Frequently Asked Questions about
Spokane River PCBs Study

from Ecology's Water Quality Program

Introduction

The Spokane River is listed by the U.S. Environmental Protection Agency (EPA) as impaired by several different pollutants. One of the pollutants is PCBs. Because of this, the Washington Department of Ecology (Ecology) is required to prepare a water quality cleanup plan, or as it is sometimes called, a "total maximum daily load" or TMDL report. The first step in the process is conducting a study and producing a technical report that serves as the basis of the water quality cleanup plan. That draft technical report was completed in June 2006.

Q: What are PCBs and where do they come from?

A: Polychlorinated biphenyls (PCBs) are a family of human-made, chlorinated chemical compounds that were once used in a variety of applications including as insulating fluids for electric transformers and capacitors. They also were used in plasticizers, paint additives, adhesives, inks and carbonless (mimeograph) paper, lubricants, and as heat transfer and hydraulic fluids.

There are 209 structural variations of PCBs called congeners that vary by the number and location of chlorine atoms on the base structure. Generally, the persistence and toxicity of PCBs increases with the degree of chlorination in the mixture. Some PCB congeners have a structure and biological activity that is similar to dioxin.

Commercial production of PCBs began in the U.S. in 1929. The EPA banned all production of PCBs in 1977 because of concerns about toxicity and persistence in the environment. However, PCB-containing materials still in service at the time of the ban were not required to be removed from use, and therefore, some are still in use. For example, the life expectancy of electrical transformers that contain PCBs is 30 years or more.

Also, PCBs are a persistent class of chemicals that unfortunately are ubiquitous throughout the environment at low concentrations. Until 1979 when they were banned, their use was widespread. Over the years, municipal wastewater treatment plants, stormwater outfalls and unknown spills also may have discharged trace amounts of this contaminant. There may be miscellaneous sources that we will never find.

Ecology has not conducted a Washington state PCB source assessment. Therefore, little is known about current statewide sources.

NOTE: There are no known *natural* sources of PCBs.

June 2006 06-10-043

Q: In a nutshell, what does the water-quality technical report (study) conclude?

A: PCBs in water increase as you travel downstream from the Idaho border to the Long Lake Dam. Sediment information shows that PCB levels decrease by half every 10-20 years. Sampling suggests that PCBs in some fish may be improving since 1999. However, the concentrations of PCBs in water are significantly higher than state and Spokane Tribal water-quality standards.

PCBs get into the Spokane River through industrial discharges, wastewater treatment plants, and storm water. PCBs deposited in sediments from historical discharges also find their way into fish. In order to meet PCB standards for the river and further reduce PCBs found in fish, industrial and municipal discharges between the Idaho border and Lake Spokane (formerly Long Lake) will need to significantly reduce the amount of PCBs in their waste water and storm water. Reductions in PCBs also are needed on the Idaho side of the border.

Q: Now what?

A: Now the Department of Ecology (Ecology) will meet with dischargers, Spokane Tribal members, the Environmental Protection Agency and the state of Idaho to discuss the results. We will form an advisory committee made up of these organizations and other community members and local government officials to discuss how to proceed. Eventually we will develop an implementation strategy or plan, which will detail how reductions of PCBs will be accomplished.

Q: Do you have any plans for how to proceed?

A: The technical report includes recommendations for how to find and clean up the sources of PCBs. These recommendations will be the starting point for a detailed implementation plan that is required as part of the TMDL process (water-quality cleanup plan).

First, further investigations of the sources of the PCB pollution are needed. Second, studies are needed to look at and characterize storm water, the effluent from industries and municipalities and ground water. Third, we need to examine treatment alternatives for removing PCBs from effluent. Finally, the appropriate treatment plant controls may need to be installed and used.

Q: How many pounds of PCBs are discharged into the river each day/month/year? And how much needs to be reduced in order to bring the river and Lake Spokane back to health?

A: Approximately 1.6 pounds per year of PCBs are discharged to the Spokane River. This includes all PCB loads, including contributions from Idaho and from the Little Spokane River. While this may not seem like much, PCBs “bio-accumulate” (persist and build up) in the tissues of fish, which are eaten by people. This trend needs to be reversed in order to protect human health by making the fish safe to eat without health advisories on consumption.

In order to meet PCB standards that are designed to protect water quality and fish, the study indicates that industrial and municipal discharges between the Idaho border and Lake Spokane could require PCB load reductions greater than 99 percent from current levels. In addition, a 95 percent PCB load reduction in the Spokane River at the Idaho border and a 97 percent PCB load reduction in the Little Spokane River will be required to meet the standard.

Q: Are PCBs coming from the Little Spokane?

A: Some PCBs are entering Lake Spokane from the Little Spokane River. PCB levels in the water of the Little Spokane River do need to be evaluated as part of the TMDL water quality cleanup plan. As part of our implementation strategy, we will try to locate and reduce PCBs getting into the Little Spokane River.

Q: Where ARE the PCBs? (In the sediments, in the water, behind the dams?)

A: PCBs exist at very low concentrations in river water (in dissolved or suspended form). Scientists have estimated PCBs in the Spokane River at concentrations ranging from 77 to 399 parts per quadrillion. While seemingly very low concentrations, the PCBs "bio-accumulate" in the fish tissues. State and Spokane Tribal water-quality criteria based on safe fish consumption are 170 and 3.37 parts per quadrillion, respectively.

Also, PCBs have a great affinity toward organic matter found in fine-grained sediments (e.g., sand size or smaller). Low concentrations (approximately 0 to 100 parts per billion, or ppb) are typical of most areas of the river having fine-grained sediments. We are currently aware of only one location on the river where significant quantities of PCBs exist in the sediments (concentrations ranging from 1,000 to 15,000 ppb). That location is the limited sediment accumulation resting just behind Upriver Dam and is being cleaned up by Ecology's Toxics Cleanup Program.

Q: What kind of work is being done to clean up the sediments behind Upriver Dam?

A: Work will proceed under Washington's Model Toxics Control Act in the late fall of 2006, as a key step in our campaign to restore the river by reducing PCBs which remain in fish and persist in the river.

Cleanup will involve two main actions: 1) the protective capping (isolation) of contaminated sediments located just upstream of Upriver Dam and covering an area of approximately 2.3 acres, and 2) the removal and proper disposal of approximately 600 cubic yards of contaminated sediments from an environmentally sensitive side-channel feature known as Donkey Island (located just upstream of Argonne Road).

The $1.5 to $2 million cleanup is being funded by Avista Corp. (The primary liable party, Kaiser Aluminum, reached a settlement during its bankruptcy phase in which funds were placed into a trust and Avista agreed to complete the cleanup).

Q: What are the ecological problems associated with high PCB concentrations?

A: PCBs are highly fat-soluble and are quickly accumulated by aquatic organisms and accumulated through the food chain. Concentrations of PCBs in aquatic organisms may **be 2,000 to more than a million times higher** than the concentrations found in the surrounding waters.

Q: Are PCBs getting in my drinking water?

A: The discharge and recharge between the Rathdrum-Spokane aquifer and the Spokane River give rise to concerns over river contaminants entering the aquifer and subsequently entering public drinking water wells. All public drinking water wells are tested frequently to assure that the drinking water is safe. Public drinking water is tested for PCBs and, to date, no PCB contamination has been found. We have no indication that PCBs have or will be contaminating drinking water supplies.

Q: If fish-tissue samples may be showing lower concentrations, why don't we just wait for the trend to continue?

A: It's true that PCBs do gradually break down over time and the river is receiving fewer PCBs than in the past. However, PCBs break down, or disperse in the environment, too slowly and the PCBs still entering the river from various discharges and tributaries continue to affect fish. So, even with the help of time and nature, we will need to substantially reduce PCB discharges. Without making further reductions, it will not be possible to meet water-quality standards. Fish tissue will continue to be high and the risk to the public will remain (i.e., anglers and fishing restrictions and advisories).

We have assessed whether this apparent downward trend is really occurring. Fish sampling conducted in 2003-2004 for the TMDL report suggests a substantial downward trend, but it is only based on a few samples. The draft *PCBs, PBDEs, and Selected Metals in Spokane River Fish, 2005* report analyzes a much larger set of samples to look at trends of PCBs in fish tissue. Compared to historic levels from the 1990s, PCB concentrations in fish appear to have decreased in all parts of the Spokane River except the Mission Park reach.

Q: Do we have any non-point sources of PCBs?

A: Yes. Stormwater runoff from urbanized areas is a likely source of PCBs. PCB concentrations were high in all four stormwater drains sampled.

We are unclear about how PCBs end up in storm water, though it is not uncommon. Since the inappropriate past handling of PCB-bearing liquids and solids likely occurred, the PCBs are likely mobilized during storm events. Some portion of the PCBs in storm water may be transported and deposited through the atmosphere, although we have no data to estimate that percentage.

Q: Will the dischargers along the river need to use new technology to reduce PCBs?

A: This is a question we can't answer fully quite yet. We will first try to find out how PCBs are getting into our waste water and stormwater discharges. We will try to eliminate any of these PCB sources. We also will need to explore new and emerging technology that can filter out the PCBs. These efforts will take time, and we will be working closely with the dischargers and other interested parties to reduce PCBs discharged to the river.

Q: How much will new technology cost the dischargers?

A: We don't know the answer to this question yet.

Q: Do any of the PCBs come from Idaho? What can Idaho do?

A: Yes. Approximately one-quarter of the PCB load in the river comes from Idaho. In addition to PCB load reductions from dischargers in Washington, our work predicts the PCB load from Idaho will need to be reduced by 95 percent in order to meet the water-quality goal. We will work with our counterparts in Idaho and EPA (the lead water-quality authority for Idaho dischargers) to achieve reductions from these upstream sources.

Q: How much more restrictive is the water-quality standard on the Spokane Indian Reservation than upriver of the reservation?

A: The tribal standard is **53 times lower** than the state standard because tribal members tend to consume more fish.

Q: When did the first sampling for PCBs occur?

A: PCBs were first reported in fish in 1980. Subsequent samplings of sediments and fish occurred in 1981, 1982, 1983, 1992, 1993, 1994, 1995, and 1996, 1999, 2000, 2001, 2003, 2004 and 2005.

Prior to the TMDL work and the 2005 fish sampling, the last major fish surveys were done in 1999 (Stateline to Nine Mile Dam) and 2001 (Long lake). The current fish consumption advisory is based on the 1999 and 2001 results. Because of levels of PCBs found at that time, the Spokane Regional Health District in coordination with the State Department of Health advised anglers to use caution when eating fish from the Spokane River (see below).

Q: What actions has the Spokane Regional Health District taken?

A: The public was notified about PCBs in upper Spokane River fish in 1995 as a result of the analysis of samples collected in 1993 and 1994. At that time, the Spokane Regional Health District recommended that if people had doubts or concerns about the fish, they should not eat them. Those still wishing to eat the fish were urged to trim all fat from the fish before cooking and to cook on a rack so that the fat would drain off. ***These preparation tips are still valid.***

The consumption advisory was revised in 2003 based on results of 1999 and 2001 sampling. The health district recommends: No fish (any species) should be consumed between Upriver Dam and the Idaho border. No more that one meal a month (any species) should be consumed from fish between Upriver Dam and Nine Mile Dam. Fish from Long Lake (Lake Spokane) are safe to eat. They also recommend trimming fat and skin from fish, allowing fat and juices to drip off before eating, and avoiding consumption of juices, bones, organs, fat and skin. The advisory can be found at the following Web site:

http://www.srhd.org/downloads/safety_environment/SpokaneRiverFishAdvisory.pdf

Q: How do data from the current fish-tissue samples (released in 2006) compare to previous tests?

A: Compared to historical levels from the 1990s, PCB concentrations in fish appear to be decreasing along several parts of the Spokane River except the Mission Park reach. Comparable data to evaluate recent trends in fish tissue contaminants in the Spokane River is limited. Observations made from the 2005 data will need to be compared and more strongly validated by ongoing systematic monitoring to overcome natural variability and confirm changes over time.

Q: What about Lake Spokane?

A: Sampling of five species conducted in 2001 showed that PCB levels in Lake Spokane fish were generally lower than in fish upstream. Based on this sampling, DOH and the Spokane Regional Health District determined that Lake Spokane fish are safe to eat without restriction. Health officials encourage people to eat yellow perch, a common species in Lake Spokane.

Q: If DOH and the Spokane Regional Health District say that Lake Spokane fish are safe to eat, why is this TMDL water-quality cleanup plan necessary?

A: PCB levels in fish along other portions of the river are not safe. Further, PCB concentrations in water and fish tissue in Lake Spokane exceed state criteria for protection from long-term fish consumption. Also, current water and fish tissue concentrations exceed Spokane Tribal criteria for protection from long-term fish

consumption. These criteria are intended to prevent fish from becoming contaminated to levels that would warrant a fish advisory.

Q: Are sediments in Lake Spokane contaminated with PCBs? Will sediments in Lake Spokane be cleaned up like behind the Upriver Dam?

A: PCB levels in Lake Spokane are much lower than behind Upriver Dam (approximately 20-200 times lower than the Upriver Dam cleanup site) and are gradually being covered by cleaner sediment, especially those coming from Latah Creek and the Little Spokane River watersheds. While our computer modeling indicates that the sediments in Lake Spokane are contributing to the PCBs measured in river water, Ecology does not expect to clean up sediments in Lake Spokane, as it is not feasible due to its size; nor would such an exercise be the most practical or effective way to improve water quality in the Spokane River.

Q: Why isn't fish tissue sampling currently being done closer to Lake Roosevelt, down stream of Long Lake Dam?

A: Ecology is focusing on the stretches where advisories are in place and PCBs are the highest. The current fish-tissue sampling study encompasses the Spokane River from the Idaho border to Long Lake Dam. Further, the Spokane Indian Tribe is independently sampling fish in the Little Falls Pool and the Spokane Arm. Based on existing sediment and past fish tissue data, fish from Little Falls have similar or lower concentrations of PCBs from lower Lake Spokane. We know of no sources of PCBs below Lake Spokane.

Q: Where did/do the PCBs come from that ended up in Spokane River fish?

A: The TMDL study shows that there are many sources, both past and present. These include permitted discharges, storm water, non-point sources, and historical releases. The largest concentrations of PCBs in fish or sediment have been found between the state line and Upriver Dam. While we don't know where all of the PCBs came from along this reach of the river, we do know that one important historic source is the Kaiser Trentwood plant in the Spokane Valley. Prior to 1994, the Spokane Industrial Park also was a likely source.

Q: Who are the dischargers to the Spokane River?

A: The municipal treatment plants from the cities of Coeur d'Alene, Hayden Lake, Post Falls, Liberty Lake, and Spokane; Kaiser Trentwood; and Inland Empire Paper. Each of these facilities has a wastewater discharge permit issued by Ecology or the EPA. Prior to 1994, the Spokane Industrial Park discharged waste water to the river. Currently the industrial park discharges to the city of Spokane treatment plant.

Storm water (combined sewer overflow) discharge points are located along the river too, as well as various other storm drains that appear to deliver PCBs to the river.

Q: Do these facilities test for PCBs?

A: The city of Spokane tests its treatment plant influent, effluent and sludge for PCBs as part of its annual scan for organic "priority" pollutants. Ecology requires that Liberty Lake sample for PCBs twice during the current five-year permit cycle. The other facilities are not currently required to conduct routine PCB analysis of their effluent. Kaiser Trentwood conducts effluent analysis and follow-up monitoring of its discharge to the river.

We have determined that important work still needs to be done to evaluate combined sewer overflow stormwater drains and other kinds of storm drains.

Q: What has Kaiser done to reduce PCBs that go in the river?

A: Since 1995, Kaiser Trentwood has taken major steps to reduce PCB concentrations in its waste water. For example, the company is investigating potential sources within its facility, is cleaning or replacing pipes that show contamination, and removed contaminated sediment from its wastewater lagoon. The company is cooperating with Ecology to complete investigation of the facility under administrative orders.

The company continues to monitor its effluent and to take efforts to reduce PCB levels discharged from their facility. Sampling conducted over the years shows that trace PCBs are still present.

Kaiser also has been monitoring ground water at the facility and is evaluating PCB contamination in ground water beneath the facility and to determine whether or not any contaminated ground water is reaching the Spokane River. Ecology's toxics cleanup program is overseeing this investigation and cleanup actions will be taken as appropriate following conclusion of the facility investigation work.

Q: How did Kaiser use PCBs?

A: The source of the PCBs appears to have been from past uses of PCB-contaminated hydraulic fluid used at the facility many years ago.

Q: What is Ecology doing to stop PCB contamination in the river?

A: Ecology has taken several actions, but we still have more work to do. This is one of our agency's top priorities.

- Ecology's toxics cleanup program is requiring responsible parties to remove or contain PCB-contaminated sediments resting behind Upriver Dam. The program is requiring an extensive investigation of the Kaiser Trentwood plant to address PCB threats at that major industrial complex.
- Ecology is advancing this TMDL process to assure PCBs are controlled and conditions improve. We are sharing the PCB TMDL study and will share additional fish tissue results with the municipal and industrial dischargers in an effort to further reduce PCBs associated with treatment plant effluents.
- We are reviewing facility and cleanup operations at Kaiser Trentwood to assure that potential surface and groundwater discharges of PCBs are permanently eliminated.
- Ecology also oversaw the cleanup of the General Electric site in 1999 which was contaminated with PCBs and had an impact on the aquifer near the river. The department continues to pursue other potential threats.

Q: How does this PCB cleanup strategy tie in with other work on bio-accumulative toxic chemicals?

A: Our efforts on the Spokane River are consistent with the department's priority of reducing toxic chemicals, in particular persistent bio-accumulative toxic chemicals. Highlights are:

- We have been and are continuing to eliminate historical sources.
- We are pursuing further reductions, e.g., cleaning up sediments and assessing the need for the further reduction of PCBs in effluent discharges.
- We are recognizing the importance of sediments as an ongoing source that has ecological implications.
- We are working to improve public awareness.
- We are bringing dischargers to the table to identify ways to make more improvements.

Earlier this year, as part of Ecology's "Persistent Bioaccumulative Toxic chemicals (PBT) Initiative," Ecology established a new regulation that is designed to address further reductions of listed PBT chemicals. This rule establishes Ecology's process and procedures to address the subject of persistent bioaccumulative toxic substances and helps Ecology set its internal priorities.

The goal of the PBT Rule is to reduce and phase-out PBT uses, releases, and exposures in Washington.

Currently, Ecology is developing a multi-year schedule for addressing different PBTs. PCBs are being considered for the next round of "chemical action plans." Already, Ecology has completed chemical action plans for mercury and for toxic flame retardants known as PBDEs.

Q: How big a problem are PCBs, statewide? Nationally?

A: PCBs continue to be a problem around the country. Nationally, PCBs have been detected in soil, surface water, air, sediment, plants, and animal tissue. As of 1998, 37 states had issued 679 fish advisories for PCBs.

The state of Oregon has issued a statewide advisory on PCBs in fish. PCBs are the focus of investigations of the Willamette River near Portland. We are aware that PCBs of up to 90 parts per billion (ppb) in fish have been observed in the Willamette. Seattle's lower Duwamish River industrial waterway have found fish with concentrations as high as 159 ppb. For comparison, 1999 Rainbow fillet concentrations from the Spokane River range from 50 to 1,610 ppb, with an average of 279 ppb. While the concentrations in the Spokane River may be lower than some heavily polluted areas in the eastern U.S., such as sites in the Great Lakes region and New York's Hudson River, they clearly are concentrations of concern.

Information on this topic can be accessed through Ecology's Web site. The address is:
http://www.ecy.wa.gov/programs/wq/wqhome.html

If you need this publication in an alternate format, please call the Water Quality Program at 509-329-3557. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.