



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005**

September 22, 2003

Mr. Stephen M. Quennoz, Vice President  
Power Supply/Generation  
Portland General Electric Company  
Trojan Nuclear Plant  
71760 Columbia River Highway  
Rainier, Oregon 97048

SUBJECT: NRC INSPECTION REPORT 50-344/2003-03; 72-017/2003-01

Dear Mr. Quennoz:

This refers to the inspection conducted on August 25-28, 2003, at the Trojan Nuclear Plant. The inspection was a routine inspection of activities related to decommissioning and the Independent Spent Fuel Storage Installation. The enclosed report presents the results of this inspection. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. Overall, the inspection found that decommissioning activities were being conducted in accordance with procedural and regulatory requirements, with one exception.

Based on the results of this inspection, the NRC identified a violation involving your failure to conduct continuous environmental air particulate sampling as stipulated by your offsite dose calculation manual. The violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011; and the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made 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).

Portland General Electric Company

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If you have any questions concerning this inspection, please contact Mr. Robert J. Evans, Senior Health Physicist, at (817) 860-8234 or the undersigned at (817) 860-8191.

Sincerely,

*/RA/*

D. Blair Spitzberg, Ph.D., Chief  
Fuel Cycle and Decommissioning Branch

Docket Nos.: 50-344; 72-017  
License Nos.: NPF-1; SNM-2509

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NRC Inspection Report  
50-344/2003-03; 72-017/2003-01

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**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket Nos.: 50-344; 72-017

License Nos.: NPF-1; SNM-2509

Report Nos.: 50-344/2003-003; 72-017/2003-001

Licensee: Portland General Electric Company

Facility: Trojan Nuclear Plant

Location: 71760 Columbia River Highway  
Rainier, Oregon 97048

Dates: August 25-28, 2003

Inspectors: Robert J. Evans, PE, CHP, Senior Health Physicist  
Fuel Cycle & Decommissioning Branch

Thomas W. Dexter, Physical Security Inspector  
Fuel Cycle & Decommissioning Branch

Approved by: D. Blair Spitzberg, Ph.D., Chief  
Fuel Cycle & Decommissioning Branch

Attachment: Supplemental Information

ADAMS Entry: IR 05000344-03-03; 072-00017-03-001 on 08/25-28/2003;  
Portland General Electric Co.; Trojan Nuclear Plant;  
Decommissioning Report; 1 NCV.

## EXECUTIVE SUMMARY

Trojan Nuclear Plant  
NRC Inspection Report 50-344/2003-03; 72-017/2003-001

The inspectors reviewed the licensee's implementation of safety reviews, design changes, and modifications; maintenance and surveillance activities; decommissioning performance and status; radioactive waste treatment, effluent and environmental monitoring; operation of the independent spent fuel storage installation (ISFSI); and physical security of the ISFSI. The inspectors also conducted a followup review of a previous NRC inspection finding. In summary, the licensee was conducting decommissioning activities in accordance with regulatory and license requirements with one exception as discussed below.

### Safety Reviews, Design Changes, and Modifications

- The licensee's safety review and design change program was in compliance with 10 CFR 50.59 requirements (Section 1).

### Maintenance and Surveillance

- The licensee was conducting maintenance and surveillance activities in accordance with site procedures. The licensee issued a corrective action report to investigate why a high alarm setpoint was not in agreement with offsite dose calculation manual requirements (Section 2.2).

### Decommissioning Performance and Status Review

- Decommissioning activities were being conducted in accordance with license and regulatory requirements. Radiation protection controls and plant systems were in place to support decommissioning activities. The operations shift crew composition met permanently defueled technical specifications requirements (Section 3.2.a).
- The licensee was maintaining the spent fuel pool within permanently defueled technical specifications requirements (Section 3.2.b).
- In accordance with the licensee's October 17, 2002, letter to the NRC, on three occasions, the licensee had notified the NRC that it had reclassified certain survey units from the classification specified in the approved license termination plan. The NRC responded to these notifications in separate letters. During the inspection, the licensee indicated its intent to expand future survey unit reclassification notifications to include additional information to support the NRC review process (Section 3.2.c).

### Radioactive Waste Treatment, and Effluent and Environmental Monitoring

- The licensee had established and implemented the radioactive liquid, gaseous effluent, and radioactive environmental monitoring programs. No sample result exceeded any license or regulatory limit, and no adverse trends were identified (Section 4.2).

- A non-cited violation was identified related to the licensee's failure to collect several environmental particulate air samples as required by the permanently defueled technical specifications (Section 4.2.b).

#### Operation of an Independent Spent Fuel Storage Installation

- The licensee had established a program for monitoring the temperatures of the concrete casks on a daily basis. No temperature has exceeded the program limit (Section 5.2.a).
- The inspectors conducted a review of the fuel debris and waste material placed into the final multi-purpose canister and confirmed through a records review and interviews that the licensee did not place unprocessed organic material into the canister (Section 5.2.b).

#### Physical Security of Independent Spent Fuel Storage Installations

- The auditing program was being effectively and objectively implemented. The licensee had an effective program for the identification, classification and resolution of problems (Section 6.2).
- Revision 2 to the Independent Spent Fuel Storage Installation physical security plan did not decrease the effectiveness of the plan. Alarm station and security radio communication systems were effectively maintained. An adequate number of portable radios were available for members of the security organization. A current letter of agreement with the local law enforcement agency was on file (Section 6.3).
- A thorough program for searching personnel, packages and vehicles entering the protected or security area was being maintained. A properly maintained records and reports program was in place. The security staff was correctly reporting security events (Section 6.3).
- The testing and maintenance of security equipment were completed in a timely manner and were properly documented. All alarms annunciated in a continuously manned alarm station. The compensatory measures program was effectively implemented. Security force personnel were well trained on program requirements. The licensee had a reliable backup power supply system to ensure the security system continued to be effective during loss of primary power incidents (Section 6.4).
- All training was conducted in accordance with the approved security, training, and contingency plans. All training records reviewed were current (Section 6.5).
- Management support for the licensee's security program was excellent. The licensee had developed a good transition plan to change from 10 CFR Part 50 security license requirements to 10 CFR Part 72 security license requirements. On-shift staffing of security officers was properly maintained (Section 6.6).

Followup

- A previously identified NRC Inspection Followup Item involving an apparent adverse procedure compliance trend was reviewed and closed (Section 7).



## Report Details

### Summary of Facility Status

The Trojan Nuclear Plant was permanently shutdown during January 1993. The major dismantlement activities have been completed at the site. Work in progress included decommissioning and decontamination of the auxiliary and fuel buildings. Final status and embedded piping surveys were in progress in and around the main steam support structure.

The licensee began moving fuel from the spent fuel pool (SFP) and into multi-purpose canisters on December 31, 2002. On September 3, 2003, the licensee completed transfer of all fuel from the SFP to their nearby independent spent fuel storage installation (ISFSI). The relocation of all fuel from the SFP to the ISFSI signified that the fuel has been transferred from the licensee's 10 CFR Part 50 license to its 10 CFR Part 72 license. Effective September 4, 2003, the licensee implemented the following program changes:

- Discontinuance of the technical specifications requirements for the SFP,
- Deletion of the defueled safety analysis report and coincident transfer of selected portions of the document into the decommissioning plan,
- Elimination of the 10 CFR Part 50 Independent Review and Audit Committee (the licensee will retain its ISFSI Safety Review Committee),
- Deletion of the 10 CFR Part 50 Fire Protection Plan and incorporation of the remainder of the program into site procedures,
- Deletion of the 10 CFR Part 50 Emergency Plan,
- Downgrading of the 10 CFR Part 50 security program,
- Deletion of the certified fuel handler training program,
- Discontinued manning of the control room on a 24-hour basis, and
- Transfer of the point of contact for emergency response from plant operators to the ISFSI central alarm station officer.

## **1 Safety Reviews, Design Changes, and Modifications at Permanently Shutdown Reactors (37801)**

### **1.1 Inspection Scope**

The purpose of this portion of the inspection was to ascertain whether facility design changes, tests, experiments, and modifications were being effectively conducted, managed, and controlled during plant decommissioning.

## 1.2 Observation and Findings

The inspectors reviewed the licensee's safety review process to determine whether the program was in conformance with 10 CFR 50.59 requirements. In particular, the inspector reviewed two safety evaluations in detail:

- a. Safety Evaluation 2002-15, Revised Description of Fuel and Auxiliary Building Ventilation System. This design change eliminated excessive detail about the fuel and auxiliary building exhaust system. Recent license amendments provided only basic details of the ventilation system requirements, such as flow paths. The licensee chose to revise the defueled safety analysis report to remove the descriptions of the fans, filters, and dampers. The inspectors confirmed that the revised defueled safety analysis report description included pertinent information including flow paths.

As part of the design change, the licensee issued a defueled plant modification request to provide a physical limitation on ventilation flow rate. The total stack flow was restricted to 95,000 cubic feet per minute to ensure compliance with offsite dose calculation manual (ODCM) requirements. During the onsite inspection, the stack ventilation flow rate was about 70,000 cubic feet per minute, a conservatively low value.

- b. Licensing Document Change Request 2002-07, Changes to the ODCM. This design change authorized a reduction in the environmental monitoring program. Program areas eliminated included groundwater sampling, upstream drinking water sampling, and airborne particulate sampling. The change also removed manganese-54 from the list of radionuclides because it has undergone a radioactive decay of eleven half-lives since plant shutdown. The NRC inspectors noted that permanently defueled technical specifications (PDTs) allowed the licensee to revise the ODCM, and the changes were approved by the State of Oregon prior to implementation. Further details of the licensee's implementation of the revised environmental monitoring program are provided in Section 4 of this inspection report.

In summary, the inspectors concluded that the licensee's 10 CFR 50.59 safety reviews were adequately documented and provided sufficient justification as to why NRC approval was not required prior to implementation of the proposed changes.

## 1.3 Conclusion

The licensee's safety review and design change program was in compliance with 10 CFR 50.59 requirements.

## **2 Maintenance and Surveillance at Permanently Shutdown Reactors (62801)**

### 2.1 Inspection Scope

The inspectors observed selected maintenance and surveillance activities to verify if site structures, systems, and components were being maintained in compliance with technical specifications and procedural requirements.

## 2.2 Observation and Findings

The auxiliary building ventilation exhaust process radiation monitor PRM-2 samples the gaseous and particulate activity levels in air being released from the fuel and auxiliary buildings. The process radiation monitor system consisted of three subsystems; the air particulate channel (PRM-2A), the low range noble gas channel (PRM-2C), and the intermediate range noble gas channel (PRM-2D). In accordance with ODCM Table 3.1.2-2, the system is required to be calibration checked at least once every 18 months.

During the inspection, the licensee was calibrating the PRM-2 monitor in accordance with Maintenance Procedure MP 15-112, "Post-Accident Airborne Radiation Monitors Calibration," Revision 0. The inspector observed the maintenance technicians performing portions of the calibration. The technicians appeared to understand the work being conducted and had measuring and testing equipment with up to date calibrations.

During the performance of the calibration procedure, the licensee discovered that the as-found output readings for two of three channels were out of tolerance. The as-found output readings were higher than the desired output tolerance for PRM-2C. Further, one reading for PRM-2A was below the desired output tolerance. In accordance with procedural requirements, the technicians planned to generate an out of tolerance report which will initiate an investigation of the out of tolerance channels. The calibration work was incomplete at the end of the onsite inspection; therefore, proposed corrective actions were not available during the inspection.

The inspectors conducted a review of the high alarm setpoints provided in Periodic Operating Test POT 26-3-2, "Radiation Monitoring System Auxiliary Building Vent Process and Effluent Radiation Monitoring System," Revision 1. The ODCM specifies high alarm setpoints of  $2.4 \text{ E } +5$  counts per minute for PRM-2C and  $4.7 \text{ E } +3$  counts per minute for PRM-2A. The inspectors noted that the procedural setpoint for PRM-2A was  $4.69 \text{ E } +3$  counts per minute, just below the ODCM setpoint in the conservatively low direction. However, the procedural setpoint for PRM-2C was  $2.48 \text{ E } +5$  counts per minute, just above the ODCM specified setpoint.

Although the procedural setpoint for PRM-2C was slightly less conservative than stipulated by the ODCM, the inspectors noted that the ODCM setpoint had been conservatively calculated. Therefore, the licensee's failure to implement the ODCM required setpoint into site procedures was not safety significant. The licensee could not explain the setpoint discrepancy, and issued corrective action report C-03-0025 to investigate the issue.

## 2.3 Conclusions

The licensee was conducting maintenance and surveillance activities in accordance with site procedures. The licensee issued a corrective action report to investigate why a high alarm setpoint was not in agreement with offsite dose calculation manual requirements.

### **3 Decommissioning Performance and Status Review at Permanently Shutdown Reactors (71801)**

#### **3.1 Inspection Scope**

The inspectors reviewed the status of decommissioning and evaluated whether the licensee and its contracted workforce were conducting decommissioning activities in accordance with license and regulatory requirements.

#### **3.2 Observation and Findings**

##### **a. Plant Tours**

Plant tours were conducted to observe decommissioning activities. Radiological controls, including postings and barriers, were in place in areas where decommissioning activities were in progress. The inspectors noted good housekeeping and fire protection practices. The inspectors conducted radiological surveys in the restricted area using a Ludlum Model 2401-EC2 survey meter calibrated to cesium-137 (NRC No. 016295G). All areas with elevated radiation levels had been identified and posted by the licensee, including high radiation areas.

Permanently Defueled Technical Specifications Table 5.2.2-1 lists the minimum shift crew composition. During plant tours, the inspectors made unannounced visits to the control room. Control room and plant operations staffing met the minimum crew composition as specified in PDTs.

##### **b. Spent Fuel Pool Safety**

Permanently Defueled Technical Specifications 3.1.1 requires that SFP water level be greater than or equal to 23 feet over the top of irradiated fuel assemblies seated in the storage racks. During the inspection, the pool level was 24 feet, 7 inches. Technical Specifications 3.1.2 requires that SFP boron concentration be greater than or equal to 2000 parts per million. During the inspection, the boron concentration was 2110 parts per million. Technical Specifications 3.1.3 specifies that SFP coolant temperature be maintained less than or equal to 140 degrees Fahrenheit. The coolant temperature was 78 degrees during the inspection. In summary, the licensee was maintaining the SFP in accordance with PDTs requirements.

The inspectors conducted a review of SFP support systems. Makeup water was available as necessary to raise pool water level as components were being permanently removed from the pool. The modular SFP cooling system fans were secured on August 25, 2003. Since the pool no longer contained a heat load, the cooling fans most likely will not be used again.

c. Reclassification of Final Survey Units

By letter dated October 17, 2002, the licensee committed to provide the NRC with written notification prior to engaging in final status survey radiation measurement activities in survey units that have been downwardly reclassified from the classification specified in the license termination plan. [Area classifications are described in NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)."] By letters dated April 30, June 26, and August 7, 2003, the licensee notified the NRC of its intent to reclassify selected survey units. During the inspection, the NRC conducted a followup review of the licensee's reclassification of the survey units as discussed in the three letters. In summary, the licensee implemented the reclassifications and conducted final surveys in accordance with license requirements and previous commitments.

By letter dated April 30, 2003, the licensee informed the NRC of its intent to conduct final status surveys in two Class 2 survey units previously designated as Class 1 survey units. One survey unit was located in the electrical penetration area, while the second survey unit was located in the steam generator blowdown building. At the time of the onsite inspection, the licensee had completed the final status surveys in both survey units. The inspectors reviewed the final status survey results and concluded that the radiological measurements were within the applicable derived concentration guideline level.

In its response letter dated May 27, 2003, the NRC recommended that future submittals include relevant portions of the turnover survey checklist to supplement the radiological data. The licensee elected not to implement this recommendation because it believed that turnover survey checklists, in general, do not provide relevant radiological data. In addition, the NRC recommended that common boundaries between Class 1 and Class 2 survey units be identified. The licensee added these boundaries to subsequent survey unit packages, as applicable.

The NRC also questioned the calibration of a meter used to collect radiological data. The licensee determined that the instrument calibration information provided to the NRC was in error. The NRC questioned why the licensee conducted remediation in the survey units when it appeared that remediation was not necessary based on the derived concentration guideline level. The licensee stated that it had conducted remediation for As Low As Reasonably Achievable (ALARA) reasons. The licensee stated during the inspection that it would include additional information in future survey unit reclassification packages to address or explain unusual activities.

During its review of the April 30, 2003, letter, NRC staff determined that the design specifications were incomplete because the specifications did not assess the presence of plant-derived radioactivity within or under painted surfaces. The licensee took exception to this comment. The licensee noted that the Trojan Decommissioning Plan and License Termination Plan, Section 4.5.3.4.2, states that no special measurement methods are applied to surfaces which were painted prior to plant start-up and have not been painted since. In practice, the licensee sandblasted areas that had been repainted after plant startup to remove the paint from the wall surfaces. In areas that had not

been repainted since start-up, the licensee did not attempt to remove the paint from the wall surfaces.

In areas that had not been painted since plant start-up, the licensee took the position that any contamination would be on the surface of the paint but not in or underneath the paint. At the time of the onsite inspection, the licensee did not intend to conduct analysis of paint chips to determine whether contamination was present in or under the paint in areas that had not been repainted. The NRC inspectors noted that the licensee was not required to take such actions based on the wording of the Trojan Decommissioning Plan and License Termination Plan.

By letter dated June 26, 2003, the licensee notified the NRC of its intent to reclassify a survey unit in the containment personnel lock area. At the end of the onsite inspection, the licensee had not conducted the final survey of this area; therefore, the results of the final survey were not reviewed by the NRC inspectors.

In its response letter dated July 10, 2003, the NRC requested that future notifications of survey unit reclassifications include specifics of operational survey coverage when used to support a reclassification decision. The licensee stated that since it could not accurately specify survey unit coverage (in percentage, ranging up to 100 percent coverage), then it could not provide specifics of operational survey unit coverage. During the inspection, the licensee agreed to consider adding an estimation of operational survey scan coverage to all future survey unit reclassification packages.

By letter dated August 7, 2003, the licensee notified the NRC of its intent to reclassify three survey units within the vicinity of the main steam support structure. The licensee had completed the final survey in only one of the survey units at the end of the onsite inspection. The inspectors reviewed the final survey data for this survey unit, and the results suggest that no sample result exceeded the applicable derived concentration guideline level.

In its August 18, 2003, response letter, the NRC questioned the information provided in the three survey unit packages. In general, the NRC did not have a complete understanding of activities previously completed in each survey unit, resulting in a number of clarification questions. The licensee agreed during the inspection to consider expanding the comments sections of the survey unit packages to include subjects such as chronology of events and discussion of any remediation completed.

As an example, the licensee chose to conduct remediation in a survey unit but did not explain in the comments section why the remediation was conducted. In this example, the licensee chose to conduct remediation for ALARA reasons. As stated earlier, the licensee agreed to consider adding additional information to future reclassification packages to clarify any unusual statement, measurement, or work activity.

### 3.3 Conclusions

Decommissioning activities were being conducted in accordance with license and regulatory requirements. Radiation protection controls and plant systems were in place

to support decommissioning activities. The operations shift crew composition met PPTS requirements. The licensee was maintaining the SFP within PPTS requirements.

In accordance with the licensee's October 17, 2002, letter to the NRC, on three occasions, the licensee had notified the NRC that it had reclassified certain survey units from the classification specified in the approved license termination plan. The NRC responded to these notifications in separate letters. During the inspection, the licensee indicated its intent to expand future survey unit reclassification notifications to include additional information to support the NRC review process.

#### **4 Radioactive Waste Treatment, and Effluent and Environmental Monitoring (84750)**

##### **4.1 Inspection Scope**

The inspectors reviewed the licensee's program to control, monitor, and quantify releases of radioactive materials to the environment in liquid, gaseous, and particulate forms. The inspectors also reviewed the radiological environmental monitoring program to ensure that it was effectively implemented per PPTS requirements.

##### **4.2 Observations and Findings**

###### **a. Radioactive Effluents**

Section 5.7.2 of PPTS states, in part, that a radioactive effluent control program shall be established, implemented, and maintained. This program is described in the ODCM, and includes the effluent release limits, instrument setpoints and surveillance test requirements, dose contributions to members of the public, and requirements for monitoring, sampling and analyses of the radioactive liquid and gaseous effluents. The PPTS also stipulates that a radioactive effluent release report will be submitted annually to the NRC. The inspectors reviewed the annual report dated April 30, 2003, and the data used in the development of this report.

Liquid effluents were released in batch mode via the plant liquid radwaste effluent line. During 2002, the licensee released liquids 32 times. The results of each release were documented in the annual report. The inspectors noted that the licensee collected all required samples and the sample results for 2002 were below the ODCM limits in all categories, including the instantaneous concentration limits and quarterly activity and dose rate limits.

Radioactive gaseous effluents were released from two locations, the auxiliary/fuel building and the condensate demineralizer building. Sampling of the two remaining effluent lines was conducted on a continuous basis. The sample results for 2002 were reviewed, and all results were well below the respective dose and dose rate limits for noble gases and tritium/particulate concentrations.

The licensee also provided solid waste shipment information for 2002 in the annual report. The licensee reported that it had shipped 2.9 cubic meters of spent resin, filters,

and sludges containing 39.5 curies of radioactivity as well as 361.5 cubic meters of dry compressible waste and contaminated equipment containing less than 1 curie of radioactivity.

b. Radiological Environmental Monitoring

Section 5.7.2 of PDTS states, in part, that a radiological environmental monitoring program shall be established, implemented, and maintained. This program is used to monitor the radiation and radionuclides in the environs of the facility and is described in the ODCM. By letter dated March 26, 2003, the licensee submitted the annual radiological environmental monitoring report for calendar year 2002 to the NRC.

The radiological environmental monitoring program consisted of direct radiation monitoring, groundwater and surface water sampling, sediment sampling, and collection of airborne particulate samples. The sample results for 2002 were presented in the annual report. In summary, the licensee collected all required samples (with one exception discussed below), and all sample results were below the applicable limits.

Ambient gamma radiation levels were measured at 12 locations using thermoluminescent dosimeters. The dosimeters were exchanged on a quarterly basis. A review of the data indicated that the ambient gamma radiation levels were essentially at background levels at all locations. The exposure rates ranged from 0.04 to 0.12 millirems per day. The average exposure rate has remained essentially constant since plant shutdown.

One groundwater (well water) sample is required to be collected quarterly. The licensee obtained the samples from a nearby unincorporated town's water supply source. The samples were analyzed for gamma-emitting radionuclides and for tritium content. The sample results indicated that the predominant gamma-emitting radionuclide (manganese-54, cobalt-60, and cesium-137) concentrations were less than the lower limits of detection for the sample analysis equipment. The tritium concentration measured 1130 picocuries per liter in one sample. The U.S. Environmental Protection Agency drinking water limit for tritium is 20,000 picocuries per liter.

Two surface (drinking) water samples were continuously collected from the Columbia River. One sample was collected upstream of the site, and the second sample was collected downstream of the site. The monthly composite sample results indicated that tritium and the gamma-emitters were less than the instrument lower limits of detection, while gross beta radioactivity was at or near background levels. Gross beta varied from 1.3 to 4.8 picocuries per liter of river water. The average gross beta concentrations have remained relatively constant since plant shutdown.

Sediment samples were collected twice per year and analyzed for gamma-emitting radionuclides. The samples were collected from the Columbia River shoreline. The sample results did not identify any gamma-emitting radionuclides (cesium-134 and cesium-137) in concentrations above the analytical instrument's lower limit of detection.



Airborne particulate samples were continuously collected at two locations. The sample filters were exchanged weekly and analyzed for gross beta concentrations following filter changeout. The gross beta sample results varied from 0.01 to 0.048 picocuries per cubic meter of air. There is no action level for gross beta, and the results are used for trending purposes only. The average gross beta concentration has remained constant for the past 8 years, indicating no upward trend in these concentrations.

The air samples were analyzed monthly for gamma-emitting radionuclides in the composite air particulate filters. During 2002, no sample result exceeded the analyzing instruments' lower limits of detection, indicating that airborne particulates were not released from the site in measurable quantities.

During August 2002, the licensee permanently discontinued collection of selected environmental monitoring samples. The licensee discontinued collection of all air particulate samples, upstream surface water (drinking water) samples, and groundwater samples. The licensee also discontinued analyzing for manganese-54. This radionuclide has a half-life of 313 days and has decayed the equivalent of 11 half-lives since plant shutdown. By letter dated August 1, 2002, the Oregon Office of Energy approved the program reduction. The inspectors noted that the licensee implemented these changes in accordance with PDS Section 5.7.2.3.2 requirements.

Table 3.3.1-1, "Radiological Environmental Monitoring Program," of the ODCM lists the environmental monitoring program sampling and collection frequencies. Prior to August 5, 2002, the date when the environmental monitoring program changes were formally approved, the licensee was required to collect air particulate samples on a continuous basis. During mid-June 2002, the licensee prematurely discontinued environmental air particulate sampling. The licensee's staff incorrectly assumed that the ODCM change to the environmental monitoring program had been approved. The licensee failed to collect any air particulate samples during the week of June 11-18, 2002. When the licensee's staff determined that air samples were still required, the licensee attempted to restore the air samplers to service. One of two samplers could not be returned to service and remained out of service because the electrical power to the sampling station had been cut during excavation activities.

In summary, the licensee's failure to collect certain environmental air particulate samples as required by the ODCM was a violation of TS 5.7.2.3 (NCV 50-344/0303-01). The licensee discovered these sampling program errors and issued corrective action report C-O2-015 to investigate the oversight. The licensee's investigation determined that the failure was attributed to human error. This non-repetitive, licensee-identified and corrected violation is being treated as a non-cited violation, consistent with Section VI.A.8 of the NRC Enforcement Policy.

#### 4.3 Conclusions

The licensee had established and implemented the radioactive liquid, gaseous effluent, and radioactive environmental monitoring programs. No sample result exceeded any license or regulatory limit, and no adverse trends were identified. A non-cited violation

was identified related to the licensee's failure to collect several environmental particulate air samples as required by the PDTS.

## **5 Operation of an Independent Spent Fuel Storage Installation (60855)**

### **5.1 Inspection Scope**

The inspectors reviewed by direct observation and independent evaluation whether the licensee was operating the ISFSI in conformance with the commitments and requirements contained in the safety analysis report and the ISFSI technical specifications.

### **5.2 Observations and Findings**

#### **a. Concrete Cask Thermal Monitoring Program**

Section 5.5.3 of the ISFSI technical specifications discusses the temperature measurement requirements for each concrete cask. According to this requirement, the air outlet and ambient air temperatures are to be measured daily. If any air outlet temperature reaches or exceeds the program limit of 195 degrees Fahrenheit, special actions are required to be taken by the licensee. Taking actions when any air outlet temperature reaches 195 degrees should help prevent a cask from reaching the short term bulk concrete temperature limit of 350 degrees which could weaken the concrete.

Trojan ISFSI Procedure TIP 17, "Concrete Cask Thermal Monitoring Program," Revision 2, provided instructions for collection of the temperatures on a daily basis. The inspectors observed the licensee's ISFSI specialist collect the daily cask temperatures. The ISFSI specialist appeared fully knowledgeable of how to collect the temperatures and knew what to do if any temperature limit were to be exceeded.

At the time of the onsite inspection, 33 of 34 concrete casks were situated on the ISFSI pad. The highest cask outlet temperature was 136.5 degrees with an ambient temperature of 62.8 degrees. The program limit of 195 degrees was not exceeded.

The inspectors reviewed the concrete cask temperature trend report for the period of July through August 2003. The trend report indicated that all temperatures remained below the program limit of 195 degrees. No unusual temperature trends were identified.

#### **b. Process Can Inventory**

Process cans were containers used to process the organic media and fuel debris located in the SFP. After high temperature steam processing, up to five process cans could be placed inside a process can capsule. The process cans could also be used to store fuel assembly hardware, loose fuel pellets and fuel fragments without steam processing. During the inspection, the licensee was storing the last multi-purpose canister in the SFP. The inspectors conducted a review of the contents of the process

cans that were going to be placed in the last canister to ensure that the material did not contain organics that required high temperature steam processing.

The licensee had previously determined that it could place up to 242 grams of organic material in each multi-purpose canister without exceeding the 5 percent hydrogen gas limit. The calculated organics limit was based on the amount of hydrogen that would be generated due to radiolysis. Limiting the amount of hydrogen in the canister minimized the potential for an explosion. The licensee's conclusion was documented in Calculation TI-151, "Analysis of Organic Compounds and Hydrogen Generation Limits in Trojan's Multi-Purpose Canisters," Revision 0.

Two process cans were to be placed into the final canister, MPC-33. Process Can 09 contained activated fuel assembly debris including thimble screws, lockwires, bushing rings, plenum springs, cladding, and a cotter pin. Process Can 04 contained fuel pellet fragments, fuel debris, and activated steel debris. Based on interviews with licensee personnel and a review of the process can inventory sheets, the inspectors concluded that the licensee did not place any organic material into these two process cans. Further, the licensee claimed that it had not placed any unprocessed organic material into any multi-purpose canister; therefore, the calculation was never invoked by the licensee.

### 5.3 Conclusions

The licensee had established a program for monitoring the temperatures of the concrete casks on a daily basis. No temperature has exceeded the program limit. The inspectors conducted a review of the fuel debris and waste material placed into the final multi-purpose canister and confirmed through a records review and interviews that the licensee did not place unprocessed organic material into the canister.

## **6 Physical Security of Independent Spent Fuel Storage Installations (81001)**

### 6.1 Inspection Scope

The purpose of this portion of the inspection was to assess the capability of the licensee to protect its ISFSI facility against radiological sabotage and to determine whether the licensee met safeguards program commitments and regulatory requirements.

### 6.2 Self Assessments, Audits, and Corrective Actions

The inspectors reviewed the licensee's Quality Assurance Surveillance Report (02-010-SURV) dated December 16, 2002, for the security program. The inspector confirmed the members of the surveillance teams were independent of plant security management. Surveillance team personnel were qualified and the surveillance(s) were performance-based. The surveillance was comprehensive and of good quality. The security department promptly resolved all identified observations.

### 6.3 Conduct of Security and Safeguards Activities

#### a. Security Plans

The inspectors reviewed the changes to the ISFSI Physical Security Plan (PSP), Revision 2, dated October 30, 2002, to determine if the changes decreased the effectiveness of the plan and to determine if the requirements of 10 CFR 72.212 were being met. The security plan incorporated the contingency plan and the training and qualification plan. The inspectors determined from a review that the plan changes did not decrease the effectiveness of the plan. The inspectors confirmed that the licensee maintained an effective management system for the development and administration of procedures and verified that the procedures were consistent with the requirements of the ISFSI PSP.

#### b. Alarm Station and Communications

The alarm station and security communication capabilities were inspected to determine compliance with the requirements of the security plan. The areas inspected included the requirements and capabilities of the alarm station, protection of the alarm station, systems security, operability of the radio and telephone systems, and the capability to effectively communicate with the local law enforcement agencies through both communication systems.

By observation and interviews, the inspectors determined that the alarm station was located in a hardened facility within a designated protected area. The alarm station was equipped with appropriate alarm, surveillance, and communication capability. The licensee was in the process of relocating their central alarm station into a more substantially hardened facility on site and in a designated protected area. The inspectors concluded from a review of the proposed new central alarm station engineering drawings, discussions with security personnel and the site engineer, and by observation of work in progress at several locations that the licensee was maintaining compliance with all physical, line and voice communication security requirements.

The licensee maintained an adequate number of portable radios for use by members of the security organization. The inspectors confirmed that the licensee had multiple means of contacting local law enforcement for response if required. Communication checks with the local law enforcement authority were conducted at least once each 24 hours. A current letter of agreement with the local law enforcement agency was on file.

#### c. Protected Area Access Control of Personnel, Packages, and Vehicles

The access control program for personnel, packages, and vehicles was inspected to determine compliance with the requirements of the security plan. Through observation and interviews, the inspectors determined that upon entering the ISFSI protected area, authorized personnel must have a current security identification badge and be approved by the ISFSI manager or designee. Personnel not authorized with a security identification card were escorted within the protected area.

Additionally, through observations, the inspectors determined that the licensee's search program for firearms, explosives, incendiary devices, and other unauthorized material met the requirements of the security plan. A security force member responsible for monitoring access into the ISFSI protected area conducted a visual search for those devices of all persons entering the protected area. In addition to the protected area at the ISFSI, the licensee also controlled access into the alarm station. Authorized personnel used their protected area security photo identification card to access this area.

All vehicles entering the security area surrounding the protected area were searched at a vehicle barrier located an adequate distance from the facility to meet the land vehicle bomb blast requirements.

d. Records and Reports

The safeguard events logs for July 2003 were inspected to determine compliance with the requirements of the PSP. The inspectors determined that the licensee conformed to the regulatory requirements regarding the reporting of events. The necessary records were available for review and were maintained for the time required by regulations.

6.4 Status of Security Facilities and Equipment

a. Testing and Maintenance

The testing and maintenance program was reviewed to determine compliance with the requirements of the security plan. From interviews with security officers and supervisors, the inspectors determined that repairs to security equipment were completed in a timely manner. Through a review of testing records, the inspectors verified that security equipment and tamper alarms were performance tested as required by the PSP. The inspectors reviewed engineering drawings with the site engineer and determined that all line tamper connections were properly identified and protected.

b. Compensatory Measures

The compensatory measures were inspected to determine compliance with the requirements of the PSP. The areas inspected included deployment of compensatory measures and the effectiveness of those measures.

Through interviews with security officers and plant management personnel and a review of the PSP, the inspectors confirmed that the licensee deployed compensatory measures in a manner consistent with the requirements of the PSP. Through interviews, the inspectors determined that the security personnel available for assignment to compensatory security posts were properly trained for those duties.

c. Security System Power Supply

The security system power supply was inspected to determine compliance with the PSP. The security plan requires that sufficient backup power be provided to the security

computer, alarm system, and radio communications system. The licensee has provided this backup power through an uninterruptible power supply system. Through observations, interviews, and a review of testing records, the inspectors determined that the system was tested under load conditions and could perform as designed.

#### 6.5 Security Staff Training and Qualification

The licensee's security training and qualification program was inspected to determine compliance with the requirements of the training and qualification plan. The inspectors observed and interviewed security officers during the performance of their duties. The security officers demonstrated excellent knowledge of the procedural requirements for the task that they performed. The training records of four officers were reviewed. The records were current and all requirements identified in the PSP were met.

All training was conducted in accordance with the approved security, training, and contingency plans. The inspectors confirmed, by a review of seven security officer's training records, that the required training had been conducted within the time frame required by the training and qualification plan.

#### 6.6 Security Organization and Administration

##### a. Management Support

The effectiveness and adequacy of management support to the physical security program was inspected. The inspectors interviewed security officers on duty and determined from their comments that licensee management support of the security organization was excellent. The inspectors determined that a well trained and qualified security staff implemented the security program. All members of the security organization had a clear understanding of their duties and responsibilities.

The licensee had developed a very good transition plan to change from 10 CFR Part 50 Security License requirements to 10 CFR Part 72 Security License requirements. The plan specified a timetable for licensing changes, operational changes, personnel, maintenance, plant support, nuclear oversight, and the ISFSI organization.

##### b. Staffing Levels

Staffing levels of the security shifts was inspected to determine compliance with the PSP. The inspectors determined from discussions with security supervisors and reviewing the security shift personnel rosters that there were an adequate number of security officers always available to meet the number specified in the PSP.

#### 6.7 Conclusions

The auditing program was being effectively and objectively implemented. The licensee had an effective program for the identification, classification and resolution of problems.

Revision 2 to the ISFSI PSP did not decrease the effectiveness of the plan. Alarm station and security radio communication systems were effectively maintained. An adequate number of portable radios were available for members of the security organization. A current letter of agreement with the local law enforcement agency was on file.

A thorough program for searching personnel, packages and vehicles entering the protected or security area was being maintained. A properly maintained records and reports program was in place. The security staff was correctly reporting security events.

The testing and maintenance of security equipment were completed in a timely manner and were properly documented. All alarms annunciated in a continuously manned alarm station. The compensatory measures program was effectively implemented. Security force personnel were well trained on program requirements. The licensee had a reliable backup power supply system to ensure the security system continued to be effective during loss of primary power incidents.

All training was conducted in accordance with the approved security, training, and contingency plans. All training records reviewed were current. Management support for the licensee's security program was excellent. The licensee had developed a good transition plan to change from 10 CFR Part 50 security license requirements to 10 CFR Part 72 security license requirements. On shift staffing of security officers was properly maintained.

## **7 Followup (92701)**

### **7.1 (Closed) Inspection Followup Item 50-344/0302-01: Followup of Corrective Actions Taken for Apparent Adverse Trend**

During the previous inspection, the inspectors reviewed the licensee's corrective action request log for 2003 to determine if quality-related problems were being identified and dispositioned. During January-April 2003, 7 of 17 corrective action requests involved procedural non-compliances during fuel handling activities. Although none of the seven procedural non-compliances were safety significant, collectively, the number of non-compliances suggested that an adverse trend existed.

In response to this apparent adverse trend, the licensee conducted a generic root cause evaluation during February 2003 which included proposed corrective actions for preventing recurrence. Another procedure non-compliance incident occurred during March 2003 suggesting that corrective actions were not entirely successful. This subject area was considered an Inspection Followup Item to ensure that the licensee's corrective action program has implemented effective actions to eliminate this apparent negative trend.

Since the previous inspection, the licensee's quality assurance group conducted a surveillance to evaluate the effectiveness of corrective actions and to identify any potential trends that may warrant additional management attention. The surveillance

concluded that no adverse trends were evident. The February 2003 evaluation concluded that the root cause of the procedural compliance problems was a lack of strong commitment to procedure compliance with a contributing condition of perceived schedule pressure. Another contributing cause may include the complexity of the fuel handling procedures which allow many activities to be conducted concurrently.

The inspectors conducted a followup review during the current inspection and noted that no corrective action reports had been issued for procedural non-compliance issues since the March 2003 incident. This finding suggested that corrective actions were effective in eliminating the potential adverse trend. The licensee completed fuel handling activities on September 3, 2003, eliminating the possibility of future corrective action reports being issued for fuel handling procedure non-compliances.

## **8 Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management and staff at the exit meeting on August 28, 2003. During this inspection, the licensee did not identify as proprietary any information provided to, or reviewed by, the inspectors.



**ATTACHMENT 1**

**PARTIAL LIST OF PERSONS CONTACTED**

Portland General Electric

P. Clark, Security Access/Fitness For Duty  
K. Cox, ISFSI Manager  
L. Dusek, Plant Support Manager  
R. Eder, Security ISFSI Specialist  
S. Ford, Licensing Engineer  
G. Huey, Radiation Protection Tech Support Manager  
M. Lackey, General Manager  
I. Li, Site Electrical Engineer  
R. Magnuson, Security Operations Supervisor  
T. Meek, Radiation Protection Manager  
J. Mihelich, Engineering Manager  
S. Nichols, Decommissioning Projects Manager  
S. Quennoz, Trojan Site Executive  
S. Schneider, Operations Manager  
C. Storms, Security Specialist  
J. Vingerud, Maintenance Manager  
M. Ward, Security Watch Supervisor  
J. Westvold, Nuclear Oversight Manager

State of Oregon

A. Bless, Oregon Office of Energy, Trojan Resident Engineer

**ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened

50-344/0303-01      NCV      Failure to Collect Air Particulate Samples

Closed

50-344/0302-01      IFI      Followup of Corrective Actions Taken for Apparent Adverse Trend  
50-344/0303-01      NCV      Failure to Collect Air Particulate Samples

Discussed

None.

## LIST OF ACRONYMS

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
IFI	Inspection Followup Item
ISFSI	Independent Spent Fuel Storage Installation
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PDTS	Permanently Defueled Technical Specifications
PSP	Physical Security Plan
SFP	Spent Fuel Pool