



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-4125

March 30, 2011

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

SUBJECT: NRC INSPECTION REPORT 072-009/2011-001

Dear Mr. Provencher:

A routine inspection of spent fuel storage activities at the U.S. Department of Energy's Fort Saint Vrain Independent Spent Fuel Storage Installation (ISFSI) was conducted on March 8-9, 2011. At the conclusion of the inspection on March 9, 2011, an exit briefing was conducted with members of your staff. The enclosed report presents the scope and results of the nonsecurity portion of this inspection. A second inspection report issued March 21, 2011, and not publicly available, presented the security findings of this inspection.

The nonsecurity portion of this inspection examined activities conducted under your license as they related to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection included reviews of the ISFSI emergency response program, training, radiation protection, environmental monitoring, operations, organization, quality assurance, corrective action program, aging management, and safety reviews conducted by your staff. No findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards 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 817-860-8191 or Mr. Lee Brookhart at 817-276-6549.

Sincerely,

/RA/

D. Blair Spitzberg, PhD, Chief
Repository & Spent Fuel Safety Branch

Docket: 072-009
License: SNM-2504

Department of Energy

- 2 -

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NRC Inspection Report 072-009/2011-01
w/attachment

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 072-009

License: SNM-2504

Report: 072-009/2011-001

Licensee: United States Department of Energy

Facility: Fort St. Vrain Independent Spent Fuel Storage Installation

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

Dates: March 8-9, 2011

Inspectors: Vincent Everett, Senior Inspector
Repository & Spent Fuel Safety Branch

Lee Brookhart, Health Physicist
Repository & Spent Fuel Safety Branch

Accompanied By: Chris Staab, Project Manager
Spent Fuel Storage and Transportation

Jean Trefethen, Project Manager
Environmental Protection and Performance Assessment

Approved By: D. Blair Spitzberg, PhD., Chief
Repository & Spent Fuel Safety Branch

Attachment: Supplemental Inspection Information

ENCLOSURE

EXECUTIVE SUMMARY

United States Department of Energy
NRC Inspection Report 072-09/11-01

The U.S. Department of Energy (DOE) was licensed by the U.S. Nuclear Regulatory Commission (NRC) to operate the Fort St. Vrain Independent Spent Fuel Storage Installation (ISFSI) located near Platteville, Colorado. The facility was being maintained by CH2M-WG Idaho, LLC (CWI) as the management and operations contractor for DOE.

Away from Reactor ISFSI Inspection Guidance (60858)

- The ISFSI facility was being maintained in good physical condition with no observable deterioration. Radiological areas inside the facility were properly posted (Section 1.2.a).
- The emergency planning program was being maintained current. Drills, exercises, and training were performed in accordance with requirements in the emergency plan. Training and participation in drills/exercises were offered to offsite support agencies. Changes to the emergency plan since the last NRC inspection were reviewed to verify that the effectiveness of the plan was not reduced (Section 1.2.b).
- Radiological conditions at the facility had not changed since the last inspection. Radiological surveys and contamination surveys were conducted in accordance with the licensee's procedures. No abnormal conditions were identified (Section 1.2.c).
- The site environmental radiation protection program was being implemented to verify radiation conditions at the ISFSI were in compliance with NRC radiation standards. Environmental dosimeters were adequately located around the ISFSI to demonstrate compliance with exposure limits to the public (Section 1.2.d).
- Biennial reports were sent to the NRC in accordance with 72.48(d)(2). Revisions to the Safety Analysis Report (SAR) and Technical Specifications since February 2006 were acceptable and within the requirements of the 72.48 process (Section 1.2.e).
- Operational activities associated with inspection of cooling inlet and outlet screens, performance of fuel storage container leak tests on a 5-year frequency, and checks of the crane's seismic restraints had been conducted in accordance with the requirements of the Technical Specifications (Section 1.2.f).
- The ISFSI organization was in compliance with SAR requirements for staffing and qualifications of personnel. Training was being performed and documented for site personnel to meet the requirements of the SAR. The Safety Review Committee had met on an annual basis and reviewed issues consistent with requirements in the SAR and Technical Specifications (Section 1.2.g).
- The Quality Assurance organization had performed two audits annually with approximately 10 surveillances annually since the last inspection of February 2006. The ISFSI program elements reviewed had been described as effective. Identified deficiencies had been entered into the licensee's corrective action system (Section 1.2.h).

- The corrective action system was being used to capture issues and document corrective actions. All deficiency reports (DRs) reviewed had been adequately resolved. No adverse trends were identified (Section 1.2.i).
- An aging management program was developed as part of the 20-year license extension application. The licensee evaluated the important to safety aspects of the ISFSI and systematically reviewed the potential areas in which periodic surveillances should be performed to identify age related degradation issues over the next licensed period of the facility. The primary area identified for additional observation was the condition of the concrete structures (Section 1.2.j).

Review of 10 CFR 72.48 Evaluations (60857)

- All safety screenings and evaluations had been performed in accordance with facility procedures and 10 CFR 72.48 requirements by qualified personnel (Section 2.2).

Report Details

Summary of Facility Status

The Fort St. Vrain Independent Spent Fuel Storage Installation (ISFSI) is a modular vault dry storage (MVDS) system developed by Foster Wheeler Energy Corporation. The facility provided storage for the spent fuel from the decommissioned Fort St. Vrain high temperature gas cooled reactor. There were 244 fuel storage containers loaded with spent fuel at the Fort St. Vrain ISFSI.

The Fort St. Vrain ISFSI license was transferred from Public Service Company of Colorado to the Department of Energy (DOE) on June 4, 1999. The facility was being maintained by CH2M-WG Idaho, LLC (CWI) as the management and operations contractor for the DOE. A tour of the ISFSI area and review of site records found the facility to be in good physical condition. Radiation levels were within acceptable levels, consistent with past dose rates at the facility. The CWI and DOE staff have continued to maintain the spent fuel in a safe configuration and have established, through a strong procedural and quality assurance process, the necessary documentation and records that confirm compliance with NRC regulations and the site license.

1 Away from Reactor ISFSI Inspection Guidance (60858)

1.1 Inspection Scope

The ISFSI inspection included review of selected records and interviews with site personnel to verify ISFSI operations were in compliance with the Fort St. Vrain License SNM-2504 certificate of compliance and Technical Specifications, Amendment 9, and the Safety Analysis Report, Revision 9. A tour of the ISFSI was conducted to confirm the facility was being maintained in good physical condition for the safe storage of the spent fuel. The Fort St. Vrain ISFSI operational inspection reviewed selected aspects of the emergency response program, training, radiation protection, environmental monitoring, operations, organization, quality assurance, corrective action program, and aging management.

1.2 Observations and Findings

a. Site Tour of the ISFSI

A tour of the ISFSI was conducted to observe the general condition of the facility. The structure was in good physical condition with no observable deterioration of the facility. The facility was being well maintained, including the general area outside the ISFSI building. The inlet and outlet screens were clear of any debris. The interior of the ISFSI was clean and well kept. A seismic monitor was positioned on the floor of the truck bay. Radiation levels were measured by inspectors during the tour. The background radiation levels outside the facility were 15 - 20 $\mu\text{R/hr}$ (0.015 – 0.020 mR/hr). This level was similar to readings taken at the Denver airport area of 19 $\mu\text{R/hr}$. Radiation levels inside the truck bay were 15 – 21 $\mu\text{R/hr}$. With the detector held against the truck bay wall that provided shielding from the stored spent fuel, the reading on the wall was 50 $\mu\text{R/hr}$. Upstairs on the charge face, the readings ranged from 11 - 35 $\mu\text{R/hr}$. The door to the charge face was posted as a radioactive materials area. Inside the charge face area was a source storage cabinet containing check sources of Cs-137, AmBe, and Tc-99. The source cabinet was roped off and posted as "Radiation Area, Neutron, and

Radiation Work Procedure (RWP) Required Entry.” The reading at the roped off area was 90 μ R/hr. A depleted uranium plug was stored on the charge face and was posted as radioactive material. In the far corner of the ISFSI were more depleted uranium plugs that were roped off and posted as a radiation area. The reading at the rope of the posted area was 33 μ R/hr. Security tamper seals on the charge face were verified to have been intact. The fuel handling machine was verified to have been properly stored.

b. Emergency Planning

Revisions to the licensee’s emergency planning program since the last NRC inspection in February 2006 were reviewed. The licensee’s emergency plan, PLN-143, had been revised six times during that time period. Revisions 8-13 were reviewed to verify that the effectiveness of the plan was not reduced.

Required emergency plan drills/exercises were listed in Section 6.6.1.2 of the emergency plan. Required semiannually drills included radiological/health physics drills, medical drills, and fire drills. Biennial exercises were larger drills that tested the adequacy of the implementing plan procedures, emergency equipment, and communications networks and ensured the emergency response personnel were familiar with their duties. Offsite response organizations were invited to participate in the biennial exercises. The licensee had successfully conducted the required exercises since the last ISFSI inspection. Drill packages for the medical drill of February 2008, a natural phenomena drill of April 2008, the security drill of January 2009, the radiological/health physics drill of March 2009, and a fire drill of May 2009 were selected for review. The biennial exercises for 2006, 2008, and 2010 were selected for review. The selected drills and exercises met the objectives of site Emergency Plan Section 6.6.1.2. The drill and exercise packages included a description of the drill that was conducted, a timeline, a synopsis, and a drill critique. Drill deficiencies and areas for improvement were identified and placed into the licensee’s corrective action program for resolution. Offsite support agencies that participated in the different drills and/or exercises included the Platteville/Gilcrest Fire Protection District, the Milliken Police Department, the Milliken Fire Department, the Weld County Office of Emergency Management, the Weld County Paramedic Service, the Weld County Regional Communications Center, the Weld County Regional Sheriff’s Center, and the North Colorado Medical Center.

Emergency Plan Section 6.6.1.3 required semiannual verification of offsite agencies’ phone numbers. Procedure EPI-108, “Requirements of Fort St. Vrain Emergency Response Plan,” Revision 8, Section 4.1.1, required verification of offsite telephone numbers. The licensee’s phone list, LST-26, “INL Emergency Telephone Numbers,” listed the agencies that were required to be contacted. The semiannual phone verification for the year 2010 was reviewed. Both required semiannual phone verifications were performed as required.

A review of the emergency response personnel training records was conducted to verify that the licensee’s emergency response organization was currently qualified. An employee qualification report dated March 9, 2011, documented that all emergency response personnel were current on their qualifications. For the Fort St. Vrain ISFSI, the on-shift security officer does not make the emergency classification. The security officer calls one of the facility management personnel and reports the situation. The management personnel then makes the emergency classification determination. Once

classified, Idaho National Laboratory (INL) is notified and Idaho makes the calls to the offsite agencies. The facility management personnel or INL would make the call to the NRC. The on-shift security officer would call 911 for immediate response. A copy of the current emergency planning procedures was in the cabinet next to the on-shift security officer.

The annually required review of the licensee's memorandums of understanding (MOU) with offsite response agencies per Section 6.6.2.3 of their emergency plan was performed. Years 2009 and 2010 were selected for compliance with the requirement. The licensee provided an interoffice memorandum that documented that the annual reviews were performed and all MOUs with offsite response organizations were still current. The offsite response organization's MOUs reviewed matched the offsite liaisons listed in Section 9.1.5 of the Final Safety Analysis Report.

The licensee's emergency plan was verified to have provisions for notifying the NRC of emergencies as required by 10 CFR 72.75. This was incorporated into Procedure EPI-103, "Event Notifications for Fort Saint Vrain," Revision 18. Section 4.1.1.2.2 of the procedure required notification to the NRC Operations Center as soon as possible but no longer than 1 hour after declaration of an emergency event classification, consistent with §72.75(a). Section 4.2.2.2 required notification to the NRC Operation Center within 4 hours of a nonemergency event consistent with §72.75(b). The reporting requirements of §72.75(d) for a 24-hour report and §72.75(g) for a 60-day report to the NRC was specified in Procedure MCP-2924, "NRC Licensee Event and Condition Reporting," in Sections 4.2.1 and 4.4.1, respectively. Procedure MCP-2924 also included reporting requirements to the NRC from the requirements listed in the Technical Specifications, 10 CFR Part 20, 10 CFR Part 21, and 10 CFR Part 73.

c. Radiation Protection

Radiological conditions at the facility had not changed since the last inspection. Radiological surveys and contamination surveys were conducted in accordance with Procedure MCP-139, "Radiological Surveys," Revision 14, and Procedure PRD-317, "Radiation Protection, Safety and Health and Environmental Protection Programs for NRC Regulated Facilities," Revision 8. Procedure PRD-317, Appendix D, "Fort St. Vrain ISFSI Radiological Survey Report," provided the forms used by the licensee to document the surveys. Surveys were conducted using an Eberline 177L survey instrument. Selected quarterly radiological surveys performed between November 28, 2006, and April 29, 2010, were reviewed. Radiological survey results outside the ISFSI building and on the charge face were less than the minimum detection limits of the survey instrument, 0.2 mR/hr. Contamination surveys found no contamination above background.

Semiannual leak tests of the sources kept in the source storage cabinet were performed using Procedure MCP-137, "Radioactive Source Accountability and Control," Revision 13. Section 4.6.4, "Inventory," and Section 4.6.5, "Source Leak Testing," provided information related to the semiannual inventory and leak test. Semiannual leak tests and inventory of the 840 mCi AmBe source were reviewed for July 2009, January 2010, July 2010, and January 2011. No leaks were detected. The three Cs-137 sources and the Tc-99 source were exempt from the accountability and leak test requirements. Section 5 of Procedure MCP-137 defined accountable sealed radioactive sources as those having a half-life equal to or greater than 30 days and an isotopic

activity equal to or greater than the corresponding value provided in 10 CFR Part 835, Appendix E, dated June 8, 2007. The three Cs- 137 sources had activities of 24.1 μ Ci, 4.53 μ Ci and 1 μ Ci. The value from Appendix E of 10 CFR Part 835 for Cs-137 was 60 μ Ci. For the Tc-99 source, the source strength was 24,605 disintegrations/minute (dpm) which equated to approximately 0.01 μ Ci. The Appendix E value for Tc-99 was 25 μ Ci.

The quarterly sampling of the vault drain system was performed using Procedure TPR-5613, "Fort St. Vrain ISFSI Radiation Survey and Vault Drain System Sample Collection and Analysis," Revision 7. Eight quarterly sampling results were reviewed from November 28, 2006, through April 29, 2010. No liquids were found in the vault drain line during any sampling.

Personnel at the Fort St. Vrain ISFSI were not assigned radiation dosimetry because radiation levels were at background levels for all accessible areas, except around the posted radiation sources. Expected personnel exposures were below the 10 percent annual limit of exposure specified in 10 CFR 20.1201 and, as such, personnel were not required to wear dosimetry per 10 CFR 20.1502. Expected exposure levels were based on radiological surveys. Approximately 12 thermoluminescent dosimeters (TLDs) were stored at the site to be available if needed.

d. Annual Radiological Environmental Monitoring Report

The annual radiological environmental monitoring reports since the last NRC inspection were reviewed to confirm that environmental conditions at the ISFSI had remained stable since the last inspection. The licensee was required by Technical Specification 5.5.4(c) to submit an annual report to the NRC within 60 days after January 1 of each year. Five reports had been submitted since the last inspection, including the 2006 report dated February 26, 2007 (ML070650337), the 2007 report dated February 20, 2008 (ML080590359), the 2008 report dated February 11, 2009 (ML090560534), the 2009 report dated February 16, 2010 (ML100550053), and the 2010 report dated February 14, 2011 (ML110540307). The environmental monitoring program at Fort St. Vrain consisted of 20 TLDs located on a 100-meter perimeter fence around the ISFSI. A control TLD was located at the Weld County Sheriff's office in Greeley, Colorado, approximately 17 miles NNE of the ISFSI. One third of the TLDs were collected and processed monthly and replaced with new TLDs. The control TLD was also processed and replaced monthly.

The following table provides the annual average exposure rates reported in the annual environmental monitoring reports:

YEAR	MEAN (mR/day)	CONTROL (mR/day)
2006	0.37 +/- 0.04	0.34 +/- 0.03
2007	0.37 +/- 0.08	0.36 +/- 0.09
2008	0.38 +/- 0.03	0.35 +/- 0.04
2009	0.40 +/- 0.08	0.37 +/- 0.10
2010	0.39 +/- 0.03	0.36 +/- 0.02

The environmental data was consistent with data that had been collected in the past at the Fort St. Vrain site and was statistically within the background levels measured by the controls. There were no radioactive liquids released from the facility.

During 2009, TLDs collected for March had unusually high readings (0.65 mR/day), whereas the samples collected for April had unusually low readings (0.24 mR/day) compared to the mean for the year of 0.40 mR/day. The higher March readings were attributed to exposure while in transit based on the control dosimeter used during shipment. However, the low April readings could not be explained. The licensee initiated Work Group Task #21972 to evaluate the issue. Preliminary indication was a problem had occurred with how the values on the control dosimeters were assigned to the 2 months.

e. Biennial Update Reports and SAR Revisions

Biennial reports for the period from June 2005 through June 2009 were reviewed. This period was covered by two reports dated May 29, 2007 (ML071580197), and June 4, 2009 (ML091950422). These reports provided information related to revisions during the reporting period to the SAR and certain programs required by the Technical Specifications. The biennial reports also discussed any safety evaluations performed.

Issuance of the May 29, 2007, biennial report included Revision 6 to the SAR. Revision 6 changes primarily related to the DOE organization titles and responsibilities in Chapter 9, "Conduct of Operations," and Chapter 11, "Quality Assurance." During this 2-year period, no changes were made to the facility pursuant to 10 CFR 72.48, to the Technical Specification bases, or to the radiological environmental monitoring program. Editorial changes were made to the training program. Changes were made to the Quality Assurance Program described in Chapter 11 of the SAR to describe the new DOE organization and to identify that contractor stop work authority resided with the INTEC Quality Assurance Manager. Stop work authority did continue to remain granted in Section 7.6.1 of the latest revision (Revision 9) of the SAR to any individual who observed an actual or potential unsafe radiological condition.

Several new gas wells were added to the area around Fort St. Vrain. Technical Specification 5.5.3 required a database be maintained of all natural gas and oil infrastructures within ½ mile of the ISFSI. If a new facility posed a new hazard not already analyzed, then a report to the NRC was required. DOE identified four new natural gas wells, one located within the 1/2-mile boundary and three just outside the boundary. All four tied into existing production equipment and were bounded by hazards analysis previously performed for the site.

The June 4, 2009, biennial report included Revision 7 of the SAR. Changes were made to nearly every chapter in the SAR. The licensee identified most of these changes as being editorial. However, several sections were identified as having changes more than just editorial. Chapters 1 and 2 were updated to include the 2000 census numbers, replacing the 1980 values. Chapters 3 and 4 were revised to move the sections "Classification of Structures, Components and Systems" and "Decommissioning Considerations" from Chapter 4 to Chapter 3 and to remove several items from the list of items important to safety. The individual fuel element grapple, the transfer cask, and the neutron source storage wells were removed from the list. Since the ISFSI was not licensed to handle individual fuel elements and the fuel was contained in fuel storage

containers which would be lifted by the container handling machine fuel storage container grapple, the individual fuel element grapple was not needed. The fuel storage container grapple was currently included on the list of items important to safety. The transfer casks had been included in the original license and were used to transfer the fuel elements from the Fort St. Vrain reactor facility to the ISFSI, but have since been replaced by the TN-FSV casks that have current 10 CFR Part 71 licensees. The neutron storage wells were originally designed to hold the six neutron source fuel elements containing the Californium-252 neutron sources. But the Cf-252 was removed from the fuel elements prior to placement of the fuel elements in the ISFSI. The neutron source storage wells were identical in design to the standby storage wells (SSW) and as such have been re-designated by the licensee as SSWs. Revision 6 to the SAR had listed "Standby and neutron source storage wells" in Table 4.5-1, "Fort St. Vrain ISFSI Components Classified as Important to Safety." Revision 7 changed the wording to "Standby storage wells." Revision 7 also moved the table to Chapter 3 as Table 3.4-1.

Changes were made to SAR Chapter 9.2, "Preoperational Testing Activities," to remove outdated information related to the transition of the ISFSI from Public Service of Colorado to DOE. The revised chapter focused on preoperational activities required for moving fuel. An update was made to the natural gas and oil data base to add two gas wells. Also during this reporting period an expansion to increase the generating capacity of the Fort St. Vrain natural gas generating facility, located adjacent to the decommissioned reactor facility, was approved by the regulatory agencies. Two additional natural gas combustion turbines, a new gas supply line, and a gas facility were part of the expansion. An evaluation conducted by the licensee determined that the new expansion was bounded by the current safety analysis and did not present a new or unanalyzed risk to the ISFSI.

Since issuance of the June 4, 2009, biennial update report, two revisions have been made to the SAR. Both revisions were in support of the application for a license extension for the Fort St. Vrain facility. On August 13, 2010, Revision 8 of the SAR was issued. The primary change was to add a new Section 9.8, "Aging Management Program." The aging management program included visual inspections of the accessible concrete and any exposed steel embedments and attachments. It also included monitoring the area radiation and loose surface contamination levels at selected areas of the ISFSI. Procedures were revised to increase inspection frequencies and perform tracking and trending of aging conditions.

The second SAR revision was described in a letter to the NRC dated November 30, 2010. Revision 9 to the SAR added a requirement to the aging management program described in Section 9.8 to conduct a visual inspection of the vault internals every 10 years.

f. Technical Specification Compliance and SAR Requirements

Technical Specification 3.3.1 required the licensee to conduct a leak test of one fuel storage container from each vault every 5 years. The leak rate limit for the seals was 1×10^{-3} standard cubic centimeters per second (cc/sec). The previous leak testing was completed September 2005 and documented in the last NRC inspection report 72-09/05-01 (ML060460621) dated February 15, 2006.

The 2010 leak tests were conducted using Procedure TPR-5604, "Fort St. Vrain ISFSI Fuel Storage Container O-Ring Vacuum Leak Test," Revision 16. The leak tests were performed by a qualified examiner certified as a Level II NDE Leak Test Examiner. The Fort St. Vrain ISFSI certified fuel handlers, facility safety officer, and the Fort St. Vrain ISFSI Manager assisted with the testing.

New leak test equipment was used in 2010 from that previously used in 2005. Leak testing was performed manually using hand operated valves and a manually read pressure indicator connected to the lid seal interface connection port. The test volume was evacuated to a pressure of approximately 100 milliTorr and isolated; then a timed pressure rise test was performed to determine a leak rate. Leak tests were performed on six fuel storage container lid seals (one for each vault) and on three standby storage well (SSW) lid seals.

The leak tests were conducted during the week of June 21, 2010. The leakage test results were all less than the allowable rate of 1.0×10^{-3} cc/sec as specified in Technical Specification 3.3.1. The results for the leak test are provided in the table below:

Fuel Storage Container	Date of Test	Leakage (cc/sec)
A-35	June 21, 2010	7.33E-04
B-41	June 21, 2010	9.85E-04
C-41	June 21, 2010	5.10E-04
D-41	June 22, 2010	4.29E-04
E-41	June 22, 2010	7.65E-04
F-28	June 22, 2010	4.80E-04
SSW-1	June 22, 2010	4.89E-04
SSW-2	June 22, 2010	5.94E-04
SSW-3	June 22, 2010	4.14E-04

Technical Specification 3.1.1.1 required that the cooling inlet and outlet screens be visually inspected every 7 days to verify that no blockage existed. If blockage was observed on the screens, compensatory actions were required with specified time limits. Through discussion with security personnel, it was identified that, on top of the weekly checks, the security personnel checked both inlet and outlet vents daily during their required rounds of the site. Records were reviewed for August 2007, December 2008, June 2008, February 2009, November 2010, and December 2010. Procedure TPR-5593, "Visual Inspection of Fort St. Vrain ISFSI Cooling Inlets and Outlets/Tornado Clamp Verification," Revision 13, had been utilized to perform the visual inspections. The licensee had completed the visual inspections in a timely manner and had identified no obstructions during the months selected for review. The NRC inspector accompanied the licensee during the weekly inspection conducted on March 9, 2011. No obstructions were observed on the inlet and outlet screens during the inspection.

Safety Analysis Report Table 9.2.1 required the licensee to check the seismic restraints on the crane weekly. Records for the months of August 2007, December 2008, June 2008, February 2009, November 2010, and December 2010 were reviewed. Procedure TPR-5593, "Visual Inspection of Fort St. Vrain ISFSI Cooling Inlets and Outlets/Tornado Clamp Verification," Revision 13, had been utilized to perform the visual inspections. The licensee had completed the required visual check on the crane's seismic restraints

as required by the SAR with no discrepancies noted. The NRC inspector accompanied the licensee during the weekly inspection conducted on March 9, 2011. The crane's seismic restraints were verified as engaged.

g. Organization and Training

Requirements related to the ISFSI staffing were included in Section 9.1 of the SAR. Figure 9.1-1 provided an organizational tree of command. The licensee provided individual names for each of the positions listed in Figure 9.1-1. Employee qualification reports, dated March 9, 2011, were reviewed to verify that the assigned individuals currently met the training requirements listed in SAR Section 9.1.4.1. The individuals assigned to the following positions were verified as having current training: ISFSI Quality Assurance Manager, Fort St. Vrain Facility Director, Manager of ISFSI Management, Fort St. Vrain ISFSI Manager, and Fort St. Vrain Facility Safety Officer.

Safety Analysis Report Section 9.1.3.1.1 required an ISFSI safety review committee for Fort St. Vrain. The purpose of this committee was to evaluate the performance of the staff level safety committees, review performance indicators, review 72.48 evaluations, review evaluations for the oil and gas program, review changes to the Technical Specifications, emergency procedure, and physical protection plan, approve license amendment requests, and review preparations for major changes in operations. The membership of the safety review committee was updated in writing when changes were made. The most recent safety review committee membership change was dated March 7, 2011. Section 9.1.4.1 of the SAR listed the training requirements for committee members and alternates. Employee qualification reports, dated March 9, 2011, were reviewed to verify that all individuals had completed the required training listed in Section 9.1.4.1. All training had been completed, except for one recently appointed alternate (Critical Safety Alternate).

The Safety Review Committee's charter was reviewed against Technical Specification 5.2.1.4 and SAR Chapter 9.1.3.1.1 related to the committee's functions and purpose. Technical Specification 5.2.1.4 required the safety review committee to meet at least once every 12 months with at least three committee members present for a quorum. The meeting minutes for the last three safety review committee meetings, dated August 13, 2008, August 4, 2009, and July 14, 2010, were reviewed. All meetings had at least three members, creating the required quorum. The issues discussed in the meetings were consistent with the objectives specified in the committee's charter, the SAR, and the Technical Specifications.

h. Quality Assurance and Audits

Both the Fort St. Vrain and Three Mile Island (TMI) - 2 ISFSI facilities used the same DOE quality assurance program implementation requirements. The quality assurance program for the Fort St. Vrain ISFSI was described in Chapter 11 of the SAR. Implementation of the quality assurance requirements was accomplished using the "Quality Assurance Requirements and Description (QARD)," DOE/RW-0333P, Revision 10. No changes had been made to the QARD since the last inspection performed in February 2006. The QARD was also used for the Yucca Mountain project and had been revised numerous times since Revision 10. However, Fort St. Vrain had not adopted the later revisions and remained at Revision 10.

The licensee had conducted two annual audits each year, under the QARD, since the last inspection performed in February 2006. Each audit evaluated the effectiveness and adequacy of implementation of the ISFSI procedures and processes for both ISFSIs (Fort St. Vrain, TMI-2). Audits 06-ISFSI-AU-002 and 09-ISFSI-AU-002, dated September 2006 and September 2009, respectively, were selected for review. In both of the audits, the elements of the quality assurance program implemented at the Fort St. Vrain ISFSI were rated as effective. All identified deficiencies were entered into the licensee's corrective action system.

The licensee also performs approximately 10 surveillances each year since the last inspection performed in February 2006. The surveillances evaluated various requirements in areas including ISFSI maintenance, physical protection, emergency preparedness, records management, administrative controls, and the safety review committee. Deficiencies identified during the surveillances were entered into the licensee's corrective action system. No significant deficiencies were identified.

i. Deficiency Reports

The licensee provided a list of the deficiency reports initiated in the corrective action system since the last inspection. The licensee had initiated 94 deficiency reports between the two ISFSIs (Fort St. Vrain, TMI-2). Six deficiency reports were selected for additional review that related to ISFSI issues. All deficiency reports reviewed were determined to be adequately resolved. No adversely developing trends were identified in the deficiency reports reviewed.

j. Aging Management Program and License Renewal

NRC License SNM-2504 was issued to Public Service of Colorado in November 1991 for the storage of spent fuel elements from the Fort St Vrain High Temperature Gas Cooled Reactor (HTGCR). The Fort St Vrain HTGCR was shut down August 1989 and has since completed decommissioning and license termination. Transfer of the spent fuel elements from the shut down reactor facility to the Fort St Vrain ISFSI began December 26, 1991, and was completed June 10, 1992. The ISFSI license issued in 1991 was for 20 years. On June 4, 1999 the license for the Fort St. Vrain ISFSI was transferred to the DOE, who currently is the licensee for the facility. The DOE Idaho Operations Office (DOE-ID) was assigned responsibility for the activities authorized by Materials License SNM-2504. On November 10, 2009, DOE submitted an application (Federal Register Notice 75FR30074) to the NRC for the renewal of the ISFSI license for a period of an additional 20 years. The application was currently under review by the NRC.

As part of the license renewal, DOE had proposed an aging management program. This was prudent with the recent uncertainty of the Yucca Mountain project and the re-evaluation by DOE concerning the options for the long-term storage and disposition of the nations spent fuel inventory. Section 2, "Scoping Evaluation," of DOE's license renewal application described the scoping process to determine if a structure, system, or component (SSC) should be evaluated for inclusion in the aging management program planned for implementation during the renewal licensing period. The criteria for inclusion related to items important to safety and items not important to safety but whose failure could prevent an important to safety requirement from being fulfilled. Specific criteria was developed and used for the evaluation which identified 10 SSCs that should be

evaluated. These included, for example, the fuel storage containers, structural concrete on the modular dry vault storage building, structural steel on the charge face, the container handling machine, and fuel in storage.

Section 3, "Aging Management Reviews," then performed an assessment of the SSC and its subcomponents to evaluate the effects of aging on the SSCs ability to perform its function during the renewal licensing period. The assessment involved four major steps: (1) identification of in-scope subcomponents requiring aging management review screening, (2) identification of materials and environments, (3) identification of aging effects requiring management, and (4) determination of the activities/programs required to manage the effects of aging. The aging analysis included the materials of construction and the environment which the SSC was exposed to in the ISFSI and addressed both the aging effects and the aging mechanisms. Potential aging mechanisms were considered from industry experience and from various industry standards groups such as the American Concrete Institute (ACI), American Society for Metals (ASM), and American National Standards Institute (ANSI). The results of the analysis determined that the only SSC that required management of aging effects during the 20-year period of the license renewal extension was the MVDS concrete. This would consist primarily of adding periodic visual inspections by personnel qualified and trained in accordance with ACI 349.3R-02, "Evaluation of Existing Nuclear Safety-Related Concrete Structures." Examinations had been performed in 2006 and 2009.

The fuel storage containers, which contain the spent fuel elements, were determined to not need additional aging management. The metallic seals on the canisters were already required to undergo 5-year testing in accordance with Technical Specification 3.3.1. In February 2008 a video inspection of two of the vaults found the exterior of the fuel storage containers to be in good condition. This was documented in Engineering Design File 8612, "Fort St. Vrain ISFSI MVDS Fuel Storage Container and Support Stool Aging Management Review," dated March 15, 2010.

DOE had added the aging management program to the SAR, Revision 8, as a new Chapter 9.8. Based on comments from the NRC during the review of the aging management program, DOE issued Revision 9 of the SAR to add visual inspections of the inaccessible areas of the vault on a 10-year basis. The aging management program was scheduled to start June 2014. Markers had already been placed on several suspected cracks on the ISFSI exterior walls and were being monitored. No increase in cracking had been measured.

1.3 Conclusions

The ISFSI facility was being maintained in good physical condition with no observable deterioration. Radiological areas inside the facility were properly posted.

The emergency planning program was being maintained current. Drills, exercises, and training were performed in accordance with requirements in the emergency plan. Training and participation in drills/exercises were offered to offsite support agencies. Changes to the emergency plan since the last NRC inspection were reviewed to verify that the effectiveness of the plan was not reduced.

Radiological conditions at the facility had not changed since the last inspection. Radiological surveys and contamination surveys were conducted in accordance with the licensee's procedures. No abnormal conditions were identified.

The site environmental radiation protection program was being implemented to verify radiation conditions at the ISFSI were in compliance with NRC radiation standards. Environmental dosimeters were adequately located around the ISFSI to demonstrate compliance with exposure limits to the public.

Biennial reports were sent to the NRC in accordance with 72.48(d)(2). Revisions to the SAR and Technical Specifications since February 2006 were acceptable and within the requirements of the 72.48 process.

Operational activities associated with inspection of cooling inlet and outlet screens, performance of fuel storage container leak tests on a 5-year frequency, and checks of the crane's seismic restraints had been conducted in accordance with the requirements of the Technical Specifications.

The ISFSI organization was in compliance with SAR requirements for staffing and qualifications of personnel. Training was being performed and documented for site personnel to meet the requirements of the SAR. The SRC had met on an annual bases and reviewed issues consistent with requirements in the SAR and Technical Specifications.

The Quality Assurance organization had performed two audits annually with approximately 10 surveillances annually since the last inspection of February 2006. The ISFSI program elements reviewed had been described as effective. Identified deficiencies had been entered into the licensee's corrective action system.

The corrective action system was being used to capture issues and document corrective actions. All deficiency reports (DR) reviewed had been adequately resolved. No adverse trends were identified.

An aging management program was developed as part of the 20-year license extension application. The licensee evaluated the importance to safety aspects of the ISFSI and systematically reviewed the potential areas in which periodic surveillances should be performed to identify age related degradation issues over the next licensed period of the facility. The primary area identified for additional observation was the condition of the concrete structures.

2 Review of 10 CFR 72.48 Evaluations (60857)

2.1 Inspection Scope

Changes to the facility and procedures since the last inspection in February 2006 were reviewed to determine if the licensee had performed the required evaluations in accordance with 10 CFR 72.48.

2.2 Observations and Findings

Safety screenings and safety evaluations were performed in accordance with Procedure MCP-2925, "Screen and Evaluate Changes." Several safety screenings were performed since February 2006, but only two of the screenings required the additional level of analysis required by a safety evaluation. Selected safety screenings and the two 72.48 safety evaluations documented as FSV-09-003 and FSV-09-004 were reviewed. The 72.48 evaluations removed the individual fuel element grapple, the transfer cask, and the neutron source storage wells from the SAR and Technical Specifications. Since the ISFSI was not licensed to handle individual fuel elements and the fuel was contained in fuel storage containers which would be lifted by the container handling machine fuel storage container grapple, the individual fuel element grapple was not needed. The fuel storage container grapple was currently included on the list of items important to safety. The transfer casks had been included in the original license and were used to transfer the fuel elements from the Fort St. Vrain reactor facility to the ISFSI, but have since been replaced by the TN-FSV casks that have current 10 CFR Part 71 licensees. The neutron storage wells were originally designed to hold the six neutron source fuel elements containing the Californium-252 neutron sources. However, the Cf-252 was removed from the fuel elements prior to placement of the fuel elements in the ISFSI. The neutron source storage wells were identical in design to the standby storage wells and, as such, have been re-designated by the licensee as standby storage wells. No findings of significance were identified for the screenings or evaluations reviewed.

Training and qualification records for personnel approved to perform 72.48 screenings and evaluations were reviewed. All personnel had current qualifications documented in the employee qualification report, dated March 9, 2011.

2.3 Conclusions

All safety screenings and evaluations had been performed in accordance with facility procedures and 10 CFR 72.48 requirements by qualified personnel.

3 Exit Meeting

The inspectors reviewed the scope and findings of the inspection during an exit meeting conducted at the conclusion of the onsite inspection on March 9, 2011. The licensee did not identify any information as proprietary that was provided to, or reviewed, by the inspectors.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

T. Borst, Fort St. Vrain ISFSI Manager
K. Whitham, DOE-ID Facility Director
J. Newkirk, Fort St. Vrain Facility Safety Officer
R. Elwood, Manager of ISFSI Management
J. Leger, Security Coordinator, NSA

INSPECTION PROCEDURES USED

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

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Discussed

None

Closed

None

LIST OF ACRONYMS

ACI	American Concrete Institute
ANSI	American National Standards Institute
ASM	American Society for Metals
cc/sec	Standard cubic centimeters per second
CFR	<i>Code of Federal Regulations</i>
CWI	CH2M-WG Idaho, LLC
DOE	Department of Energy
DR	Deficiency Report
FSV	Fort Saint Vrain
HTGCR	High Temperature Gas Cooled Reactor
INL	Idaho National Laboratory
ISFSI	Independent Spent Fuel Storage Installation
MOU	Memorandum of Understanding
mCi	milliCurie
mR/hr	milliRoentgen per hour
MVDS	modular vault dry storage
NRC	Nuclear Regulatory Commission
QARD	Quality Assurance Requirements Document
RWP	radiation work procedure
SAR	Safety Analysis Report
SSC	structures, systems, or component
SSW	standby storage wells
TLD	thermoluminescent dosimeter
TMI	Three Mile Island
μR/hr	microRoentgens per hour