

1974, September 13

Duwamish Waterway, Seattle, Washington, USA

Polychlorinated biphenyl (Class 9) in an electrical transformer; toxic, bioaccumulative and carcinogenic liquid; TLV 0.001-0.5 mg/m³ (USA)

Summary: An **electrical transformer** was dropped on the quay while being loaded by a crane onto a barge. The transformer was punctured and most of its content of 1 m³ **polychlorinated biphenyl** (PCP), used as cooling liquid, leaked out onto the quay and down into the Duwamish waterway. The Duwamish River is one of the many **anadromous** (= migrating up the river) fish runs in the area. The hazard of the spill was not realized until four days afterwards when laboratory personnel and divers arrived and examined the place. The divers could observe pools of free PCB on the bottom of the 15 m deep waterway. On October 9 a 50 ton heavy special **chemical treatment unit** arrived. The bottom area was dredged by a pipeline dredge handled by divers. During the dredging operation, the river level depth was checked by means of **fathometer** readings over a cross section of the spill area. The depth checks were made aboard a Coast Guard cutter that was in attendance throughout the operation. The perimeter of the contaminated river area was physically cordoned off by a **bubble air curtain** established by pumping air through a perforated fire hose lying on the bottom around the area. The purpose of the bubble screen was twofold - protect migrating fish and prevent PCB from spreading. 2300 m³ of sludge was handled by the treatment unit and purified through settling using **Nalco 634**, a polyelectrolyte. This settling agent was chosen after tests with several different agents. 215 drums of PCB-contaminated mud was collected and later carried to a disposal site. The cost of the operation was USD 150,000.

Cause of Accident: The transformer was packed in a wooden box and bolted to 4" x 4" "skids" or planks under the box. When hoisting the box, one or both of the skids broke at the point where they were bolted. The transformer fell to the quay and broke some of the "fins" on its metal case. Thereby the case was ruptured, permitting the PCB coolant to leak out.

Comments on Response: The transportable physical/chemical treatment unit with its staff proved to be a very sophisticated cleaning tool for this kind of projects. The unit is a mobile waste water treatment plant utilizing primary settling, mixed media pressure filters and activated carbon columns. Earlier it had been used successfully in pesticide spills. By settling the sludge in this unit, the PCB content in the return water could be sufficiently reduced to permit immediate discharge back to the waterway.

Source of Information: Proceedings of the 1976 National Conference on Control of Hazardous Material Spills, p. 351-355
(Abstracted April 1991 by Björn Looström, Swedish Coast Guard H.Q.)