Appendix E: Implementation Actions

This appendix includes implementation actions to reduce or prevent PCBs, provided during the public comment. It also includes information showing involvement in or support of past and regional workgroups to address PCBs. The EPA has excerpted information from public comment letters that describes these activities. In some cases, the complete comment includes questions related to the TMDL. For the full comment letters, go to [insert URL] and Appendix F, Response to Comments.

- **Avista comment letter, Page 2**

Avista implements an aggressive spill policy for discovering, reporting, mitigating, and removing oil spills. The spill response policy requires employees to respond and notify environmental staff immediately upon discovery, 24 hours a day, 7 days a week via a spill phone number. The purpose of this policy is to mitigate the potential of PCB- containing oil spill (or any petroleum product release) from damaging human health and the environment according to 40 CFR 761 (Toxic Substances Control Act, Subpart G "PCB Spill Cleanup Policy") and Ecology's Model Toxics Control Act (MTCA [Chapter 173-340 WAC]) spill response and reporting guidance. In addition, utility groups such as the Northwest Public Power Association have been collaborating with member electric utilities for over 30 years regarding the best practices for spill response, PCB/hazardous waste management and emerging environmental concerns. These steps have been beneficial in coordinating with state and federal agencies to improve various utilities best management practices to address spill and reporting requirements.

- **City of Post Falls comment letter, Page 1**

The City of Post Falls is committed to the fundamental goals of the Clean Water Act and improving water quality as a means of protecting public health and supporting a high quality of life for our communities. The city takes seriously our role as a steward of water quality within the Spokane River watershed as demonstrated by completion of regular compliance sampling and reporting, development of various management plans, infrastructure investments to meet current discharge limits, and voluntary participation with the Spokane River Stewardship Partnership and Spokane River Toxics Advisory Committee.

The City of Post Falls intends to continue this stewardship by operating the City of Post Falls Water Reclamation Facility utilizing all necessary staff, equipment, power, best management practices (BMPs) and chemicals to meet applicable water quality discharge limits while employing a sustainable, cost-efficient, and effective treatment methodology**.**

- **City of Spokane, Public Works comment letter, Pages 1-4**

The City recognizes and values the Spokane and Little Spokane rivers as significant natural resources and is committed to preserving and improving these resources including managing PCB loadings into the rivers. Over the past 10 years, the City has made a generational investment exceeding $450 million in its wastewater/stormwater infrastructure. These investments include:

Improved Wastewater Treatment: In 2021, the City completed an upgrade to the Riverside Park Water Reclamation Facility (RPWRF) including installation of the Next Level Treatment (NLT) system, a state-of-the-art membrane filtration system that provides tertiary treatment for the City's wastewater effluent prior to discharge to the Spokane River. Due to the very low solubility of PCBs, PCBs in wastewater are almost exclusively bound to suspended particles. As a result, the removal of particles in the treated effluent through microfiltration is a best available technology for removal of PCBs. The City's membrane filtration system (0.1 micron pore size) became fully operational in 2022. The membrane filtration system has a standard operating capacity of 50 million gallons per day (MGD) but can be operated at rates as high as 75 MGD for short periods of time. The RPWRF receives an average flow of approximately 30 MGD, thus, under normal operating conditions, the membrane filtration system treats 100% of the RPWRF influent. As discussed in the technical comments, the PCB concentrations in the treated RPWRF effluent are so low that they cannot be accurately measured. However, based on influent and effluent testing conducted since the installation of the membrane filtration system, the best estimate is that the RPWRF is achieving, on average, over 99% removal of PCBs compared to influent concentrations.

Improved Management of Combined Sewer Flows: In addition to upgrading the RPWRF, the City has implemented a number of measures to minimize direct discharge of untreated mixed stormwater and wastewater associated with combined sewer overflow (CSO) events. The City has also been working for many years to reduce or eliminate CSO events. The most recent improvements include construction and maintenance of a storage capacity for up to 13 MG of combined sewer flow within the collection system, and operation and maintenance of the sewer network to maximize flow capacity to the RPWRF including routine maintenance to remove debris, roots, and other blockages. In addition, the City has an on-going program to install cured in-place pipe ("CIPP") liners in sewer lines identified to have excess infiltration of groundwater or storm water. These liners minimize infiltration within the rehabilitated sections reserving flow capacity for other inflow sources. Although the number of CSO events varies from year to year due to variations in total precipitation and storm event magnitude, the City has seen a steady decline in the number and magnitude of CSO events from 2016 to 2023.

Identification and Control of PCB Sources: The City has a comprehensive program to identify and control sources of PCBs. The source identification program includes two key elements:

1) Identification of products and industries that are likely to be significant sources of PCBs. From 2014 to 2016, the City conducted product testing programs to measure the PCB concentrations in specific products used by the City. These data are used to shape source control measures discussed below.

2) Analysis for PCBs on wastewater samples collected from key locations throughout the City's wastewater collection system. These data are used to determine which parts of the system receive the greatest inflows of PCBs. Fingerprinting analyses are used to determine what products and/or industries may be contributing to these inflows.

In order to reduce PCB concentrations in the City's wastewater influent, the City has implemented a broad range of source reduction measures including: removal of PCB containing equipment from City departments; public education concerning PCB sources and control measures; low impact development incentives; procurement practices that support use of "PCB-free" products; green infrastructure projects that, where feasible, eliminate direct discharge of storm water into the Spokane River; and participation in regional initiatives to control migration of PCBs in the environment.

Diverting Direct Stormwater Discharges into Infiltration Basins: The City completed a series of projects in 2015 and 2020, which disconnected the Union Basin stormwater system from discharging directly to the river. This basin was identified in the early 2000s as containing elevated PCB concentrations compared to the rest of the municipal separate storm sewer system (MS4). These projects converted the basin into an infiltration system, utilizing green infrastructure technologies. The City is also in the midst of bringing online infiltration infrastructure for the majority of the Cochran Basin MS4. The basin is the largest in the City and encompasses an area of approximately 5,160 acres. Once online, the new Cochran treatment facility will vastly decrease the amount of stormwater flows (and associated PCBs) going into the Spokane River.

As a result of public education, source control, treatment, and control actions for wastewater and stormwater, the City has significantly reduced the amount of PCBs entering the Spokane River. The technologies and activities described above constitute best available treatment and management practices to remove PCBs and other pollutants from wastewater and stormwater and to minimize CSO discharges. The City has minimized its discharges of PCBs to the Spokane River to the extent practicable.

3) The City supports a comprehensive regional approach to management of PCBs in the Spokane and Little Spokane Rivers

Despite the control measures implemented by the City, the City recognizes that the total PCB loading to the Spokane River from all point sources and non-point sources throughout the watershed continues to result in exceedances of water quality standards (WQS) in the Spokane and Little Spokane Rivers. The City agrees that a comprehensive regional approach is needed to continue reductions on PCB loading and improvement in overall water quality. The City was an active participant in the Spokane River Regional Toxics Taskforce (SRRTTF). The SRRTTF led valuable efforts to identify and understand sources of PCBs to the Rivers and developed recommendations for management and reduction of PCB loadings. The City believes that regional efforts such as the SRRTTF are important for continued progress in reduction of PCB loading to the Spokane and Little Spokane Rivers.

concentration and the associated loads and wasteloads do not provide a useful framework for guiding continued progress in reducing PCB loading to the Spokane and Little Spokane Rivers. More details regarding these concerns are provided in the attached technical comments.

- **City of Spokane Public Works comment letter attachment, Page 5**

As discussed in the cover letter, the City has installed the NLT system at the RPWRF including a state-of-the-art membrane filtration system that provides best-available tertiary treatment for the City's wastewater effluent prior to discharge to the Spokane River with a typical operating capacity of 50 MGD. With operation of this tertiary treatment system, the City is achieving over 99% removal efficiency for Total PCBs. As discussed below, the PCB concentrations in the RPWRF effluent are so low that they cannot be accurately measured.

In addition to installation of microfiltration at the RPWRF, the City has invested over $100 million in recent years to reduce combined sewer overflow (CSO) events. As shown in Figure 2, the number and magnitude of CSO events has declined dramatically as a result of these measures. Considering both the tertiary treatment at the RPWRF and the measures to minimize CSO events, the City has implemented all practicable measures to minimize discharges of wastewater- associated PCBs to the Spokane River.

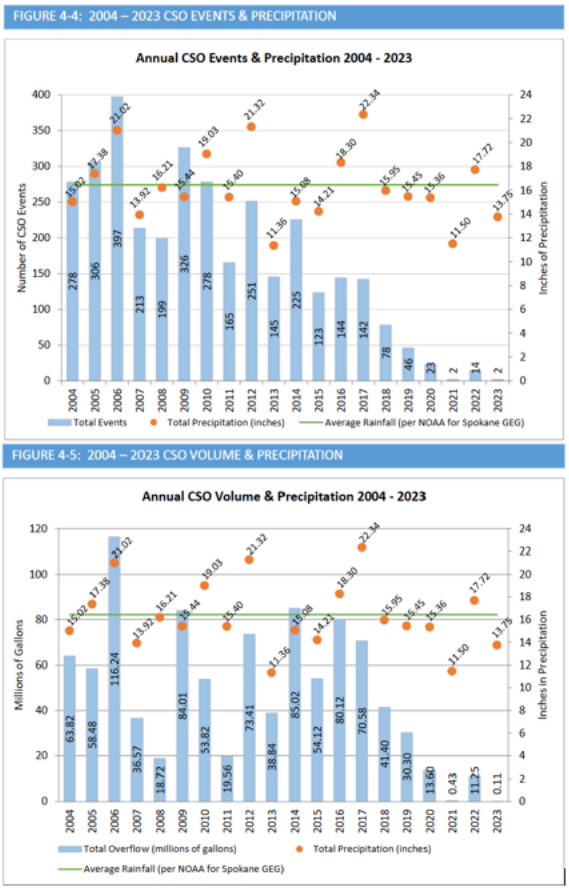

Figure 2. Summary of City of Spokane CSO Events by Year (From City of Spokane, 2024)

- **Washington Department of Ecology comment letter, Page 2**

Ecology currently requires cleanup at the Kaiser Trentwood Site under Washington's Model Toxics Control Act, including operation of a full-scale pump-and-treat system. This system, which is an Interim Action under the Amended Agreed Order between Kaiser and Ecology, is expected to significantly decrease the concentration and mass flux of PCBs in groundwater at the site. Ecology intends to continue implanting a multi-faceted approach at this location, with the goal of eliminating the impacts of PCB to the Spokane River and Spokane Valley/Rathdrum Prairie Aquifer from this location.

- **Hayden Area Regional Sewer Board comment letter, Pages 1-2**

The Hayden Area Regional Sewer Board (sometimes hereafter referred to as "HARSB") is an Idaho Joint Powers Board comprised of three separate public entities: City of Hayden, Hayden Lake Sewer District and the Kootenai County Airport. HARSB owns and operates a publicly owned treatment works (POTW) which provides wastewater treatment services for each of its member entities. The POTW currently discharges to the Spokane River through Outfall 001 pursuant to existing Idaho IPDES Permit *ID0026590*. The existing Permit became effective on June 1, 2024.

The Hayden Area Regional Sewer Board is committed to the fundamental goals of the Clean Water Act and improving water quality as a means of protecting public health and supporting a high quality of life for our communities and our region. The HARSB takes seriously our role as a steward of water quality within the Spokane River watershed as demonstrated by completion of regular compliance sampling and reporting, development of various management plans, infrastructure investments to meet current discharge limits, and voluntary participation with the Spokane River Stewardship Partnership and Spokane River Regional Toxics Task Force (SRRTTF).

The Hayden Area Regional Sewer Board intends to continue this stewardship by operating the Hayden Area Regional Sewer Board Water Reclamation Facility utilizing all necessary staff, equipment, power, best management practices (BMPs) and chemicals to meet applicable water quality discharge limits while employing a sustainable, cost-efficient, and effective treatment methodology.

The EPA actions in pollutant source control, particularly in Pretreatment Programs, have been very successful in reducing pollutants from the wastewater.

- **Inland Empire Paper Company comment letter, Pages 8-9**

IEP has installed the most advanced wastewater treatment system for a pulp and paper mill in North America, including the first state-of-the-art tertiary membrane treatment system that effectively removes more than 99% of the PCBs. Ecology has determined that the IEP advanced wastewater treatment technologies meet the definition of all known, available and reasonable

methods of prevention, control and treatment (AKART) for reduction of PCBs. Additionally, IEP also removes and eliminates these PCBs from reentering the environment through thermal destruction.

The unprecedented level of treatment that IEP has achieved represents the limit of technology. IEP documented this fact in its 2019 application for a water quality variance. The variance application thoroughly documents that the treatment systems installed and maintained result in the “highest attainable conditions” for PCBs in IEP’s effluent.

- **Kaiser Aluminum Washington comment letter, Pages 1-3**

Kaiser has consistently worked toward water quality improvements in the Spokane River by significantly reducing its permitted discharge, actively participating in the Spokane River Regional Toxics Task Force and other stakeholder groups, continuously identifying and addressing legacy sources of PCBs, and proactively piloting and implementing innovative technology to destroy PCBs. Kaiser looks forward to continuing its collaboration with EPA, the Washington Department of Ecology ("Ecology"), and regional stakeholders to continue water quality improvements.

I. Kaiser is committed to taking effective actions to improve Spokane River water quality.

Kaiser's Trentwood Works facility ("Trentwood") was constructed by the U.S. Government Defense Plant Corporation in 1942 to produce aluminum for World War II aircraft. Kaiser has operated the Trentwood facility since the 1940s and produces high-quality aluminum for the aerospace and general engineering markets. Like facilities throughout the Spokane River watershed and throughout the state, the Trentwood facility historically used PCBs for their safety-related properties in electrical and hydraulic systems until PCBs were banned in 1978. Kaiser does not produce or use PCBs in any current manufacturing processes, but low-level residual PCBs remain at the Trentwood facility, in the groundwater underneath the facility, and in groundwater upgradient of the facility from non-Kaiser sources.

Kaiser values being a good steward of the environment and has made-and continues to make-significant efforts to reduce and eliminate sources of legacy PCBs at the Trentwood facility. Trentwood's on-site treatment system treats wastewater, stormwater, cooling water, and sanitary wastewater, discharging the treated water into the Spokane River as authorized by its NPDES Permit. Kaiser operates a walnut shell filtration system to remove approximately 82% of PCBs from its permitted effluent, and Kaiser's permit requires additional monitoring and control activities to address legacy sources of PCBs.

To reduce legacy PCBs in its permitted effluent, Kaiser has cleaned or replaced wastewater pipes impacted by historical contamination and removed contaminated sediment from a wastewater lagoon as part of treatment system maintenance. Kaiser has also reduced its water usage and discharge, even as Trentwood's production has increased, thereby reducing the volume of PCBs in its permitted effluent to the Spokane River. Kaiser discharges approximately

5 million gallons per day to the river, significantly less than its permit allowance of 11 million gallons per day.

Kaiser proactively seeks environmental solutions and, in coordination with Ecology, tested innovative technologies for prevention and control of PCBs in Trentwood's permitted discharge. After Kaiser's application to Ecology for a variance was put on hold, Kaiser nonetheless reached out to negotiate an agreed order to move forward with the actions described in the variance application. Pursuant to the agreed order and overseen by Ecology, Kaiser evaluated all known, available and reasonable methods of prevention, control and treatment of PCBs. Pilot testing demonstrated that an ultraviolet/advanced oxidation process ("UV/AOP") can destroy PCBs and remove them from the environment,[1] and Kaiser has proceeded to build out a UV/AOP system capable of destroying up to 98% of PCBs in contaminated groundwater and is evaluating the technology's application to Trentwood's permitted discharge. Kaiser's UV/AOP system is the only known effort in the Spokane River watershed to destroy PCBs, including PCBs from upgradient of the Trentwood facility.

Finally, Kaiser implements and continuously updates a PCB pollutant minimization plan ("PMP") to identify and complete legacy PCB reduction activities. First required under the agreed order Kaiser proactively sought with Ecology and now an enforceable NPDES permit requirement, the PMP is a clear and measurable roadmap for water quality improvements that Kaiser updates regularly and submits to Ecology. Pursuant to the PMP, Kaiser has completed treatment system performance improvements, operational modifications, and material substitutions. These actions have reduced PCB inputs to the walnut shell filtration system that treats the facility's permitted effluent.

As demonstrated by reductions to its permitted discharge, pilot testing and evaluation of the UV/AOP system, PMP activities, and active participation in regional water quality collaborations such as the Spokane River Regional Toxics Task Force and the Spokane River Toxics Advisory Committee, Kaiser is committed to improving water quality in the region and to addressing legacy PCB contamination.

- **Kaiser Aluminum Washington comment letter, Page 3**

Kaiser pursued, in coordination with Ecology, pilot tests of innovative technologies to remove PCBs from groundwater, including PCBs from upgradient of Kaiser's property. These tests demonstrated that the UV/AOP system can destroy up to 98% of PCBs in groundwater, and Kaiser moved forward to construct and operate a full-scale system, overseen by Ecology.

As explained above, Kaiser has significantly reduced its permitted discharge volume and will achieve further volume reductions as Kaiser implements actions described in the PMP and overseen by Ecology.

- **Kaiser Aluminum Washington comment letter, Page 7**

Although the draft TMDL paints an incomplete picture of the inputs of PCBs to the Spokane River and leaves many gaps regarding the actions necessary to achieve water quality improvements, Kaiser welcomes the opportunity to work with EPA, Ecology, IDEQ, the Spokane Tribe, and other stakeholders to continue to gather data, address legacy PCB sources, and reduce PCBs inputs from throughout the watershed.

- **Kaiser Aluminum Washington attachment, Page 18-19**

In accordance with Agreed Order No. 02WQER-3487, dated January 30, 2002, Kaiser prepared an Engineering Report with analysis of all known, available, and reasonable methods of prevention, control, and treatment (AKART) for PCBs at an industrial facility. Based on this analysis, the facility installed a Walnut Shell Filtration System (WSFS) upstream of the discharge location to remove PCBs. The process blends water with a low dose of castor oil (<10ppm), which absorbs PCBs. The solution is then passed through a walnut shell media, which adsorbs the oil. Filter vessels are backwashed to remove the PCB-rich oil, which is treated and disposed offsite. The process reliably removes greater than 80% of PCBs from waters with high PCB concentrations (>5,000 pg/L) but is unable to remove greater than 99% of PCBs as would be required to meet the 1.3 pg/L limit.

The performance of the WSFS has improved with reductions in process water flow over twenty years of operation. An optimization study is underway as of May 2024 to further improve WSFS performance, but the technology is not capable of reducing process water PCB concentrations to 1.3 pg/L. An updated AKART analysis was performed in 2022 and determined that an advanced oxidation process can achieve higher PCB removal rates than WSFS (CDM 2021).

Kaiser is currently starting up a groundwater pump-and-treat system to degrade PCBs by UV-AOP. The process combines ultraviolet (UV) irradiation with an oxidizer, typically hydrogen peroxide, to generate hydroxyl radicals. These radicals indiscriminately break down organic molecules, eventually yielding carbon dioxide and water. The technology is primarily useful for clean waters with low organic and solids content; organics will increase oxidant demand, UV attenuation, and result in fouling of the UV bulbs. The technology is likely incapable of achieving 1.3 pg/L concentrations in point source discharge water, given the high concentration of PCBs and competing oxidant demand in the process water.

- **Liberty Lake Sewer and Water District emailed comment, Page 1**

The District has spent $25 million on upgrading its water reclamation facility which has resulted in a 110% increase to its annual debt service obligations through 2038. These upgrades included its ultrafiltration membrane system that removes over 97% of influent PCBs before discharging to the Spokane River.

- **Spokane County Public Works comment letter, Pages 1-2**

Spokane County Public Works is committed to protecting and enhancing the water resources in our region. Our membrane ultrafiltration water reclamation facility removes contaminants to very low levels. Even with this level of advanced wastewater treatment, the TMDL recognizes the WLA based on the Water Quality Standard (WQS) of 1.3 pg/L cannot be met.

In the Spokane region, expansion and improvements to sanitary sewer collection and treatment led to dramatic increases in water quality in the Spokane River and the Spokane Valley-Rathdrum Prairie Aquifer.

Spokane County currently uses ultrafiltration membranes and removes 99% of influent PCBs before discharging to the Spokane River, but still cannot meet the WLA concentration of 1.3 pg/L.