

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 50-344  
License No.: NPF-1  
Report No.: 50-344/97-05  
Licensee: Portland General Electric Company  
Facility: Trojan Nuclear Plant  
Location: 121 S. W. Salmon Street, TB-17  
Portland, Oregon  
Dates: December 1-3, 1997  
Inspector: J. V. Everett, Health Physics Inspector  
Approved By: D. Blair Spitzberg, Ph.D., Chief  
Nuclear Materials Inspection and Fuel Cycle/Decommissioning  
Attachment: Supplemental Information

## EXECUTIVE SUMMARY

### Trojan Nuclear Plant NRC Inspection Report 50-344/97-05

The Trojan facility had been undergoing active decommissioning and dismantlement for several years. Estimated completion of the decommissioning was 2001. Structural components, tanks, and piping were being removed from containment and the fuel/auxiliary building. Material that was contaminated had been shipped for burial at Hanford. Material expected to be clean was initially surveyed at the work area, then sent to a second area for final survey and eventual release for sale as scrap metal. Workers observed during plant tours by the NRC inspector were complying with radiological controls and restrictions. Housekeeping and fire loading was acceptable and overall good safety practices were being implemented by the workers. The water clarity and condition of the spent fuel pool was good. No potential freezing problems due to cold weather were identified.

Problems continued to occur with surveys of potentially contaminated materials. Previous problems associated with the adequacy of surveys for shipping containers destined for burial at Hanford appeared to have been corrected. However, certain surveys of materials removed from the radiologically controlled area had been identified as inadequate in 1997. This resulted in the release of some materials outside the radiologically controlled area that exceeded free release limits. The licensee's review of the problem identified that similar inadequacies occurred with certain materials released during earlier years. The licensee was being aggressive in identifying the extent of the problem and had shown considerable commitment to correct the problem. Corrective actions recently initiated for future surveys should be effective in reducing unintentional releases of contaminated material from the radiologically controlled area.

#### Spent Fuel Pool Safety

- Spent fuel pool water level and temperature were confirmed to be within the required limits of the Trojan Technical Specifications. Water clarity was good. Dismantlement work within the facility had not affected the spent fuel pool or associated systems (Section 1).

#### Cold Weather Preparations

- A significant number of tanks and systems which contained water had been removed from the Trojan facility. The few tanks that were operational did not appear to be vulnerable to freezing damage considering the typical temperature ranges for the Trojan area and the location of the tanks. Systems used to maintain the spent fuel pool were located within the building and were not susceptible to freezing (Section 2).



#### Decommissioning Performance and Status Review

- Dismantlement activities were proceeding, and a large number of tanks had been removed since the last inspection. A tour of work areas indicated general conditions were safe, housekeeping was acceptable, and fire hazards were low (Section 3).

#### Control of Radioactive Material and Contamination

- Accountability for sealed sources was being maintained by the licensee through an annual inventory. The sources were being stored in locked cabinets (Section 4).
- One violation concerning the discovery by the licensee of contaminated tools and scaffolding outside the radiologically controlled area in excess of the release limits specified in the Trojan Decommissioning Plan was identified. The NRC has requested that in response to the violation, the licensee is to take appropriate actions to locate and resurvey tools and scaffolding that were removed from the radiologically controlled area. (Section 4).

#### Organization, Management, and Cost Controls

- Changes to the licensee's emergency plan implementing procedures submitted August 14, 1997, were reviewed with the emergency preparedness engineer and found acceptable (Section 5).
- The site emergency exercise was conducted September 30, 1997. The exercise involved a fire in containment and a medical emergency involving a potentially contaminated individual. The licensee's evaluation found that all exercise objectives had been successfully met (Section 5).
- The year 2000 computer system problem was being evaluated by a consultant to the licensee. A number of tracking and scheduling systems were being evaluated to determine the magnitude of the problem for software used at Trojan (Section 5).

## Report Details

### Summary of Plant Status

Dismantlement and decommissioning activities were in progress at the Trojan facility. Noticeable dismantlement had occurred since the last inspection, especially in the area of tank removal. Work had expanded into new rooms and new radiological controls were observed at several locations.

Free release of radioactive material had received considerable attention by the licensee over the past several months. Changes to the program had been made to strengthen controls to prevent contaminated material from being released from the radiologically controlled area. A significant effort had been initiated by the licensee to survey all areas of the site to locate contaminated materials improperly released from the radiologically controlled area during past activities.

### **1 Spent Fuel Pool Safety (60801, 86700)**

#### **1.1 Inspection Scope**

Technical Specifications for the spent fuel pool specified water level and water temperature limits. These limits were verified during this inspection. In addition, a tour of the general area of the spent fuel pool was conducted to evaluate the structural condition of the spent fuel pool walls and piping and verify that no dismantlement work was underway that posed a threat to the structural integrity of the pool.

#### **1.2 Observation and Findings**

Trojan Technical Specification 3.1.1 required the spent fuel pool water level to be maintained at or above 23 feet over the top of the spent fuel assemblies. The records for the spent fuel pool water level for 1997 were reviewed. Water level was maintained above 24 feet throughout the year with the lowest level recorded on November 11, 1997, at 24 feet 3 inches.

Trojan Technical Specification 3.1.3 required the spent fuel pool water temperature to be maintained below 140° F. For 1997, the water temperature was typically maintained between 50° F to 80° F. During December, a maximum temperature was recorded at 102° F. The licensee had allowed the temperature to increase in order to increase evaporation to make room for the transfer of water from the cask loading pit into the spent fuel pool.

The steam reformer project was still underway and sorting of material in the spent fuel pool was observed. Some water clouding around the work area in the fuel transfer canal was observed; however, the water clarity around the spent fuel was good. A tour was conducted of the various floors around the spent fuel pool. Work underway to dismantle



tanks, pipes and systems did not appear to affect the systems associated with the spent fuel pool. The licensee had implemented a program to ensure that critical systems were not deactivated. Prior to any dismantlement work in an area, a survey was completed by engineering. Piping and cables that were not to be removed were marked with red tape. A tour of several areas where dismantlement had been completed near the spent fuel pool revealed several pipes that were taped and had not been affected by the work completed in the room.

### 1.3 Conclusion

Spent fuel pool water level and temperature were confirmed to be within the required limits of the Trojan Technical Specifications. Water clarity was good. Dismantlement work within the facility had not affected the spent fuel pool or associated systems.

## 2 **Cold Weather Preparations (71714)**

### 2.1 Inspection Scope

A general review of the licensee's provisions for cold weather protection was conducted. Primary emphasis was placed on systems related to the spent fuel pool and tanks that could leak contaminated water.

### 2.2 Observation and Findings

A significant portion of the dismantlement effort at Trojan in 1997 was directed toward removal of tanks. This eliminated much of the potential water inventory in the building. Tanks inside the building that still had water included the dirty waste tank, clean waste tank, treated waste tank, spent resin storage tank and several cumps. Outside the building, water was still stored in the primary water storage tank. This water contained tritium. The Trojan facility was kept heated in most areas, with automatic switches to activate heaters in selected areas. Weather conditions at Trojan are relatively mild with few periods of hard freezing temperatures. Freezing of pipes had not been a problem in the past.

Three systems with water were connected to the spent fuel pool. These were the cooling system, the skimmer system, and the make-up water system. The demineralizer system was connected to the cooling system. All three systems were within the heated structure. The freezing potential for these systems appeared to be minimal.

An auxiliary operator had conducted routine plant tours each shift. Shifts were 12 hours in length. Procedure OG 13-100 entitled "Auxiliary Operator Rounds," Revision 18, was used by the auxiliary operator. Step 4.4.1(r) directed the auxiliary operator to check room temperatures during the routine tours to determine if temperatures were appropriate for the time of year and to check heaters and coolers for proper operation. A checklist was attached to the procedure to document the completed activities. The

procedure also established a specific minimum temperature of 40°F for the diesel fire pump room, otherwise the system was declared inoperable. Procedure POT 24-6, "Shift Operating Routines for Permanently Defueled Conditions," Revision 3, specified that if temperatures were below 32°F, special attention should be directed toward equipment supporting the spent fuel pool, fuel transfer tube which passes through the auxiliary building facade, demineralizer water line in containment and containment heaters.

On June 30, 1994, the licensee submitted to the NRC a response to NRC Bulletin 94-01, "Potential Fuel Pool Draindown Caused by Inadequate Maintenance Practices at Dresden Unit 1." A comparison of the 1994 response with the current procedures found that procedural commitments were still in place for systems related to the spent fuel pool.

### 2.3 Conclusion

A significant number of tanks and systems which contained water had been removed from the Trojan facility. The few tanks that were operational did not appear to be vulnerable to freezing damage considering the typical temperature ranges for the Trojan area and the location of the tanks. Systems used to maintain the spent fuel pool were located within the building and were not susceptible to freezing.

## 3 **Decommissioning Performance and Status Review (71801)**

### 3.1 Inspection Scope

The status of dismantlement activities was observed during a plant tour to evaluate work conditions, housekeeping, and fire protection.

### 3.2 Observation and Findings

The dismantlement work at Trojan was proceeding and significant work had been completed since the last inspection. A large number of tanks had been removed and segmented for burial. Several tanks remained in service. A tour of tanks used to collect water from the sumps was performed with the licensee. This included observing the control panel which indicated the status of active tanks and touring the area where the tanks were located to verify that piping was still connected.

A discussion was held with the licensee concerning control of dismantlement activities to ensure systems were not inadvertently deactivated or disconnected. Prior to work being conducted in an area, the engineering department identified all systems that were not to be dismantled and placed pink tape on the system. A tour of several work areas included observation of the pink tape on selected systems.

During the tour, the work areas were observed to be relatively free from unnecessary trash. Work areas appeared to be safe with no noticeable industrial hazards observed during the tour. Fire loading was minimal and no fire hazards were observed.



Contamination areas were properly identified and posted. Radiation rope or tape was evident to prevent unintentional entry.

### 3.3 Conclusion

Dismantlement activities were proceeding with a large number of tanks removed since the last inspection. A tour of work areas indicated general conditions were safe, housekeeping was acceptable, and fire hazards were low.

## 4 **Control of Radioactive Material and Contamination (83726)**

### 4.1 Inspection Scope

The licensee's program for control of sealed radioactive sources was reviewed to verify the current inventory was accurate and provisions were in place to annually inventory sources.

The site survey effort underway to determine if contaminated material had been improperly released from the radiologically controlled area was reviewed. This effort involved a comprehensive survey of areas onsite where material was stored or placed that could have been released from the radiologically controlled area. The effort was part of the corrective actions committed to by the licensee in response to the Notice of Violation issued with Inspection Report 50-344/97-03 dated September 9, 1997.

### 4.2 Observation and Findings

Technical Specification 5.9.2(e) required records to be maintained of the annual physical inventory of sealed source material. In addition, 10 CFR 20.1801 and 20.1802 require security and controls for sealed sources. The annual physical inventory sheet dated July 1997 was reviewed during this inspection. There were 128 radioactive sources listed. Most sources were stored in either the chemistry laboratory or the radiation protection cabinet. The storage cabinets were kept locked. A random selection of ten sources was identified from the inventory list. The radiation protection supervisor located all sources selected.

NRC inspection conducted July 21-24, 1997, resulted in issuance of a Notice of Violation to the licensee on September 9, 1997, related to the discovery of contaminated material outside the radiologically controlled area. The material had been inadvertently released from the radiologically controlled area during the final surveying process. The licensee initiated a comprehensive effort to determine if additional contaminated material had been released. This included surveying all buildings onsite where material was stored or placed that had been removed from the radiologically controlled area.

On September 17, 1997 a corrective action request (CAR-97-0024) was initiated by the licensee describing the discovery of additional radiological material outside the

radiologically controlled area. A bucket was found on September 15, 1997, by a radiation protection technician outside the normal radiologically controlled area, but inside a satellite radiologically controlled area, with fixed contamination on its bottom side reading 1 million disintegrations per minute (dpm)/100 cm<sup>2</sup>. The bucket had come from the North American tool room. Surveys were conducted of the North American tool room and shops plus the licensee's maintenance tool room and shops. Several additional items were subsequently found which had fixed contamination levels of up to 25,000 dpm/100 cm<sup>2</sup> with one item reading 50,000 dpm/100 cm<sup>2</sup>. These items included two welding leads, an electrical cord, socket, lifting eye, impact wrench, metal cable sling, screwdriver, torque wrench, packing puller, and two shackles. All had fixed contamination except for one item with smearable contamination. The licensee later identified numerous other items, including scaffolding, that was found to be contaminated.

Technical Specification 5.7.2.1 requires that procedures for personnel radiation protection be prepared in a manner consistent with the requirements of 10 CFR 20 and be approved, maintained, and adhered to for all operations involving personnel radiation exposure. 10 CFR 20.1501(a)(2)(ii) requires that each licensee make, or cause to be made, surveys that evaluate concentrations and quantities of radioactive material. Limits for the release of beta/gamma contaminated material from the radiologically controlled area at Trojan were established in the NRC-approved Trojan Decommissioning Plan, Table 4.2.1, as 5,000 dpm/100 cm<sup>2</sup> average, 15,000 dpm/100 cm<sup>2</sup> maximum, and 1,000 dpm/100 cm<sup>2</sup> smearable. The 5,000 dpm/100 cm<sup>2</sup> fixed and 1,000 dpm/100 cm<sup>2</sup> smearable limits were also specified in Step 6.1 of Trojan Procedure 20-19, "Release of Materials from Radiologically Controlled Areas," Revision 1. Contrary to the above, the inspector determined that a violation of Trojan Technical Specification 5.7.2.1 had occurred due to the release of contaminated material from the radiologically controlled area exceeding both the average and maximum fixed contamination release limits of the Trojan Decommissioning Plan and Procedure 20-19 (Violation 50-344/9705-01). Despite having been identified by the licensee, this violation is being cited because of programmatic significance of the violation.

In the response by the licensee to the violation issued in Inspection Report 50-344/97-03 dated September 9, 1997, the licensee identified that between 1994 and 1997, tools removed from the radiologically controlled area were offered for sale to the public. Scaffolding was also loaned-out for personal use. As discussed during our telephone exit on January 14, 1998, a reasonable effort is expected of Portland General Electric to identify, locate and resurvey, tools and scaffolding that may have been removed from the radiologically controlled area and sold or released to members of the public during the 1994 through 1997 time frame. For all future releases of material from the site that were not surveyed as part of the recent corrective actions effort, additional controls should be identified that will preclude releases of contaminated material from the Trojan site in excess of the limits approved in the Trojan Decommissioning Plan.



#### 4.3 Conclusion

Accountability for sealed sources was being maintained by the licensee through an annual inventory. The sources were being stored in locked cabinets.

One violation concerning the discovery by the licensee of contaminated tools and scaffolding outside the radiologically controlled area in excess of the release limits specified in the Trojan Decommissioning Plan and site radiological procedures was identified. The NRC has requested that in response to the violation, the licensee is to take appropriate actions to locate and resurvey tools and scaffolding that were removed from the radiologically controlled area.

### 5 **Organization, Management, and Cost Controls (36801)**

#### 5.1 Inspection Scope

The 1997 annual exercise and changes completed during the year to the emergency plan implementing procedures were reviewed. In addition, the year 2000 computer problem was discussed with the licensee to determine if any impact on licensee activities relating to decommissioning was expected.

#### 5.2 Observation and Findings

On August 14, 1997, the licensee submitted changes to its emergency plan implementing procedures to the NRC. These changes included the addition and clarification of terminology related to the emergency action levels and a new attachment containing guidance and considerations for emergency classifications. These changes were reviewed during this inspection with the emergency preparedness engineer and found acceptable.

The annual exercise for Trojan was conducted on September 30, 1997. The scenario involved a fire in containment which caused significant amounts of smoke and the explosion of several gas bottles exposed to the heat of the fire. A possibly contaminated worker was injured during evacuation of containment. The containment purge exhaust pre-filters became plugged causing smoke to enter the fuel/auxiliary building through the equipment hatch.

Offsite agencies and organizations that participated in the exercise included the Rainer Rural Fire Protection District, St. John Medical Center, and Professional Communication Service. Limited participation was provided by Columbia County and the Oregon Office of Energy. Emergency response actions included offsite notifications, activation of the emergency response organization, communications with offsite response organizations, dispatching of inplant emergency teams, removal of an injured and contaminated person from the site and treatment at St. John Medical Center, protective actions for onsite personnel, and issuance of a news release.

The strengths identified by the Trojan evaluation team included the response to the scenario by the emergency team and the drillmanship of the players to deal with the scenario events as if actual occurrences. No weaknesses were observed and all 23 exercise objectives were met. A number of observations and areas needing improvement were identified including clarity and volume of the plant public address system, coordination of information with the media representative, unavailability of a radiation survey instrument during initial fire brigade response, and information flow within the emergency response organization. Completion of the exercise satisfied the annual exercise requirements in Section 9.1.3 of the Trojan Permanently Defueled Emergency Plan, Revision 5.

Over the past several years, special concerns have surfaced related to the year 2000 software issue. This issue affects software that uses only the last two digits of the year to perform calculations. When the year 2000 is reached, errors could be encountered for any computer operation that subtracts dates.

Portland General Electric had hired a contractor to assist in determining which software in use at the Trojan facility will encounter problems due to the year 2000 problem. Examples of systems being evaluated included the work management system, scheduling software, licensing tracking system, radiation information management system, CAD system for plant drawings, fire protection tracking system, security access control system, and records management system. There were no computerized systems in the control room identified as being susceptible to this problem.

### 5.3 Conclusion

Changes to the licensee's emergency plan implementing procedures submitted August 14, 1997, were reviewed with the emergency preparedness engineer and found acceptable.

The site emergency exercise was conducted September 30, 1997. The exercise involved a fire in containment and a medical emergency involving a potentially contaminated individual. The licensee's evaluation found that all exercise objectives had been successfully met.

The year 2000 computer system problem was being evaluated by a consultant hired by the licensee. A number of tracking and scheduling systems were being evaluated to determine the magnitude of the problem for software used at Trojan.

## 6 **Onsite Follow-up of Written Reports on Nonroutine Actions (92700)**

(Opened and Closed) Licensee Event Report 50-344/9705-02: pH Limit Exceeds NPDES Limit: On September 6, 1997, Trojan notified the NRC Duty Officer that a violation of the licensee's national pollution and discharge effluent system (NPDES) permit had occurred. While rinsing a sodium bisulfite barrel in the discharge and dilution structure



after refilling the sodium bisulfite tank, the licensee received a low pH alarm on the control room annunciator for the discharge and dilution structure effluent pH monitor. The minimum pH measured was 5.6 according to the recorder, and 5.3 based on a grab sample. The lower limit for the licensee's discharge permit was 6.0. The licensee was able to return the pH level to above 6.0 within approximately 10 minutes. The discharge permit limit was not an NRC requirement or licensee technical specification requirement, however, since the licensee notified the State of Oregon, then notification to the NRC was required by 10 CFR 50.72(b)(2)(vi).

The licensee issued Corrective Action Request C-97-0021 and evaluated the event. Approximately 24,000 gallons were released to the Columbia River outfall during the period the pH level was below the permit limit. The licensee determined that other methods of rinsing the barrels were available which would preclude recurrence of the event and planned to develop procedural guidance on rinsing the barrels. The inspector found the licensee's actions appropriate.

#### **7 Exit Meeting**

The inspector presented the inspection results to members of the licensee management and the Resident Inspector for the Oregon Office of Energy at the exit meeting on December 3, 1997. The licensee acknowledged the findings presented. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspector. On January 14, 1997, a telephone followup exit briefing was conducted to discuss the final results of the inspection as presented in the inspection report.

## ATTACHMENT

### PARTIAL LIST OF PERSONS CONTACTED

#### Licensee

A. Bowman, Radiation Protection Supervisor  
J. Cooper, Emergency Preparedness Engineer  
M. Gatlin, Nuclear Security Manager  
T. Meek, Radiation Protection Manager  
D. Nordstrom, Nuclear Oversight Manager  
H. Pate, Licensing Manager  
S. Schnieder, Plant Operations Manager

#### State of Oregon

A. Bliss, Resident Inspector, Oregon Office of Energy

### INSPECTION PROCEDURES USED

36801	Organization, Management, and Cost Controls at Permanently Shutdown Reactors
60801	Spent Fuel Pool Safety at Permanently Shutdown Reactors
71714	Cold Weather Preparations
71801	Decommissioning Performance and Status Review at Permanently Shutdown Reactors
83726	Control of Radioactive Materials and Contamination, Surveys, and Monitoring
86700	Spent Fuel Pool Activities
92700	Onsite Follow-up of Written Reports of Nonroutine Events

### ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

50-344/9705-01	VIO	Free Release of Contaminated Material
50-344/9705-02	IFI	pH Limit Exceeds NPDES Limit

#### Closed

50-344/9705-02	IFI	pH Limit Exceeds NPDES Limit
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#### Discussed

None



# LIST OF ACRONYMS

cm	centimeter
CFR	Code of Federal Regulations
dpm	disintegrations per minute
mRem	milli-Roentgen equivalent man
mSv	milli-Sievert
NPDES	National Pollution and Discharge Effluent System
PDR	Public Document Room
ppm	parts per million
rem.	Roentgen equivalent man
Sv	Sievert