



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

December 17, 2015

Mr. Bradley Y. Jenkins
Vice President, Generation
Portland General Electric Company
71760 Columbia River Highway
Rainier, OR 97048

SUBJECT: TROJAN INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)
INSPECTION REPORT 07200017/2015001

Dear Mr. Jenkins:

This letter refers to a routine inspection conducted on November 17-19, 2015, of the dry cask storage activities associated with your Independent Spent Fuel Storage Installation (ISFSI). The enclosed inspection report documents the inspection results, which were discussed on November 19, 2015, with Mr. Mark Tursa, ISFSI Manager, and other members of your staff.

The inspection examined 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. The inspection reviewed compliance with the requirements specified in your site specific Materials License No. SNM-2509, the associated Technical Specifications, the Trojan ISFSI Final Safety Analysis Report (FSAR), and the regulations in Title 10 of the Code of Federal Regulations (CFR) Part 72 and Part 20.

The inspection reviewed the areas of radiation safety, quality assurance, corrective action program, safety evaluations, cask maintenance, and how you addressed industry issues that affected your ISFSI program. The inspection also reviewed the changes made to your ISFSI program since the last U.S. Nuclear Regulatory Commission (NRC) routine ISFSI inspection. Your ISFSI operations were found to be in compliance with the applicable NRC regulations and requirements and your storage casks were found to be in good physical condition. No violations of NRC regulations were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <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. Lee Brookhart at (817) 200-1549.

Sincerely,

/RA R. Browder for/

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

Docket: 72-17
License: SNM-2509

Enclosure:
Inspection Report 07200017/2015001
w/attachments:
1. Supplemental Information
2. Loaded Casks at the Trojan ISFSI

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DISTRIBUTION:
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SIGN	<i>/RA/</i>	<i>/RA/</i>					
DATE	12/17/15	12/17/15					

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Letter to Mr. B. Jenkins from Mr. R. Kellar dated December 17, 2015

SUBJECT: TROJAN INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)
INSPECTION REPORT 07200017/2015001

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**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV**

Dockets: 07200017
Licenses: SNM-2509
Report Nos.: 07200017/2015001
Licensee: Portland General Electric Company (PGE)
Facility: Trojan Independent Spent Fuel Storage Installation (ISFSI)
Location: 71760 Columbia River Highway
Rainier, OR 97048
Dates: November 17-19, 2015
Inspector: Lee Brookhart, Senior Inspector
Fuel Cycle and Decommissioning Branch
Approved By: Ray L. Kellar, P.E., Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Trojan Independent Spent Fuel Storage Installation NRC Inspection Report 07200017/2015001

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine inspection of the licensee's programs and activities for safe handling and storage of spent fuel at the Trojan Independent Spent Fuel Storage Installation (ISFSI) on November 17-19, 2015. The inspection reviewed a number of topics to evaluate compliance with the applicable NRC regulations and the provisions of the site-specific license SMN-2509. Trojan's unique design utilized a Holtec Multi-Purpose Canister (MPC) and a BNFL Fuel Solutions TranStor concrete over-pack. Thirty-four casks had been loaded and stored on the Trojan ISFSI pad. All spent nuclear fuel was moved to the ISFSI between January 2003 and September 2003. The Part 50 license for the Trojan reactor facility was terminated in 2005. Since then, a majority of the site structures not related to the ISFSI have been dismantled and completely removed from the site. The ISFSI facility was well maintained and dose rates around the perimeter were being monitored. Perimeter dose rates measured since the fuel was loaded into the ISFSI have continued to drop as the spent fuel decays. A review of the environmental monitoring program demonstrated that radiological exposures to offsite locations and individuals were in compliance with federal regulations. The quality assurance program and corrective action program were being effectively implemented to capture and correct issues related to the dry cask storage program.

The NRC routine inspection reviewed documentation relevant to ISFSI activities and operations that have occurred at Trojan since the last ISFSI inspection that was performed in June of 2013. In summary, the licensee was conducting ISFSI activities in compliance with regulatory and license requirements.

Away-From-Reactor ISFSI Inspection Guidance (60858)

- The licensee was conducting quality assurance audits of the ISFSI program. A review of the audit reports determined that the audits were covering a broad range of topics. A number of recommendations were identified in the audits and entered into the ISFSI Activities Database for implementation. (Section 1.2.a)
- Radiation data reviewed from the 2013 through 2014 environmental monitoring reports determined that radiation levels offsite were in compliance with 10 CFR 72.104 federal regulations. (Section 1.2.b)
- Required records were maintained that described the specific fuel parameters for the spent fuel stored in each of the licensee's loaded casks. (Section 1.2.c)
- Since the last NRC ISFSI inspection, Trojan had revised its FSAR one time in Revision 13. No issues were identified in the review of the changes associated with the revision. (Section 1.2.d)
- Selected condition reports were reviewed for the period June 2013 through November 2015. A few issues had been identified and resolved. Resolutions of the condition reports were appropriate for the safety significance of the issue. No adverse trends were identified during the review. (Section 1.2.e)

- Concrete cask temperature monitoring requirements of Technical Specification 5.5.3 were performed daily and vent surveillances were performed weekly as required. No temperature issues with the casks were found during the review of selected records. (Section 1.2.f)
- The inspector verified that the annual site drills and biennial exercises had been performed for the period of 2013 through 2015, in compliance with the site's emergency plan and 10 CFR 72.32 (a)(12) requirements. (Section 1.2.g)
- Annual concrete cask, ISFSI pad, and transfer station inspections had been completed in accordance with FSAR requirements. Only minor superficial concrete surface issues were identified and repaired. (Section 1.2.h)
- Aging management programs were adequately implemented at the ISFSI related to the 5-year cask interior inspection. The outer surface of the spent fuel canister showed no signs of degradation after 10 years in storage. (Section 1.2.i)
- The US Army Corps of Engineers installed an anchor buoy designated as the Prescott Anchorage Area on the Columbia River. Trojan ISFSI staff adequately evaluated the use of the anchorage from a radiological aspect. An Unresolved Item (URI) was opened to track the licensee's review of use of the anchor to ensure it was bounded by the Trojan FSAR's fire hazards and explosions analyses. (Section 1.2.j)

Review of 10 CFR 72.48 Evaluations (60857)

- All required safety screenings and safety evaluations had been performed in accordance with the licensee's procedures and 10 CFR 72.48 requirements. All screenings and safety evaluations reviewed were determined to be adequately evaluated. (Section 2)

REPORT DETAILS

Summary of Facility Status

The Trojan Independent Spent Fuel Storage Installation (ISFSI) was loaded with 34 storage casks between January 2003 and September 2003 containing all the spent nuclear fuel stored onsite at the Trojan Nuclear Power Plant. Each BNFL Fuel Solutions TranStor concrete cask contained one Holtec Multi-Purpose Canister (MPC) of the MPC-24E or MPC-24EF design. The MPC-24E and MPC-24EF are designed to accommodate up to 24 pressurized water reactor (PWR) fuel assemblies. Trojan's ISFSI is protected by its own protected area and lies adjacent to the area where the Trojan reactor was originally located. The reactor facility was radiologically remediated to release limits and demolished. The reactor site was released by the NRC from radiological controls under the Part 50 license on May 23, 2005. The ISFSI is maintained under a site-specific NRC Part 72 license. The facility was staffed primarily by personnel who had worked at the Trojan site when it was an operating reactor facility. This staff has continued to maintain the spent fuel in a safe configuration and has established the necessary programs and records that confirmed compliance with NRC regulations and the site license.

The casks at the Trojan ISFSI were loaded using SNM-2509 License Amendment 3 and Final Safety Analysis Report (FSAR) Revision 2 or 3, but were all currently maintained under SNM-2509 License Amendment 6 and the FSAR Revision 13 at the time of the inspection.

1 **Away-From-Reactor ISFSI Inspection Guidance (60858)**

1.1 Inspection Scope

An inspection of the status of the loaded casks at Trojan was completed to verify compliance with requirements of its SNM-2509 License, ISFSI FSAR, and federal regulations. The inspection reviewed a broad range of topics including audits conducted under the licensee, condition reports related to the ISFSI, environmental radiological data collected around the ISFSI for the past several years, review of the cask maintenance records, and review of industry issues that affected the site's ISFSI program. A tour of the ISFSI area was performed and radiological dose rates measured by the licensee around the perimeter of the ISFSI pad and near the casks were reviewed.

1.2 Observations and Findings

a. Quality Assurance Audits and Surveillances

The Portland General Electric (PGE) Company had issued several audit reports for the Trojan ISFSI since the last inspection in June 2013. Those audits covered ISFSI documentation and activities related to ISFSI Technical Specifications; FSAR requirements; Training and Qualifications; Structural Inspection; Concrete Cask Inspection; Important to Safety (ITS) Facility Operations, Modifications, Maintenance, and Surveillances; Correction of Deficiencies; Quality Assurance (QA); and other ISFSI related areas. The inspectors reviewed the 2013, 2014, and 2015 Audits of Trojan ISFSI Operations, which were documented in Audit Reports AP 2013-I-023, AP 2014-I-024, and AP 2015-I-026. In addition, the independent assessment of the 2015 Biennial ISFSI Emergency Exercise was reviewed.

All recommendations or findings identified by the QA audits were reviewed and appropriately placed in either the ISFSI Activities Database or the licensee's Corrective Action Program (CAP). The licensee's QA audits were found to be quite extensive and the licensee held a low threshold for making audit recommendations. No NRC findings were identified regarding the licensee's Quality Assurance Program audits.

b. Radiological Conditions Related to Stored Casks

A tour of the ISFSI pad was performed during the inspection. The tour found the 34 loaded casks to be in good condition. No flammable or combustible materials were observed inside the ISFSI protected area fence. A recent radiological survey of the ISFSI pad was provided to the NRC inspector upon their arrival on-site.

Offsite and onsite monitoring data from the 2013 and 2014, *Annual Review of the ISFSI Radiation Protection Program* was reviewed. The reports were generated by the Trojan Radiological Environmental Monitoring Program (REMP). The program utilized a total of 16 environmental thermoluminescent dosimeter (TLD) monitoring locations onsite. Eight locations were in close proximity to the ISFSI and were located along the Control Access Area fence (TLD locations 8 – 15). The other 8 locations were farther away from the ISFSI, but were within the Controlled Area Boundary (TLD locations 1 – 7 and 16). The ISFSI Controlled Access Area fence is roughly 50 to 105 feet around the outside of the ISFSI pad. The Controlled Access Boundary is a 200 meter (roughly 656 feet) perimeter around the Trojan ISFSI. The area known as the Controlled Access Boundary is well within Trojan's owner controlled area (OCA). The REMP also utilized two TLD monitoring locations to provide the control or background dose (TLD locations 17 and 18).

The ISFSI Controlled Access Boundary monitoring locations are the ones used to demonstrate compliance with the 10 CFR 72.104 requirements for radiation dose. Locations 1-6 represent TLD locations at or near the licensee's designated controlled area boundary. The highest reading from TLDs 1-6 were used to calculate the maximum dose rate from the ISFSI pad. Monitoring locations 7 and 16 were much closer to the ISFSI pad on the shoreline side of the site at distances of 100 and 30 meters, respectively. The higher of those two measurements was used to calculate the annual recreational shoreline dose attributable to the ISFSI.

The maximum calculated doses that could have been received as a result of fuel stored on the Trojan ISFSI for the years 2013 to 2014 were an occupational dose of 7.1 mrem for monitoring location 4 for the calendar year (CY) 2013 and a recreational dose of 1.4 mrem for monitoring location 16 for CY 2013. The occupational dose was calculated using an occupancy factor based on 2080 hours worked on site per year. The shoreline dose was calculated using a recreational factor based on 24 hours of time spent at the shoreline or boating near the site per year. Both of the calculated values were below the 10 CFR 72.104 dose requirement of less than 25 mrem per year.

c. Cask Records of Fuel Contents

Permanent records describing the spent fuel stored in Trojan's ISFSI are required by 10 CFR 72.212(b)(12). A review of the Trojan ISFSI records was performed to determine if an adequate description of the spent fuel loaded in the casks was

documented as a permanent and retrievable record. The fuel assembly contents of each of the loaded canisters used at Trojan were documented in an online database and in binders titled, "DOE/OCRWM Spent Nuclear Fuel Verification Plan," for each canister loaded at Trojan. Records for fuel burn up in megawatt days per metric ton uranium (MWD/MTU), original U-235 enrichment percentage, and discharge date were found in Section 3 of the binder, "Trojan Nuclear Plant Fuel SNM Inventory." The heat load calculation data was stored in another file titled "Trojan ISFSI MPC Heat Load Calculation." Spreadsheets attached to that document were reviewed and contained each fuel assemblies' decay heat in watts. No issues, regarding record retention, were identified by the NRC inspector.

d. Changes to the SNM-2509 License and FSAR

At the time of the last inspection in June 2013, Trojan was utilizing SNM-2509 License Amendment 6 and FSAR Revision 12. Since then, Trojan had revised the FSAR one time in Revision 13, dated March 19, 2015.

The major changes associated with Revision 13 of the FSAR were due to the demolition and removal of the Trojan Training and North Buildings, which required administrative changes in the FSAR to remove them from being referenced. Additionally, the site made changes to the FSAR to reflect its ISFSI Decommissioning Cost Estimate changes and to reflect the revised 10 CFR 72.30 rule change. No issues were identified during the review of the FSAR revision.

e. Corrective Action Program

A list of condition reports issued since the last NRC inspection was provided to the inspector by the licensee for the ISFSI activities. Issues were processed in accordance with Trojan ISFSI Procedure (TIP) 50 "Corrective Action Program," Revision 3. When an adverse to quality issue was identified, the licensee would document the issue as a Corrective Action Request (CAR) and assign a CAR tracking number.

The inspector reviewed a total of six CARs from the list of condition reports related to the ISFSI. The CARs were related to a variety of issues. The CARs reviewed were well documented and properly categorized based on the safety significance of the issue. The corrective actions taken were appropriate for the situations. Based on the level of detail of the CARs, the licensee demonstrated a high attention to detail in regard to the maintenance and operation of its ISFSI program. No NRC safety concerns were identified related to the CARs reviewed.

f. Weekly Vent Inspections and Daily Temperature Inspections per TS 5.5.3

Trojan's License SNM-2509 Technical Specification 5.5.3 required that the air outlet temperature and the ambient air temperature for each cask be measured daily. In addition to the temperature checks, all air inlet vents for each concrete cask was required to be inspected weekly to verify each vent was free of blockage. To perform these actions the licensee utilized Procedure TIP 17 "Concrete Cask Thermal Monitoring System," Revision 6 for recording the concrete cask temperatures obtained from a digital readout. The change in temperature between the outlet vents and the ambient temperature was recorded and reviewed to ensure the difference was below 180 degrees F. Licensee Procedure TIP 12 "Monitoring of the Concrete Cask System," Revision 8, incorporated the

technical specification requirement for weekly visual inspection of all concrete cask air vents for blockage. Documentation of both required surveillances were reviewed for the months of December 2013, September 2014, and June 2015. The licensee records indicated that the technical specifications had been performed and correctly documented. No abnormal observations were noted during the reviewed time frames.

g. Concrete Casks, ISFSI pad, and Transfer Station Annual Visual Inspection

Trojan FSAR Section 9.7.6 required periodic inspection of the concrete casks, ISFSI pad, and transfer station to ensure structural integrity. An annual inspection program was implemented by the licensee using Procedure TIP 09, "Structural Inspection Program," Revision 7. Procedure TIP 09 discussed the annual visual inspection of the casks, the storage pad surface, the ISFSI pad surface, the transfer pad surface, and the transfer station. All steel, concrete surfaces, including cask vertical surfaces, and the inlet/outlet screens were visually inspected for defects and irregularities. The definition section of the procedure provided clear definitions of the terms defects and irregularities. For the concrete casks, a defect of the concrete surface was scabbing, spalling or cracking larger than approximately 1/2 inch in diameter or width with a depth greater than 1/4 inch. For the pad, a defect was defined as visible signs of settling, movement, or holes/large cracks greater than 1/2 inch across and extending to the rebar.

The licensee had kept very detailed documentation on the annual visual inspections performed on the casks, ISFSI pad, and transfer station. Each cask, the ISFSI pad, and the transfer station had its own defect log book. The log books contained each year's inspection results that documented all defects and irregularities that were found. The defect log books also contained detailed pictures of the defects/irregularities that were found. The defects/irregularities that were recorded in the log books had a before repair and after repair photograph. A select number of defect log books documentation over the period 2013, 2014, and 2015 for the 34 casks, the ISFSI pad, and the transfer station were reviewed by the NRC inspector. The NRC verified that no significant issues were identified by the licensee during those inspections. All small defects/irregularities such as small holes and pitting were noted for repair. The discrepancies identified by the licensee were repaired with an approved silicone sealant.

h. Emergency Plan

The licensee had implemented one revision to the site's Emergency Plan since the last ISFSI routine inspection in June 2013. The Emergency Plan, Revision 10, was reviewed by the inspector to ensure the changes had not decreased the effectiveness of the plan. In Revision 10, the licensee had only made a minor editorial changes to reflect the removal of the Trojan Training and North Buildings, which were demolished in 2014.

Section 7.1.2 of the emergency plan required a fire, a medical, and a radiological/health physics drill to be performed on an annual basis. In addition to the three drills, a site exercise was required biennially. The licensee had successfully conducted all the required drills and exercises since the last ISFSI inspection. The biennial exercise package for 2015 and the multiple drills packages were selected for additional review. The selected drills met the objectives of site Emergency Plan Step 7.1. The drill and exercise packages included a description of the drill that was conducted, a timeline, a synopsis, and a drill/exercise critique. All recommendations identified in the critiques were placed into the licensee's ISFSI Activities Database for tracking purposes.

Offsite support agencies, including the Columbia River Fire and Rescue, the Oregon Department of Energy, and the Columbia County Emergency Management, were notified of the exercises and offered the opportunity to participate consistent with 10 CFR 72.32 (a)(12)(ii).

i. 5-Year Concrete Cask Internal Inspection

Licensee's FSAR Section 9.7.7, "Concrete Cask Interior Inspection Program," required an inspection of the first concrete cask placed in service at 5-year intervals. The first inspection was conducted August 12, 2008, and submitted to the NRC by letter dated September 4, 2008 (ML082520016). The second inspection was conducted on September 24, 2013, and the results of the inspection were submitted to the NRC by letter dated October 17, 2013 (ML13304B428). The inspection used a small camera (video-probe) and observed the condition of the outer surface of the canister holding the spent fuel, the interior cask liner plate surfaces, and interior areas around the carbon steel vents. Insects, small amounts of dirt, and light rust were observed in several locations. White residue of calcium from the concrete was observed in several places in the outlet vent inner plenums. Compared to images taken in 2008, there were no significant changes in the appearance of the residue. The outer surface of the spent fuel canister showed no signs of degradation after 10 years in storage.

j. Columbia River Prescott Anchorage Area

In August 2012, the US Army Corps of Engineers installed an anchor buoy for the newly designated Prescott Anchorage Area on the Columbia River. The anchor buoy is located along the Columbia River between mile markers 72.1 and 72.5. The anchorage is 0.4 miles long and was intended to accommodate one vessel. PGE and the Trojan ISFSI personnel were not notified of its installation. In the summer of 2013, after ships began to utilize the anchorage, Trojan staff became aware of the newly installed buoy. Due to the close proximity to the Trojan site, Trojan personnel initiated an evaluation to review the use of the buoy from a radiological perspective to ensure ship personnel would not be in any risk of exceeding the radiation dose limit as described in 10 CFR 72.104. Trojan ISFSI staff requested site survey assistance from PGE Power Supply Engineering Services to perform a survey on a ship moored at the Prescott Anchorage to accurately determine its proximity to Trojan's 200 meter Controlled Area Boundary (CAB). The bow of the ship (its closest section), was found to be 110 ft (33.5 meters) from the edge of the licensee's 200 meter CAB. Based on the location of the ship, the historical data from the Annual Summary of ISFSI Environmental TLD Exposure Results, and the existing Memorandum of Understanding with the US Coast Guard, the Trojan ISFSI staff determined that the placement and use of the Prescott Anchorage provided no additional risk to personnel from radiation exposure from the spent fuel stored on the ISFSI. The NRC inspector reviewed the information and agreed with Trojan's conclusion regarding radiation exposure. However, the NRC inspector was unable to determine if the supporting analyses for Trojan FSAR Sections 2.2.3.1 "Explosions" and Section 8.2.8 "Explosions of Chemicals, Flammable Gasses, and Munitions" remained bounding due to the newly installed buoy. The licensee's review to ensure that the use of the Prescott Anchorage Area still meets the analyses of Trojan's FSAR for explosions and fire hazards is being tracked as Unresolved Item (URI 72-17/1501-01).

1.3 Conclusions

The licensee was conducting quality assurance audits of the ISFSI program. A review of the audit reports determined that the audits were covering a broad range of topics. A number of recommendations were identified in the audits and entered into the ISFSI Activities Database for implementation.

Radiation data reviewed from the 2013 through 2014 environmental monitoring reports determined that radiation levels offsite were in compliance with 10 CFR 72.104 federal regulations.

Required records were maintained that described the specific fuel parameters for the spent fuel stored in each of the licensee's loaded casks.

Since the last NRC ISFSI inspection, Trojan had revised its FSAR one time in Revision 13. No issues were identified in the review of the changes associated with the revision.

Selected condition reports were reviewed for the period June 2013 through November 2015. A few issues had been identified and resolved. Resolutions of the condition reports were appropriate for the safety significance of the issue. No adverse trends were identified during the review.

Concrete cask temperature monitoring requirements of Technical Specification 5.5.3 were performed daily and vent surveillances were performed weekly as required. No temperature issues with the casks were found during the review of selected records.

The inspector verified that the annual site drills and biennial exercises had been performed for the period of 2013 through 2015, in compliance with the site's emergency plan and 10 CFR 72.32 (a)(12) requirements.

Annual concrete cask, ISFSI pad, and transfer station inspections had been completed in accordance with FSAR requirements. Only minor superficial concrete surface issues were identified and repaired.

Aging management programs were adequately implemented at the ISFSI related to the 5-year cask interior inspection. The outer surface of the spent fuel canister showed no signs of degradation after 10 years in storage.

The US Army Corps of Engineers installed an anchor buoy designated as the Prescott Anchorage Area on the Columbia River. Trojan ISFSI staff adequately evaluated the use of the anchorage from a radiological aspect. An Unresolved Item (URI) was opened to track the licensee's review of use of the anchor to ensure it was bounded by the Trojan FSAR's fire hazards and explosions analyses.

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 June 2013 NRC ISFSI inspection were reviewed to determine compliance with regulatory requirements.

2.2 Observations and Findings

A list of modifications to the ISFSI program was provided by the licensee. Five 10 CFR 72.48 screenings were selected for further review and one 72.48 full evaluation was selected for review. The licensee utilized Procedure TIP 05 "10 CFR 72.48 and Other Regulatory Evaluations," Revision 5 to perform the 10 CFR 72.48 safety screenings and evaluations. The four 72.48 screenings were reviews performed to change some ISFSI operations procedures. One 72.48 screen was completed to evaluate the removal of the Trojan Training and North Buildings. No other modifications to the ISFSI equipment, components, or the facility had been performed since the last inspection.

One 72.48 safety evaluation had been performed since the last inspection. ISFSI 72.48 Evaluation Identification No. 2015-001 implemented the Holtec re-evaluation of the hypothetical overturning event and Transfer Station drop event of a Trojan Multi-Purpose Canister (MPC). A Holtec Information Bulletin notified Holtec customers that under certain drop analysis the calculated g-loading would increase if the weight of the MPC was less. At Trojan, the licensee had utilized a fully loaded MPC to confirm compliance with overturning and drop event limits. Due to the Holtec Information Bulletin, Trojan staff contracted Holtec to evaluate Trojan's lightest MPC, which was identified to only contain 20 of the 24 cells filled with spent fuel assemblies. The Holtec re-evaluation documented that the overturning event g-load would increase by only 1.6% from 38g to approximately 38.6g. This was still well below the 60g limit defined in the site's FSAR. The re-evaluation of the MPC drop at the Transfer Station showed there would be essentially no change in the g-loading and it remained at 54g. This was identified to be still well below the FSAR limit of 60g. Based on the information provided by Holtec, Trojan ISFSI staff concluded that activities at Trojan were still bounded by the limits defined in the Trojan FSAR and implementation of this change did not require prior NRC approval. No issues were identified in review of this 72.48 evaluation.

2.3 Conclusions

All required safety screenings and safety evaluations had been performed in accordance with the licensee's procedures and 10 CFR 72.48 requirements. All screenings and safety evaluations reviewed were determined to be adequately evaluated.

3 Exit Meeting

The inspector reviewed the scope and findings of the inspection during an exit conducted with Mr. Mark Tursa, ISFSI Manager, and other members of the Trojan ISFSI staff on November 19, 2015.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

S. Besi, QA Engineer
B. Eder, ISFSI Specialist
M. Kramberg, ISFSI Specialist
K. Lehman, Admin Assistant
J. Vanlooven, RP and Licensing Specialist
M. Tursa, ISFSI Manager

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

72-17/1501-01 URI Use of Prescott Anchorage Bounded by Trojan's FSAR

Discussed

None

Closed

None

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CAB	Controlled Area Boundary
CAP	Corrective Action Program
CAR	Corrective Action Request
CFR	Code of Federal Regulations
CY	calendar year
DNMS	Division of Nuclear Material Safety
DOE/OCRWM	Department of Energy/Office of Civilian Radioactive Waste Management
FCDB	Fuel Cycle and Decommissioning Branch
FSAR	Final Safety Analysis Report
IP	Inspection Procedure
ISFSI	Independent Spent Fuel Storage Installation
ITS	Important to Safety
kW	kilo-watt
LDCR	Licensing Document Change Request
MPC	multipurpose canister
mR	milliRoentgen
micro(μ)R/hr	microRoentgen per hour
mrem	milliRoentgen equivalent man
MWD/MTU	megawatt days/metric ton uranium
NRC	U.S. Nuclear Regulatory Commission
OCA	owner controlled area
PGE	Portland General Electric
PWR	Pressurized Water Reactor
QA	Quality Assurance
REMP	Radiological Environmental Monitoring Program
RP	radiation protection
TLD	thermoluminescent dosimeter
TIP	Trojan ISFSI Procedure
U-235	Uranium 235
URI	Unresolved Item

LOADED CASKS AT THE TROJAN ISFSI

LOADING ORDER	HOLTEC MPC No.	ISFSI LOCATION	CONCRETE CASK No.	DATE ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU (max)	MAXIMUM FUEL ENRICHMENT %	PERSON-REM DOSE
1	28	E33	PCC-03	01/17/2003	6.247	39,110	3.56	0.236
2	26	E32	PCC-04	01/26/2003	6.872	38,877	3.56	0.238
3	35	E11	PCC-09	02/05/2003	17.432	41,889	3.46	1.145
4	11	E12	PCC-10	02/12/2003	15.896	41,278	3.20	0.950
5	18	E13	PCC-05	02/16/2003	15.426	39,966	3.45	0.905
6	22	E14	PCC-06	02/22/2003	14.692	39,040	3.30	0.660
7	36	E15	PCC-07	03/05/2003	13.898	40,032	3.20	0.778
8	37	E16	PCC-08	03/13/2003	12.187	40,632	3.20	0.446
9	38	E21	PCC-11	03/19/2003	15.118	40,917	3.30	0.523
10	24	E22	PCC-12	03/26/2003	17.009	36,364	3.40	0.472
11	30	E23	PCC-13	04/02/2003	16.108	38,860	3.40	0.452
12	31	E24	PCC-14	04/07/2003	15.611	38,769	3.40	0.402
13	32	E25	PCC-15	04/14/2003	13.920	39,345	3.39	0.341
14	34	E26	PCC-16	04/20/2003	11.648	35,019	3.11	0.305
15	39	E31	PCC-02	04/26/2003	14.365	38,718	3.30	0.630

LOADING ORDER	HOLTEC MPC No.	ISFSI LOCATION	CONCRETE CASK No.	DATE ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU (max)	MAXIMUM FUEL ENRICHMENT %	PERSON-REM DOSE
16	09	E34	PCC-17	05/02/2003	15.362	37,698	3.40	0.461
17	29	E35	PCC-18	05/09/2003	13.878	38,269	3.46	0.881
18	15	E36	PCC-19	05/14/2003	10.973	37,681	3.10	0.437
19	08	W11	PCC-20	05/18/2003	13.336	40,730	3.20	0.461
20	12	W14	PCC-21	05/24/2003	14.55	37,009	3.40	0.460
21	16	W15	PCC-22	05/28/2003	13.969	38,116	3.42	0.443
22	17	W16	PCC-23	06/03/2003	10.931	33,830	3.10	0.272
23	07	W21	PCC-24	06/10/2003	12.889	38,932	3.11	0.442
24	27	W22	PCC-25	06/15/2009	13.228	40,244	3.45	0.514
25	13	W24	PCC-26	06/20/2003	11.870	37,850	3.42	0.240
26	19	W25	PCC-27	06/26/2003	10.071	37,461	3.56	0.182
27	20	W26	PCC-28	07/01/2003	10.855	38,215	3.20	0.348
28	21	W31	PCC-29	07/06/2003	10.497	35,363	3.10	0.297
29	23	W32	PCC-30	07/11/2003	10.483	37,729	3.09	0.249
30	25	W33	PCC-31	07/17/2003	9.652	33,187	3.10	0.207
31	40	W34	PCC-32	07/22/2003	8.911	30,150	2.61	0.195
32	41	W35	PCC-33	07/28/2003	8.719	33,732	3.10	0.275

LOADING ORDER	HOLTEC MPC No.	ISFSI LOCATION	CONCRETE CASK No.	DATE ON PAD	HEAT LOAD (kW)	BURNUP MWd/MTU (max)	MAXIMUM FUEL ENRICHMENT %	PERSON-REM DOSE
33	42	W36	PCC-01	07/31/2003	8.467	29,595	2.61	0.250
34	33	W23	PCC-34	09/03/2003	12.183	37,153	3.42	0.626

- NOTES:**
- Heat load (kW) is the sum of the heat load values for all spent fuel assemblies in the cask
 - Burn-up is the value for the spent fuel assembly with the highest individual discharge burn-up
 - Fuel enrichment is the spent fuel assembly with the highest individual "initial" enrichment per cent of U-235

All casks are currently maintained under SNM-2509, License Amendment 6 and the Final Safety Analysis Report, Revision 13.