSV ISFSI. Twenty dosimeters are located around the perimeter fence to monitor direct radiation from the FSV ISFSI. One third of the perimeter fence dosimeters are changed out and processed each month. The control station dosimeter is changed out and processed each month.

**Figure 1.** FSV ISFSI Radiological Environmental Monitoring Locations





Dosimetry processing services were provided by the Idaho National Laboratory (INL) from January through September, and an outsourced qualified processor during October through December. All thermoluminescent dosimeters (TLDs) were replaced with optically stimulated luminescent dosimeters (OSLs) in October 2015.

In December 2015, the perimeter fence was replaced. As a result, dosimeters were relocated to the new perimeter fence from 0 to 20 meters further away from the facility than the previous dosimeter locations.

### 3.0 Results

Dosimetry results for the FSV ISFSI are presented in Table 1 in units of mR/d. The mean exposure rate of 0.38 +/- 0.05 mR/d measured at the ISFSI perimeter fence is comparable to the pre-operational background exposure rate of 0.34 +/- 0.03 mR/d and is consistent with the five-year historical operation mean exposure rate of 0.39 +/- 0.05 mR/d. Additionally, the control station dosimeter responses (0.35 +/- 0.05 mR/d) are consistent with historical values associated with the control station location. Therefore, both the perimeter fence and control dosimeter responses are consistent with historical values.

**Table 1. FSV ISFSI Exposure Rates (mR/d)**

Location	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DÉC	Mean
I-1	0.36			0.39			0.39		0.44	0.48			0.41
I-2		0.38			0.39			0.40	0.40		0.25		0.36
I-3			0.40			0.39			0.40			0.20	0.35
I-4	0.37			0.39			0.40		0.43	0.48			0.41
I-5		0.41			0.39			0.42	0.41		0.27		0.38
I-6			0.38			0.37			0.37			0.29	0.35
I-7	0.32			0.37			0.37		0.38	0.38			0.36
I-8		0.41			0.40			0.41	0.41		0.27		0.38
I-9			0.39			0.38			0.40			0.32	0.37
I-10	0.37			0.40			0.39		0.44	0.41			0.40
I-11		0.40			0.40			0.41	0.42		0.27		0.38
I-12			0.38			0.37			0.38			0.31	0.36
I-13	0.36			0.39			0.38		0.40	0.41			0.39
I-14		0.40			0.38			0.40	0.44		0.27		0.38
I-15			0.38			0.37			0.39			0.32	0.37
I-16	0.36			0.39			0.39		0.41	0.38			0.39
I-17		0.39			0.37			0.39	0.41		0.27		0.37
I-18			0.38			0.36			0.39			0.27	0.35
I-19	0.36			0.39			0.37		0.44	0.41			0.39
I-20		0.40			0.38			0.39	0.42		0.27		0.37
Mean	0.36	0.40	0.39	0.39	0.39	0.37	0.38	0.40	0.41	0.42	0.27	0.29	0.38
Control	0.34	0.38	0.37	0.37	0.35	0.34	0.35	0.36	0.34	0.41	0.22	0.32	0.35
Control									0.35				
Control									0.38				

#### 4.0 Discussion

The FSV ISFSI REMP was successfully implemented during 2015. There was no loss of sample data. However, uncharacteristically low dosimetry results were reported by the dosimetry processor during November and December. REMP monitoring in 2016 indicated a mean daily exposure rate of 0.33 +/- 0.04 mrem/day. The December 2015 results are within this range. While not within the 2016 daily average exposure rate range, similar exposure rates to the November 2015 results were reported occasionally in 2016. The OSLs produce results approximately 15% lower than the previously used TLDs. Other than relocating dosimeters to the new perimeter fence, there were no sampling location changes. There were no deviations from the established sampling schedule. The radiation dosimetry results indicate there has been no measurable increase in ambient background radiation levels beyond the FSV ISFSI perimeter fence attributed to storage of the FSV fuel. There were no radioactive liquid effluents released from the facility, hence no radionuclides to report. There are no sources of radioactive material that may become airborne during normal operations, hence no radionuclides to report.

#### 5.0 Conclusion

Direct radiation exposure from the facility during 2015 did not contribute to any increase in the maximum potential dose commitment (0.15 mrem/y) to the nearest resident (located 797 meters from the ISFSI) projected in the FSV ISFSI Safety Analysis Report.<sup>2</sup>

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