

August 28, 1985

Docket No. 50-344

Mr. Bart D. Withers
Vice President Nuclear
Portland General Electric Company
121 S.W. Salmon Street
Portland, Oregon 97204

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Dear Mr. Withers:

SUBJECT: SILT ACCUMULATION ON SERVICE WATER STRAINERS

The NRC staff has completed its review of LER No. 84-21 dated December 26, 1984 relating to service water system flowrate problems at the Trojan Nuclear Plant, and subsequent additional information.

The reconstruction of events indicates that on three occasions, one on October 11, 1984, and two on October 30, 1984, the passing of large ships in the Columbia River at higher than normal speed and the ensuing boat wakes (waves) resulted in the suspension of silt that was carried into the Trojan Service Water Intake System. Sufficient quantities of silt were suspended to plug the service water strainers.

To the extent the problem is understood, subsequent actions by PGE address the relevant issues involved in the incidents. These issues are defined as (1) increased sediment in suspension resulting from boat wakes, (2) intake channel sedimentation (siltation), and (3) service water (SW) strainer clogging. PGE's response to these issues has been as follows:

- 1) To request both the U.S. Coast Guard and the Columbia River Pilots Association to minimize large ship wakes generated by ships while passing the Trojan Nuclear Plant.
- 2) To dredge the accumulated sediment in the intake channel and to annually inspect the intake channel using divers for abnormal siltation. If an accumulation is detected, dredging operation will be initiated to remove it.
- 3) To replace the service water strainer 10 mil mesh size with 20 mil mesh.

The review of the problem indicates a direct relationship between large boat wakes generated by excessive speeds of ships passing the plant and the occurrence of large sediment accumulation on the SW strainers.

Mr. Bart D. Withers

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PGE evaluated the U.S. Army Corps of Engineers' dredging in the Columbia River during September and October 1984 at approximate River Mile 74.5 (about 2 miles upstream) that was being discharged at River Mile 79 (approximately 6.5 miles upstream from the plant). It was the Corps of Engineers' conclusion that this dredging operation would not have been expected to have any significant effect on the Trojan Intake Structure or approach channel. Although there is no evidence available that relates the upstream dredging operation as the source of organic sediment, there is the possibility that the dredging operation might have added to the suspended organic materials carried downstream by the river.

Analysis of samples of the sediment in the Intake Channel prior to dredging operations (October 17 to November 11, 1984) indicated that only 0.5% by weight would not pass a 9.8 mil mesh (No. 60 sieve). A comparison of samples taken from the Intake Channel in March 1985 and October 1984, showed that the March 1985 samples generally contained a higher percentage (4 to 20%) by weight of sediment retained by the 9.8 mil mesh (No. 60 sieve) than the October 1984 samples. PGE's analysis of the material trapped on the strainers during the October 11, 1984, event indicated that the material was composed of organic matter, sand, and silt with 73% by weight of the sample not passing a 11.6 mil mesh (No. 48 sieve). PGE concluded that the 10 mil strainer mesh was too small for your application and that the natural occurrence of organic matter in the river, which when put in suspension by large boat wakes, was ingested by the pumps and resulted in the plugging of the SW strainers. By changing the strainer mesh from 10 mils to 20 mils, it is believed that the strainers will pass the material without any further plugging, should the suspended material recur. At time the Trojan Plant was licensed the system used 60 mil strainer mesh.

The NRC staff advises PGE to be sensitive to the potential implications of allowing larger sediments to circulate through the Service Water System, such as continuing the periodic surveillance of the Safety Injection Pump Room Coolers which are now being checked for sediment.

It is the staff's opinion that PGE has taken the necessary steps (1) to identify the material that plugged the strainers, (2) to identify and resolve the cause of the suspension of the sediment and (3) to resolve the plugging problem for sediments (materials) smaller than 20 mil size. Mineral sediments coarser than 20 mils would require greater wave and current velocities to put them in suspension and reach the SW strainers.

It is therefore concluded that the licensee has developed an acceptable solution of the service water strainer plugging issue and the issue is closed.

Sincerely,

/s/

Edward J. Butcher, Acting Chief
Operating Reactors Branch #3
Division of Licensing

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PKreutzer
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LLazo:dd
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EJButcher
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