



Response to Comments

Second Periodic Review for the Spokane River Upriver Dam and Donkey Island PCB Sediment Site

**Public comment period held
September 27 – October 26, 2021
Facility Site ID 65178472, Cleanup Site ID 4213**

Toxics Cleanup Program

Washington State Department of Ecology
Spokane, Washington

September 2022

Document Information

This document is available on the Department of Ecology's [Spokane River Upriver Dam and Donkey Island cleanup site page](#)¹.

Related Information

- Facility site ID: 65178472
- Cleanup site ID: 4213

Contact Information

Toxics Cleanup Program

Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205

Brendan Dowling, Site Manager
509-724-3119, brendan.dowling@ecy.wa.gov

Erika Beresovoy, Public Involvement Coordinator
509-385-2290, erika.beresovoy@ecy.wa.gov

Website²: [Washington State Department of Ecology](#)

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¹ <https://apps.ecology.wa.gov/cleanupsearch/site/4213>

² <https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-sites>

³ <https://ecology.wa.gov/About-us/Accountability-transparency/Our-website/Accessibility>

Toxics Cleanup in Washington State

Accidental spills of dangerous materials and past business practices have contaminated land and water throughout the state. The Washington State Department of Ecology (Ecology) Toxics Cleanup Program (TCP) works to remedy these situations through cleanup actions. TCP cleanup actions range from simple projects requiring removal of a few cubic yards of contaminated soil to large, complex projects requiring engineered solutions.

Contaminated sites in Washington are cleaned up under the [Model Toxics Control Act](#)⁴ (MTCA, Chapter 173-340 Washington Administrative Code), a citizen-mandated law passed in 1989. This law sets standards to ensure toxics cleanup protects human health and the environment and includes opportunities for public input.

Public Comment Period Summary

Ecology held a comment period September 27 through October 26, 2021, for the draft [Second Periodic Review](#)⁵ for the Spokane River Upriver Dam and Donkey Island cleanup site. We conduct a periodic review at least every five years after beginning cleanup at a site, as required by MTCA. The purposes of the review are to evaluate site conditions and to ensure continued protection of human health and the environment when institutional controls are used as part of a cleanup.

Ecology appreciates the comments we received from four organizations. We address them in the Response to Comments section that begins on page 4. After considering the comments, we have finalized the draft document without further changes.

Site Background

The Spokane River drains more than 4,900 square miles in Washington and Idaho. Industries and municipal wastewater treatment plants within the watershed upstream of the site have discharged PCBs (polychlorinated biphenyls), creating contaminated deposits above Upriver Dam and in a channel on the northern side of Donkey Island. The two deposits were investigated and cleaned up from 2006 to 2007. The Upriver Dam deposit was covered with a protective cap, and the Donkey Island deposit was excavated, backfilled with clean sediment, and replanted.

Ecology visited the site August 13, 2021, and used data from sediment samples taken in 2008, 2010, and 2020 to determine the remedies are still effective. We are recommending further sampling and monitoring of the Upriver Dam cap because 2020 sampling results indicated PCBs are beginning to move upwards through the cap, but have not broken through. In addition, surficial sediments deposited on the cap contained elevated PCBs and heavy metals, meaning

⁴ <https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Rules-directing-our-cleanup-work/Model-Toxics-Control-Act>

⁵ <https://apps.ecology.wa.gov/gsp/DocViewer.aspx?did=105245>

upstream contaminants are continuing to deposit at the site. The additional samples would show how much has resurfaced. Monitoring is planned in 2025 to inform the next periodic review.

Response to Comments

Comments have been copied verbatim from the letters and organized in alphabetic order based on the organization’s name. Each comment is followed by Ecology’s response. Full versions of the letters are in Appendix A.

Index of comments received

The organizations that submitted comments are listed below in alphabetical order, followed by the date we received the comments and the page on which the comments begin.

Table 1. Index of comments received

Organization	Submitter’s Name(s)	Date received	Page
Avista Corporation	Bryce Robbert	October 2	4
Inland Empire Paper (IEP) Company	Douglas Krapas	October 26	7
LimnoTech	David Dilks	October 26	13
National Council for Air and Stream Improvement (NCASI), on IEP’s behalf	Paul Wiegand Brad Barnhart	October 26	14

Avista Corporation, received via email October 2

Comment 1

Page 17, 4th paragraph. Ecology should add text summarizing that all 10 surface sediment and cap sand layer samples collected in 2020 from Deposit 1 had total PCB Aroclor concentrations at least 8 times below the cleanup level of 62 µg/kg. While total PCB concentrations were generally comparable between Aroclor and congener analyses, total PCB congener concentrations measured in surface sediments collected at station ST-10 (**NOT** ST-06 as stated in the draft Ecology report) were more than 36 times higher than the corresponding total PCB Aroclor concentration (248.9 µg/kg vs. not detected at 7.0 µg/kg). The wide range in ST-10 surface sediment total PCB results suggests a high degree of small-scale sample variability and limits any conclusions that can be drawn from these data.

Ecology should also add text clarifying that station ST-10 is located at the far upstream end of Deposit 1. Text from the DH Environmental (2020) sampling report revealing that accumulated sediments at this location are indicative of upstream organic inputs unrelated to Deposit 1 should also be added: *“The accumulated surface sediment at ST-10 consisted almost entirely of organic matter, primarily pine needles, small twigs, and similar material, mixed with fine sand*

and silt. It is possible this sample may have been affected by the relatively high percentage of organic matter in the sample relative to the other surface grab samples.”

However, because total organic carbon (TOC) was not analyzed in the 2020 samples collected by Ecology, only in 2008 and 2010 samples collected by Avista, the hypothesized relationship between PCBs and TOC cannot be evaluated, further limiting any conclusions that can be drawn from these data.

Ecology’s response

The text has been changed to correct ST-06 to ST-10 and to note that ST-10 is the sample furthest upstream on the cap. While the ST-10 total Aroclors reported back as below the reporting limit, the total congener data is useful information as it does indicate the presence of PCBs above the cleanup level. In addition, Avista’s analysis of the ST-10 data substantiates that PCBs as total Aroclors and congeners are present in the deposited surface sediments above the cleanup level.

While the woody debris noted in the ST-10 sample may contribute to an increase in TOC and thus the higher concentrations of PCBs, Ecology uses a dry-weight basis for sediment management comparisons to sediment quality standards and cleanup levels.

Comment 2

Page 18, 1st paragraph. Ecology should add text clarifying that total PCB congener concentrations in the sand layer (ST-11 and ST-13) were less than 0.1 µg/kg, more than 100 times lower than the 62 µg/kg cleanup level. Based on the analytical results from the 2008, 2015 and 2020 sampling events, no measureable amounts of PCBs were detected in the sand isolation layer. Removing the sentence beginning “Detecting PCBs in the sand isolation layer” would help clarify for the reader that no evidence was present regarding increasing PCB concentration within the sand isolation layer.

Ecology’s response

The revised sentences now read: “Detecting PCBs in the coal layer indicates the upward movement of PCBs from the native sediment to the coal absorption layer. At present, the concentrations of PCBs in the coal and sand isolation layer are not posing a threat to human health and the environment; however, continued monitoring will be needed to observe whether PCB concentrations continue to increase in in each of the cap layers.”

Comment 3

Page 18, Institutional Controls. Remove the sentence “Ecology encourages Avista to enter into an easement or lease agreement with the landowner, DNR”, as Avista has complied with all institutional controls required by the 2005 CD.

Ecology’s response

Ecology recognizes Avista’s compliance with the 2005 Consent Decree; however, the Washington Department of Natural Resources (DNR) mandates that any structure placed on the

beds and banks of state-owned land, including the bed of the Spokane River, require and easement or lease agreement. Ecology continues to encourage Avista to work with DNR to enter such an agreement.

Comment 4

Page 19, Cleanup Level Evaluation. Avista agrees it is appropriate to continue to use the 62 µg/kg cleanup level Ecology selected in the CAP. The 62 µg/kg cleanup level was protective when the CAP was issued, and it is protective now. It is also the cleanup level Avista agreed to implement as detailed in the Consent Decree.

Ecology's response

Noted.

Comment 5

Page 20, Conclusions. Avista will be analyzing our archived split sample collected from station ST-10 to better characterize surface sediment PCB (Aroclor and congener) and TOC concentrations at this location to help resolve the high degree of small-scale sample variability in PCB concentrations observed in Ecology's samples. Ecology should incorporate these split sample data into the final report when they are available (likely by the end of 2021), as they will better inform the need for any follow-on sampling.

Also, removing the bullet that "further sampling is recommended" to determine if there is a wide-spread area of heavy-metal impacts in Upriver Dam – that is already well known by the U.S. Environmental Protection Agency (Interim Record of Decision Amendment, Upper Basin of the Coeur d'Alene River, Bunker Hill Mining and Metallurgical Complex Superfund Site, August 2012 edition) through their investigations to date.

Ecology's response

Ecology has received Avista's data report dated November 23, 2021. Ecology appreciates Avista running the additional analyses on the ST-10 split sample given to Avista during the 2020 monitoring event. While the analysis was done more than a year after the monitoring event and past required holding times, it nonetheless confirms the results reported in the Periodic Review with the addition of PCB Aroclors also being detected above the 62 microgram per kilogram (µg/kg) cleanup level. The split sample's results reinforce Ecology's determination that further sampling around ST-10 is recommended to determine if there is a widespread area of potential PCB and heavy-metal impacts around ST-10.

Ecology is also aware of the widespread impacts of heavy metals in the Spokane River. While Ecology has conducted several shoreline sediment beach cleanups to address these heavy metal impacts, we have observed that the Spokane River is a dynamic system with movement of sediments contaminated with heavy metals and PCBs continuing to this day. As a result of this continuous movement of contaminated sediments within the system, frequent monitoring is required to understand where and to what extent contaminated sediments are accumulating to ensure the health of humans and the environment.

IEP, received via email October 26

Comment 1, General

The Spokane River Regional Toxics Task Force (Task Force) has committed significant time and resources studying PCB sources and pathways to the Spokane River over the past ten years, including the focus area of this Second Periodic Review. IEP suggests using the comprehensive data and findings generated by the Task Force to support the second and subsequent periodic reviews. The current information developed by the Task Force is more representative of actual conditions that will affect the study areas, in lieu of the historical conditions reported under the Remedial investigation and feasibility study (RI/FS) section, especially for surface water and groundwater. If Ecology is determined to maintain the historical context of the RI/FS then IEP suggests including a new section that accurately reports current conditions.

In addition to the work of the Task Force, there have been other significant efforts that resulted in reductions of PCBs to municipal and industrial discharges, storm water and groundwater. These improvements will ultimately benefit the study areas covered by current and subsequent periodic reviews. IEP has attempted to point out some of these improvements in the following comments, but suggests reviewing the body of work by the Task Force for a more complete compilation of efforts to identify and reduce sources of PCBs to the Spokane River watershed.

Ecology's response

Ecology appreciates IEP and the Taskforce's efforts to identify and reduce PCB discharges into the Spokane River; however, the Upriver Dam Site and the success of the cleanup remedy is the focus of this Periodic Review. As such, important historical context is required to understand the known sources of PCBs into the Spokane River at that time, the nature and extent of PCB accumulation of sediments in the river, and the decision points to address the two known areas of PCB accumulation when the Cleanup Action Plan (CAP, Ecology 2005) was implemented.

Comment 2, Page 7 – Known PCB sources to the dam area of the river include:

Much of the investigative work of the Task Force was memorialized in the Comprehensive Plan approved in 2016. Section 3.2, Delivery Mechanisms of PCBs to the Spokane River in the Comprehensive Plan identified the following potential sources to the Spokane River: PCBs were determined by LimnoTech (2016a) to be delivered to the Spokane River study area via a number of mechanisms, as depicted in Figure 7. Categories of delivery consist of:

- Transport of PCBs from upstream sources through Lake Coeur d'Alene
- Atmospheric deposition
- Groundwater loading
- Stormwater runoff, either as part of an MS4 stormwater system or via direct drainage
- Combined sewer overflows (CSOs)
- Tributaries
- Discharge from municipal and industrial wastewater treatment plants
- Discharge of wastewater and stocking of fish from fish hatcheries

- Diffusion or resuspension of PCBs from bedded sediments in the Spokane River and Lake Spokane

Most of the above sources are applicable to the focus area of the Second Periodic Review. Of particular significance to the focus area is a groundwater source upstream of IEP, as summarized in Section 3.2.3 of the Comprehensive Plan:

3.2.3 Groundwater Loading

The synoptic water quality survey conducted by the SRRTTF in August 2014 identified a significant groundwater loading source entering the river between Greenacres (Barker Rd.) and the Trent Avenue Bridge, with an estimated loading rate of 170 mg/day. A second synoptic survey conducted in August 2015 confirmed the presence of this load, and estimated its magnitude at 130 mg/day. Uncertainty analyses conducted in conjunction with the loading assessment (LimnoTech, 2015) indicate that this loading estimate can range between 60 and 300 mg/day.

For comparison, the PCB load from this groundwater source is significantly greater than the discharge from IEP, especially since the installation and operation of advanced ultrafiltration membrane treatment technology in 2020. IEP requests that Ecology include other relevant sources, with emphasis provided to the significant groundwater source identified above.

Ecology's response

The focus of this Periodic Review is evaluating the remedy at the Upriver Dam PCB Sediment Site. While upstream sources of PCBs are of importance to reduce recontamination at the site, it is outside the scope of this Periodic Review to evaluate them.

Comment 3, Page 10 – Surface Water, Water chemistry results

IEP requests that Ecology use updated data collected by the Task Force over the past 10 years, in lieu of referencing information that is nearly 20 years old. The Task Force has expended significant resources to comprehensively characterize PCBs throughout the upper reaches of the Spokane River, including the focus area of the Second Periodic Review. The more recent data collected by the Task Force takes into consideration significant implementation actions to reduce PCBs to the Spokane River watershed, including the installation of advanced wastewater treatment technologies by municipal and industrial dischargers to comply with the Dissolved Oxygen TMDL. In addition to reducing nutrients, these treatment technologies are removing in excess of 99% of PCB discharges to the river which is relevant to this and future periodic reviews.

Ecology's response

Please see Ecology's response IEP General Comment 1.

Comment 4, Page 10 – Surface Water, Water chemistry results

Under MTCA, the National Recommended Water Quality Criterion for PCBs of 64 pg/L must be considered since it is recognized as an applicable, relevant, and appropriate requirement (ARAR).

Ecology should acknowledge that the department has promulgated its own human health water quality criterion for PCBs at 170 pg/L. WAC 173-201A-240. The state PCB criterion was submitted to EPA in 2016 and ultimately approved by EPA in 2019. The EPA national water quality criteria are guidance only and have no regulatory basis other than to inform Ecology or EPA when either agency is developing new water quality standards. Ecology should rely on the state water quality criterion for PCBs to set the cleanup objectives for this site.

Ecology's response

Ecology develops cleanup standards that are protective of all media pathways and receptors. This also includes developing cleanup standards that take into account contaminant interactions between different media types. In the case of this site, the selected cleanup level had to be at least as stringent to meet both the sediment and surface water cleanup values and account for any PCB movement between those two media. As described in further detail in the CAP, the 62 µg/kg sediment cleanup value is also protective of the surface water cleanup value. The 62 µg/kg sediment cleanup value was selected to be protective of benthic macroinvertebrates interacting and residing within the sediment.

Comment 5, Page 11 – Surface water, water chemistry results

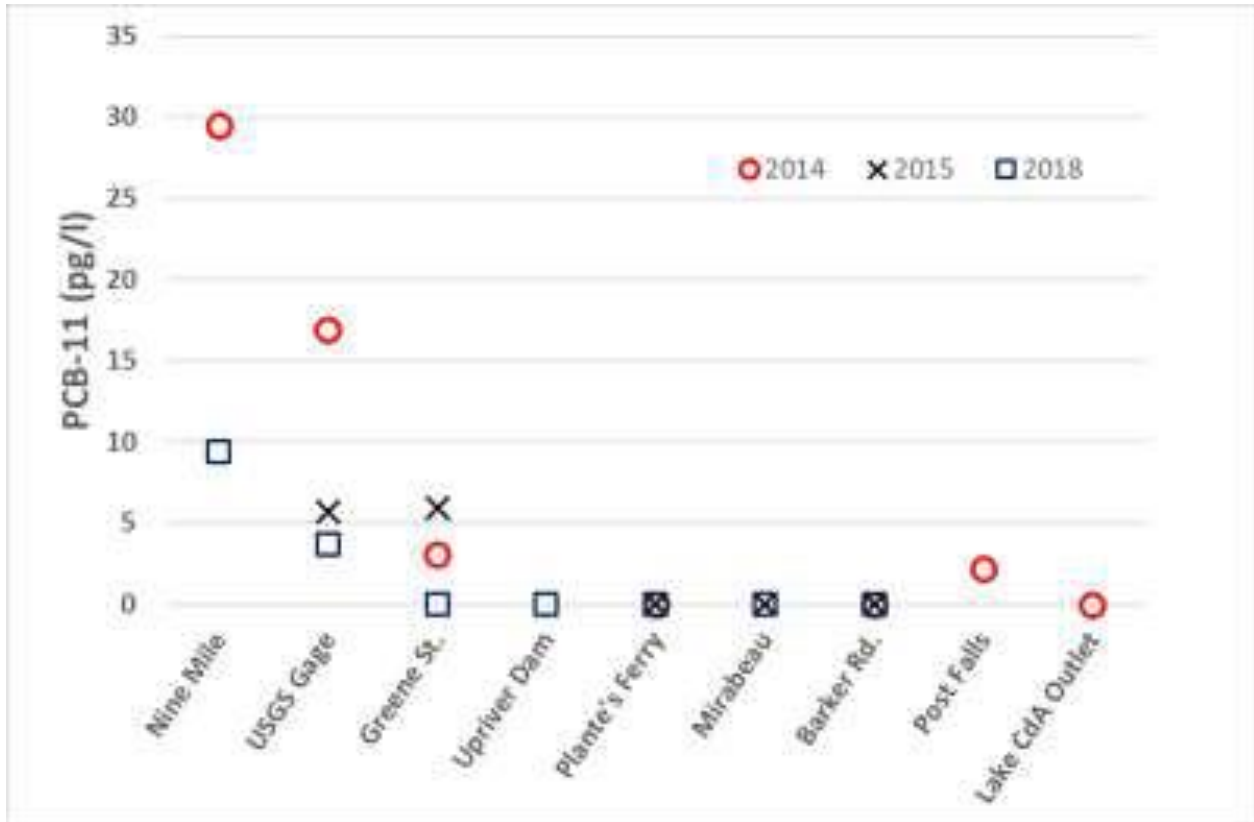
Based on the available data, the apparent seasonal increase in total PCB concentrations observed during September 2003 is indicative of surface water releases of predominantly PCB-11 to the river system between Plante's Ferry Park and Boulder Beach. This increase appears to be from treated wastewater discharged from the IEP outfall (Ecology 2002) located in this stretch of the river.

IEP requests that these statements be removed in their entirety since they are outdated and based on conjecture. There is no support for this conclusion contained in the report and the reference, Ecology 2002, is not included in the reference list, so it is unclear how Ecology determined the basis for this supposition. Additionally, as stated in Comments #2 and #3 above, industrial and municipal facilities upstream of this location have installed advanced wastewater treatment technologies capable of removing PCBs in excess of 99%. A recent internal study demonstrates that IEP is removing in excess of 99.99% of the total PCBs entering its facility using the most advanced wastewater treatment system in the pulp and paper industry. In lieu of referencing information that is no longer pertinent, IEP requests that Ecology recognize these efforts due to the relevance of these remedial actions for current and future improvements to this study area.

To further illustrate the disparity between current and past conditions, data collected by DH Environmental, Inc. in 2020 to support Ecology's Second Periodic Review did not detect any

concentrations of PCB-11 in the surface, sand or coal layers at the location of the Upriver Dam cap.

Furthermore, a recent study by LimnoTech (Technical Advisor to the Task Force), Sources and Pathways of PCB-11: Initial Investigations concluded the following regarding PCB-11: “Concentrations [of PCB-11 are] essentially indistinguishable from blanks at Upriver Dam and upstream.” The following graph resulting from this study illustrates the level of PCB-11 found throughout the study area over multiple years with essentially non-detectable levels of PCB-11 upstream of Upriver Dam:



Based on the overwhelming evidence provided above, it should be apparent that Ecology must present a periodic review that accurately represents current conditions and delete the requested paragraph that is erroneous and misleading.

Ecology's response

The identified reference has been updated in the Periodic Review. The statement in question is a part of the RI/FS discussion in the Periodic Review. The brief overview of the RI/FS provides historical context about the nature and extent of contamination at the site and the reasons a cleanup action occurred. The focus of the Periodic Review is to evaluate whether the cleanup remedy at the site continues to protect human health and the environment. Evaluation of PCB concentrations and source control upstream of the site is outside the focus of the Periodic Review.

Comment 6, Page 11 – Semi-permeable membrane device (SPMD) results

IEP has numerous concerns with the use and discussion of SPMD results. The referenced NCASI comment letter describes the technical concerns with the use of SPMD's to reliably estimate water column concentrations. Furthermore, the discussion on SPMD's in the Second Periodic Review is misleading as there are no dates as to when this study was conducted or data to support any of the conclusions. As written, this section gives the appearance that these results are relevant to the Second Periodic Review, whereas the study using SPMDs was actually performed during the remedial investigation (RI) between 2003 and 2004. Besides the technical concerns with deriving any conclusions from the use of SPMD's, the results from this study are no longer relevant to current conditions affecting the focus areas and should not be used in any manner to support the findings of the Second Periodic Review. As stated in the comments above, there has been significant progress in the identification and reduction of PCBs since the RI in 2003, so Ecology should be using current information to support its conclusions in the Second Periodic Review. IEP requests that the discussion on SPMDs be deleted in its entirety since it has no relevance to the Second Periodic Review, and that Ecology use currently available data that is more representative of conditions affecting the focus areas.

Ecology's response

As noted by IEP, the SPMD discussion is a part of the RI/FS discussion within the Periodic Review. The brief overview of the RI/FS provides historical context about the nature and extent of contamination at the site and the reasons a cleanup action occurred. The focus of the Periodic Review is to evaluate whether the cleanup remedy at the site continues to protect human health and the environment. Evaluation of PCB concentrations and source control upstream of the Site is outside the focus of the Periodic Review.

Comment 7, Page 11 – Groundwater

Once again, Ecology is relying solely upon information developed under the RI nearly 20 years ago. As referenced in Comment #2 above, there is more recent data developed by the Task Force that characterizes groundwater PCB loadings to the focus area that can be used to supplement the Second Periodic Review.

Ecology's response

See Ecology's response to IEP's comments 5 and 6.

Comment 8, Page 17 – Effectiveness of completed cleanup actions, Sediment 2020

The deposited sand material on top of the cap was collected and analyzed for PCBs and metals as a part of the surface grab samples (Tables 3 and 4, Appendix A). The analysis found that one surface grab sample, ST-06-Surface Grab, had total PCB congener concentrations of 248.9 µg/kg, which is above the cleanup level of 62 µg/kg.

According to Table 3, it is sample location ST-10 that showed total PCB congener concentrations of 248.9 µg/kg, and not location ST-06.

Ecology should explain what analytical methods are being applied to produce the reported results, such as: how qualifiers are treated (i.e.: J, U, B, and q flags), blank correction and censoring methods, blank correction and censoring multipliers, and the reasoning for the selected multipliers. The resulting analysis of any applied analytical methods should be included in the report for clarity.

The elevated metal concentrations and the PCB exceedance observed in the deposited sand on top of the cap are most likely associated with upstream sources.

This statement is conjecture with no basis or supporting evidence and should be removed. Having only one surface sample out of eight with an elevated level of PCBs (248.9 µg/kg) is highly suspicious, especially considering that all other seven surface samples were less than 8.4 µg/kg. EPA Method 1668 is a non-promulgated test method that is highly susceptible to contamination and interferences, so a more likely explanation is that this is simply an outlier that is suspect due to the sampling and analytical method being used.

Ecology's response

The text has been changed to identify ST-10 as the correct sample. As for qualifiers applied to any result, please refer to the referenced DH Environmental report. The report is available on Ecology's [document repository for this site](#).⁶

Regarding the use of Method 1668, Ecology approved it for regulatory use to analyze PCB mixtures in soil, sediment, tissue, and water matrices. Please see Ecology's Implementation Memorandum #12 ([Publication 15-09-052](#)⁷) regarding this. In addition, Avista's analytical results of split samples taken during the monitoring event, and provided to Ecology after the comment period closed, substantiate the results found in ST-10.

Comment 9, Page 18 – New scientific information for individual hazardous substances or mixtures present at the Site

As stated throughout this comment letter, there is new and significant scientific information that has been produced by the Task Force relevant to the focus areas that should be a consideration for this and subsequent periodic reviews. Additionally, municipal and industrial dischargers have installed advanced treatment systems over the past 5 years. The combined efforts by the Task Force and Dischargers to reduce levels of PCBs to the Spokane River watershed will ultimately have a positive impact on the focus areas of the periodic reviews and should be an integral element of the reports.

⁶ <https://apps.ecology.wa.gov/gsp/CleanupSiteDocuments.aspx?csid=4213>

⁷ <https://apps.ecology.wa.gov/publications/SummaryPages/1509052.html>

Ecology's response

Please see Ecology's response to IEP's Comment 1.

LimnoTech, received via email October 26

Comment 1, There is an inconsistency in reported sediment PCB concentration between the body text and Table 3

The text on page 17 states:

The deposited sand material on top of the cap was collected and analyzed for PCBs and metals as a part of the surface grab samples (Tables 3 and 4, Appendix A). The analysis found that one surface grab sample, ST-06-Surface Grab, had total PCB congener concentrations of 248.9 µg/kg, which is above the cleanup level of 62 µg/kg.

Table 3 shows that the total PCB congener concentration of 248.9 µg/kg occurs at station ST-10, not Station ST-06. This discrepancy needs to be corrected.

Table 3. Year Ten (2020) sediment PCB results (µg/Kg)

	ST-11	ST-12	ST-13	ST-13	ST-14	ST-15	ST-01	ST-02	ST-03	ST-04	ST-05	ST-06	ST-06 Dup	ST-08	ST-10
Layer Type	Sand	Coal	Sand	Coal	Coal	Coal	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Aroclor 1016	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1221	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1232	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1242	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1248	2.5 U	3.2 U	2.6 U	2.8 U	69	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	8.6 J	2.8 UJ	2.5 U	7.0 U
Aroclor 1254	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1260	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Total PCB Aroclors	2.5 U	3.2 U	2.6 U	2.8 U	69	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	8.6 J	2.8 UJ	2.5 U	7 U
Total PCB Congeners	0.0	16.4	0.1	1.6	97.3	2.8	6.2	4.1	7.0	2.5	3.7	5.9	8.4	5.7	248.9

Notes:

1. Total PCB concentrations greater than the Site cleanup level of 62 µg/kg are shaded and **bolded**.

Ecology's response

Noted, and the table has been corrected.

Comment 2, Elevated PCB concentration is not highlighted in Table 3

The note to Table 3 (shown above) states "Total PCB concentrations greater than the Site cleanup level of 62 µg/kg are shaded and bolded." The total PCB congener concentrations of 248.9 µg/kg needs to be shown in bold in Table 3.

Ecology's response

Noted, and the table has been corrected.

Comment 3, Discrepancy between Total PCB Aroclors and Total PCB Congeners for elevated sample

There is greater than a 30-fold difference in reported total PCB concentration in Table 3 for station ST-10 between the Aroclor and Congener methods (248.9 µg/kg vs. not detected at 7 µg/kg). It may be worthwhile to note this discrepancy in the body of the report, as it could serve as an indication that one of the two reported results is anomalous.

Ecology's response

We added the following language to the Periodic Review:

While the total PCB concentrations varied within this sample, the total PCB congener concentrations were supported by the Avista analysis of the ST-10 split sample. The results of the split sample analysis found total PCB congener and Aroclor concentrations of 144 and 236 µg/kg, respectively. The reported Aroclor concentrations from Ecology's analysis of ST-10 appears to be an anomaly.

NCASI, received via email October 26

Comment 1, Development/adjustment of clean-up levels using equilibrium partitioning theory

The document (Ecology 2021) introduces the prospect of establishing a more stringent sediment cleanup level (48 µg/kg) than the currently used cleanup level described as being consistent with the Consent Decree (62 µg/kg). While the current sediment cleanup level was stated as being based on the "lowest apparent effects threshold (AET) for use in freshwater sediments, as recommended by Michelson (2003)" (Ecology 2021, p. 12), the newly introduced cleanup level value was stated as being derived using an equilibrium partitioning model that depends upon a site-specific organic carbon partitioning value of 457,088 L/kg as well as EPA's 2002 recommended water quality criterion for total PCBs (64 pg/L) for the protection of human health. The report does not contain data describing the fraction of organic carbon used in the calculation, and therefore the calculation could not be replicated.

The report did not contain references or supporting data that would have allowed the reader to evaluate the specific applicability of the equilibrium partitioning model in this context. Caution should be taken when implementing equilibrium partitioning theoretical models, particularly in lotic ecosystems. Water temperature, flow, and depth, among other site-specific parameters, can influence the leaching of PCBs from soil into the water column and these should be carefully accounted for when using these types of models. Furthermore, Ecology should assess whether an equilibrium partitioning model would accurately produce water column concentrations of PCBs at this site over spatial and temporal scales that are relevant for the exposure pathways associated with human health-based water quality criteria. As noted above, the report provides no detail that would allow the reader to know if, or to what spatial and temporal extent, water column concentrations would be expected to approach criteria levels as a result of various clean-up thresholds.

Ecology's response

The Periodic Review has been updated with additional language identifying the source of data that arrived at a 48 µg/kg cleanup level. For clarity, the cleanup level evaluation was outlined in the CAP, which referred to both the 48 and the 62 µg/kg values as potential cleanup values. When the CAP was implemented and signed with a Consent Decree between Ecology and Avista, the 62 µg/kg cleanup level was used. When Ecology reviewed the cleanup level during the 2012 Periodic Review, we found that selecting 62 µg/kg was incorrect, and 48 µg/kg should have been selected since it is the most stringent value. To be transparent, Ecology included both cleanup levels in our Periodic Reviews and will continue to do so; however, only the 62 µg/kg level is actionable at this time.

Comment 2, Semi-permeable membrane device (SPMD) results

SPMD deployments were referred to in several portions of the document as supporting existing data collection methodologies and findings. In particular, Ecology states that "SPMD data further corroborate that, on a river reach scale, concentrations of both dissolved and total PCBs were below the 170 pg/L water quality standard but above the National Recommended Criterion of 64 pg/L under the seasonal low-flow conditions sampled" (Ecology 2021, p. 11). No data are included to support this statement. Firstly, it is unclear how SPMD data (which measure primarily dissolved substances that can migrate through the bag membranes) are useful in supporting estimates of total PCBs. Secondly, reliable estimates of water column concentrations are very difficult to predict using SPMDs. The report contained no details regarding the deployment approach and data analysis techniques used in the SPMD study and thus it is not possible for the reader to assess whether the SPMD data is indeed supportive of the statement above. NCASI has conducted analyses using SPMD technology (NCASI 2002) and found location-specific environmental variables (e.g., flow velocity, degree of biofouling) to negatively influence the ability to resolve true differences in concentrations among replicated samples and, therefore, to yield any reliable estimate of water column concentration.

Ecology's response

The referenced SPMD data discussion is part of Section 2.3 of the Periodic Review, which summarizes data collected and evaluated during the RI/FS. The RI/FS data discussion was included to provide historical context for the site. To review the data contained within the RI/FS, please see Ecology's [document repository for this site](#).⁸

Comment 3, Blank correction methods

The water chemistry results were reported as "USEPA-method blank-qualified and blank-corrected values" (Ecology 2021, p. 10) as well as using an "alternative blank-corrected method" (Ecology 2021, p.10). We could not find citations or references that specified the particular correction methods used. As you know, the choice of blank correction methods can

⁸ <https://apps.ecology.wa.gov/gsp/CleanupSiteDocuments.aspx?csid=4213>

have a large impact on the resulting concentration values and therefore details describing the methods are essential when interpreting conclusions based on the data.

Ecology's response

Please see the RI report linked in response to NCASI Comment 2 for additional details.

Comment 4, Comparing Aroclor and congener concentrations

Several passages in the report as well as Table 3 in Appendix A compare analytical results for Aroclors and analytical results for congeners to PCB cleanup targets and water quality standards. This is problematic in that the analytical procedures used to measure Aroclors and those used to measure congeners (and homologs) yield results that are not directly comparable and would not be expected to be identical (or even similar) when applied to most environmental samples. One of many examples available in the PCB literature is discussed in an EPA Region 4 Technical Services Section Issue wherein it was found that "The total PCB homolog soil concentrations vary in that for some samples the total homolog concentration data is 2+ orders of magnitude higher than the total Aroclor concentrations. In other instances the total Aroclor data is up to an order of magnitude higher in concentrations than the total homolog concentration data" (EPA 2013, p. 19). Ecology should recognize and address this issue when making comparisons between measured data, cleanup criteria, and water quality criteria.

Ecology's response

Noted.

Comment 5, Reference omission

The reference "Ecology (2002)" mentioned in the document (Ecology 2021, p. 11) was not included in the References section.

Ecology's response

Noted and corrected.

Appendix A: Comment Letters

Organization	Submitter's Name(s)	Date received
Avista Corporation	Bryce Robbert	October 2
Inland Empire Paper (IEP) Company	Douglas Krapas	October 26
LimnoTech	David Dilks	October 26
National Council for Air and Stream Improvement (NCASI), on IEP's behalf	Paul Wiegand Brad Barnhart	October 26

Avista Corporation, received via email October 2



Date: 10/2/2021

To: Washington State Department of Ecology, Eastern Region Office, Toxics Cleanup Program

From: Bryce Robbert, Environmental Scientist, Avista Corporation

Subject: Comments regarding the Periodic Review of the Upriver Dam and Donkey Island PCB Site (Site ID# 4213)

Avista Corporation appreciates the opportunity to provide comments regarding the 2020 periodic review of the Upriver Dam and Donkey Island PCB sediment site.

In general, the draft report is generally clear and easy to follow, it could be improved to provide more clarity on key findings. Our suggested revisions are outlined below.

Page 17, 4th paragraph. Ecology should add text summarizing that all 10 surface sediment and cap sand layer samples collected in 2020 from Deposit 1 had total PCB Aroclor concentrations at least 8 times below the cleanup level of 62 µg/kg. While total PCB concentrations were generally comparable between Aroclor and congener analyses, total PCB congener concentrations measured in surface sediments collected at station ST-10 (**NOT** ST-06 as stated in the draft Ecology report) were more than 36 times higher than the corresponding total PCB Aroclor concentration (248.9 µg/kg vs. not detected at 7.0 µg/kg). The wide range in ST-10 surface sediment total PCB results suggests a high degree of small-scale sample variability and limits any conclusions that can be drawn from these data.

Ecology should also add text clarifying that station ST-10 is located at the far upstream end of Deposit 1. Text from the DH Environmental (2020) sampling report revealing that accumulated sediments at this location are indicative of upstream organic inputs unrelated to Deposit 1 should also be added: *"The accumulated surface sediment at ST-10 consisted almost entirely of organic matter, primarily pine needles, small twigs, and similar material, mixed with fine sand and silt. It is possible this sample may have been affected by the relatively high percentage of organic matter in the sample relative to the other surface grab samples."*

However, because total organic carbon (TOC) was not analyzed in the 2020 samples collected by Ecology, only in 2008 and 2010 samples collected by Avista, the hypothesized relationship between PCBs and TOC cannot be evaluated, further limiting any conclusions that can be drawn from these data.

Page 1 of 2

- **Page 18, 1st paragraph.** Ecology should add text clarifying that total PCB congener concentrations in the sand layer (ST-11 and ST-13) were less than 0.1 µg/kg, more than 100 times lower than the 62 µg/kg cleanup level. Based on the analytical results from the 2008, 2015 and 2020 sampling events, no measureable amounts of PCBs were detected in the sand isolation layer. Removing the sentence beginning “Detecting PCBs in the sand isolation layer” would help clarify for the reader that no evidence was present regarding increasing PCB concentration within the sand isolation layer.
- **Page 18, Institutional Controls.** Remove the sentence “*Ecology encourages Avista to enter into an easement or lease agreement with the landowner, DNR*”, as Avista has complied with all institutional controls required by the 2005 CD.
- **Page 19, Cleanup Level Evaluation.** Avista agrees it is appropriate to continue to use the 62 µg/kg cleanup level Ecology selected in the CAP. The 62 µg/kg cleanup level was protective when the CAP was issued, and it is protective now. It is also the cleanup level Avista agreed to implement as detailed in the Consent Decree.
- **Page 20, Conclusions.** Avista will be analyzing our archived split sample collected from station ST-10 to better characterize surface sediment PCB (Aroclor and congener) and TOC concentrations at this location to help resolve the high degree of small-scale sample variability in PCB concentrations observed in Ecology’s samples. Ecology should incorporate these split sample data into the final report when they are available (likely by the end of 2021), as they will better inform the need for any follow-on sampling.

Also, removing the bullet that “further sampling is recommended” to determine if there is a wide-spread area of heavy-metal impacts in Upriver Dam – that is already well known by the U.S. Environmental Protection Agency (Interim Record of Decision Amendment, Upper Basin of the Coeur d’Alene River, Bunker Hill Mining and Metallurgical Complex Superfund Site, August 2012 edition) through their investigations to date.

If you have any question or comments regarding these comments, please send them to bryce.robbert@avistacorp.com

IEP, received via email October 26



3320 N. ARGONNE
SPOKANE, WASHINGTON 99212-2099

PHONE 509.924.1911
FAX 509.927.8461

October 26, 2021

Via E-mail (brendan.dowling@ecv.wa.gov)

Mr. Brendan Dowling, Site Manager
4601 N. Monroe St.
Spokane, WA 99205

Regarding: Second Periodic Review: Spokane River Upriver Dam and Donkey Island PCB
Sediment Site

Dear Mr. Dowling:

Inland Empire Paper Company (IEP) appreciates the opportunity to provide comments to Ecology's report entitled *Second Periodic Review: Spokane River Upriver Dam and Donkey Island PCB Sediment Site* (Second Periodic Review). Also attached as a supplement to this submittal is a comment letter from the National Council for Air and Stream Improvement, Inc. (NCASI), the technical trade organization for the forest products industry in North America. IEP requested that NCASI review the Second Periodic Review and provide comments to the technical aspects of the report. IEP supports the comments provided by NCASI and requests that Ecology consider these comments in the final draft of the Second Periodic Review, along with the following additional comments by IEP:

Comment #1. General:

The Spokane River Regional Toxics Task Force (Task Force) has committed significant time and resources studying PCB sources and pathways to the Spokane River over the past ten years, including the focus area of this Second Periodic Review. IEP suggests using the comprehensive data and findings generated by the Task Force to support the second and subsequent periodic reviews. The current information developed by the Task Force is more representative of actual conditions that will affect the study areas, in lieu of the historical conditions reported under the *Remedial investigation and feasibility study* (RI/FS) section, especially for surface water and groundwater. If Ecology is determined to maintain the historical context of the RI/FS then IEP suggests including a new section that accurately reports current conditions.

In addition to the work of the Task Force, there have been other significant efforts that resulted in reductions of PCBs to municipal and industrial discharges, storm water and groundwater. These improvements will ultimately benefit the study areas covered by current and subsequent periodic reviews. IEP has attempted to point out some of these improvements in the following comments, but suggests reviewing the body of work by the Task Force for a more complete compilation of efforts to identify and reduce sources of PCBs to the Spokane River watershed.

Comment #2, Page 7 - Known PCB sources to the dam area of the river include:

Much of the investigative work of the Task Force was memorialized in the Comprehensive Plan approved in 2016¹. Section 3.2, *Delivery Mechanisms of PCBs to the Spokane River in the Comprehensive Plan* identified the following potential sources to the Spokane River:

PCBs were determined by LimnoTech (2016a) to be delivered to the Spokane River study area via a number of mechanisms, as depicted in Figure 7. Categories of delivery consist of:

- *Transport of PCBs from upstream sources through Lake Coeur d'Alene*
- *Atmospheric deposition*
- *Groundwater loading*
- *Stormwater runoff, either as part of an MS4 stormwater system or via direct drainage*
- *Combined sewer overflows (CSOs)*
- *Tributaries*
- *Discharge from municipal and industrial wastewater treatment plants*
- *Discharge of wastewater and stocking of fish from fish hatcheries*
- *Diffusion or resuspension of PCBs from bedded sediments in the Spokane River and Lake Spokane*

Most of the above sources are applicable to the focus area of the Second Periodic Review. Of particular significance to the focus area is a groundwater source upstream of IEP, as summarized in Section 3.2.3 of the Comprehensive Plan:

3.2.3 Groundwater Loading

The synoptic water quality survey conducted by the SRRTTF in August 2014 identified a significant groundwater loading source entering the river between Greenacres (Barker Rd.) and the Trent Avenue Bridge, with an estimated loading rate of 170 mg/day. A second synoptic survey conducted in August 2015 confirmed the presence of this load, and estimated its magnitude at 130 mg/day. Uncertainty analyses conducted in conjunction with the loading assessment (LimnoTech, 2015) indicate that this loading estimate can range between 60 and 300 mg/day.

For comparison, the PCB load from this groundwater source is significantly greater than the discharge from IEP, especially since the installation and operation of advanced ultrafiltration membrane treatment technology in 2020. IEP requests that Ecology include other relevant sources, with emphasis provided to the significant groundwater source identified above.

Comment #3, Page 10 – Surface Water, Water chemistry results:

IEP requests that Ecology use updated data collected by the Task Force over the past 10 years, in lieu of referencing information that is nearly 20 years old. The Task Force has expended significant resources to comprehensively characterize PCBs throughout the upper reaches of the Spokane River, including the focus area of the Second Periodic Review. The more recent data collected by the Task Force takes into consideration significant implementation actions to reduce PCBs to the Spokane River watershed, including the installation of advanced wastewater treatment technologies by municipal and industrial dischargers to comply with the Dissolved Oxygen TMDL. In addition to reducing nutrients, these treatment technologies are removing in excess of 99% of PCB discharges to the river which is relevant to this and future periodic reviews.

¹ LimnoTech. 2016 Comprehensive Plan to Reduce Polychlorinated Biphenyls (PCBs) in the Spokane River. Prepared for the Spokane River Regional Toxics Task Force. November 16, 2016

Comment #4, Page 10 – Surface Water, Water chemistry results:

Under MTCA, the National Recommended Water Quality Criterion for PCBs of 64 pg/L must be considered since it is recognized as an applicable, relevant, and appropriate requirement (ARAR).

Ecology should acknowledge that the department has promulgated its own human health water quality criterion for PCBs at 170 pg/L. WAC 173-201A-240. The state PCB criterion was submitted to EPA in 2016 and ultimately approved by EPA in 2019. The EPA national water quality criteria are guidance only and have no regulatory basis other than to inform Ecology or EPA when either agency is developing new water quality standards. Ecology should rely on the state water quality criterion for PCBs to set the cleanup objectives for this site.

Comment #5, Page 11 – Surface Water, Water chemistry results:

Based on the available data, the apparent seasonal increase in total PCB concentrations observed during September 2003 is indicative of surface water releases of predominantly PCB-11 to the river system between Plante's Ferry Park and Boulder Beach. This increase appears to be from treated wastewater discharged from the IEP outfall (Ecology 2002) located in this stretch of the river.

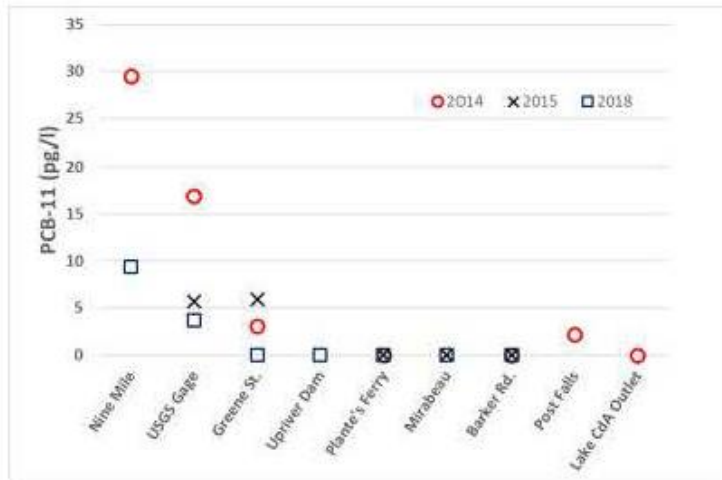
IEP requests that these statements be removed in their entirety since they are outdated and based on conjecture. There is no support for this conclusion contained in the report and the reference, Ecology 2002, is not included in the reference list, so it is unclear how Ecology determined the basis for this supposition. Additionally, as stated in Comments #2 and #3 above, industrial and municipal facilities upstream of this location have installed advanced wastewater treatment technologies capable of removing PCBs in excess of 99%. A recent internal study demonstrates that IEP is removing in excess of 99.99% of the total PCBs entering its facility using the most advanced wastewater treatment system in the pulp and paper industry. In lieu of referencing information that is no longer pertinent, IEP requests that Ecology recognize these efforts due to the relevance of these remedial actions for current and future improvements to this study area.

To further illustrate the disparity between current and past conditions, data collected by DH Environmental, Inc. in 2020 to support Ecology's Second Periodic Review² did not detect any concentrations of PCB-11 in the surface, sand or coal layers at the location of the Upriver Dam cap.

Furthermore, a recent study by LimnoTech (Technical Advisor to the Task Force), *Sources and Pathways of PCB-11: Initial Investigations*³ concluded the following regarding PCB-11: "Concentrations [of PCB-11 are] essentially indistinguishable from blanks at Upriver Dam and upstream." The following graph resulting from this study illustrates the level of PCB-11 found throughout the study area over multiple years with essentially non-detectable levels of PCB-11 upstream of Upriver Dam:

² DH Environmental, Inc. Upriver Dam Sediment Sampling Results, Spokane River Upriver Dam PCB Sediment Site. November 23, 2020

³ LimnoTech. Sources and Pathways of PCB-11: Initial Investigations. Presentation at the iPCB and TSCA Meeting. September 1, 2021



Based on the overwhelming evidence provided above, it should be apparent that Ecology must present a periodic review that accurately represents current conditions and delete the requested paragraph that is erroneous and misleading.

Comment #6, Page 11 – Semi-permeable membrane device (SPMD) results:

IEP has numerous concerns with the use and discussion of SPMD results. The referenced NCASI comment letter describes the technical concerns with the use of SPMD's to reliably estimate water column concentrations. Furthermore, the discussion on SPMD's in the Second Periodic Review is misleading as there are no dates as to when this study was conducted or data to support any of the conclusions. As written, this section gives the appearance that these results are relevant to the Second Periodic Review, whereas the study using SPMDs was actually performed during the remedial investigation (RI) between 2003 and 2004. Besides the technical concerns with deriving any conclusions from the use of SPMD's, the results from this study are no longer relevant to current conditions affecting the focus areas and should not be used in any manner to support the findings of the Second Periodic Review. As stated in the comments above, there has been significant progress in the identification and reduction of PCBs since the RI in 2003, so Ecology should be using current information to support its conclusions in the Second Periodic Review. IEP requests that the discussion on SPMDs be deleted in its entirety since it has no relevance to the Second Periodic Review, and that Ecology use currently available data that is more representative of conditions affecting the focus areas.

Comment #7, Page 11 – Groundwater

Once again, Ecology is relying solely upon information developed under the RI nearly 20 years ago. As referenced in Comment #2 above, there is more recent data developed by the Task Force that characterizes groundwater PCB loadings to the focus area that can be used to supplement the Second Periodic Review.

Comment #8, Page 17 - Effectiveness of completed cleanup actions, Sediment 2020:

The deposited sand material on top of the cap was collected and analyzed for PCBs and metals as a part of the surface grab samples (Tables 3 and 4, Appendix A). The analysis found that one surface grab sample, ST-06-Surface Grab, had total PCB congener concentrations of 248.9 µg/kg, which is above the cleanup level of 62 µg/kg.

According to Table 3, it is sample location ST-10 that showed total PCB congener concentrations of 248.9 µg/kg, and not location ST-06.

Ecology should explain what analytical methods are being applied to produce the reported results, such as: how qualifiers are treated (i.e.: J, U, B, and q flags), blank correction and censoring methods, blank correction and censoring multipliers, and the reasoning for the selected multipliers. The resulting analysis of any applied analytical methods should be included in the report for clarity.

The elevated metal concentrations and the PCB exceedance observed in the deposited sand on top of the cap are most likely associated with upstream sources.

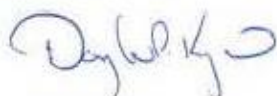
This statement is conjecture with no basis or supporting evidence and should be removed. Having only one surface sample out of eight with an elevated level of PCBs (248.9 µg/kg) is highly suspicious, especially considering that all other seven surface samples were less than 8.4 µg/kg. EPA Method 1668 is a non-promulgated test method that is highly susceptible to contamination and interferences, so a more likely explanation is that this is simply an outlier that is suspect due to the sampling and analytical method being used.

Comment #9, Page 18 - New scientific information for individual hazardous substances or mixtures present at the Site

As stated throughout this comment letter, there is new and significant scientific information that has been produced by the Task Force relevant to the focus areas that should be a consideration for this and subsequent periodic reviews. Additionally, municipal and industrial dischargers have installed advanced treatment systems over the past 5 years. The combined efforts by the Task Force and Dischargers to reduce levels of PCBs to the Spokane River watershed will ultimately have a positive impact on the focus areas of the periodic reviews and should be an integral element of the reports.

IEP appreciates Ecology's consideration of the enclosed comments. Please contact me should you have any questions regarding this information.

Sincerely,



Douglas P. Krapas
Environmental Manager
Enclosure

LimnoTech, received via email October 26



501 Avis Drive
Ann Arbor, MI 48108
734.332.1200
www.limno.com

From: David Dilks **Date:** October 26, 2021

To: Brendan Dowling, Ecology Site Manager **CC:**

SUBJECT: Comments on report "Second Periodic Review Spokane River Upriver Dam and Donkey Island PCB Sediment Site"

I have reviewed the draft Ecology report "Second Periodic Review Spokane River Upriver Dam and Donkey Island PCB Sediment Site" and provide the following comments to be considered by Ecology in finalizing the report.

1. There is an inconsistency in reported sediment PCB concentration between the body text and Table 3.

The text on page 17 states:

The deposited sand material on top of the cap was collected and analyzed for PCBs and metals as a part of the surface grab samples (Tables 3 and 4, Appendix A). The analysis found that one surface grab sample, ST-06-Surface Grab, had total PCB congener concentrations of 248.9 µg/kg, which is above the cleanup level of 62 µg/kg.

Table 3 shows that the total PCB congener concentration of 248.9 µg/kg occurs at station ST-10, not Station ST-06. This discrepancy needs to be corrected.

Table 3. Year Ten (2020) sediment PCB results (µg/Kg)

	ST-11	ST-12	ST-13	ST-13	ST-14	ST-15	ST-01	ST-02	ST-03	ST-04	ST-05	ST-06	ST-06 Dup	ST-08	ST-10
Layer Type	Sand	Coal	Sand	Coal	Coal	Coal	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface	Surface
Aroclor 1016	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1221	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1232	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1242	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1248	2.5 U	3.2 U	2.6 U	2.8 U	69	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	8.6 J	2.8 UJ	2.5 U	7.0 U
Aroclor 1254	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Aroclor 1260	2.5 U	3.2 U	2.6 U	2.8 U	3.0 U	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	2.7 U	2.8 U	2.5 U	7.0 U
Total PCB Aroclors	2.5 U	3.2 U	2.6 U	2.8 U	69	3.2 U	3.5 U	2.9 U	2.7 U	2.6 U	2.6 U	8.6 J	2.8 UJ	2.5 U	7 U
Total PCB Congeners	0.0	16.4	0.1	1.6	97.3	2.8	6.2	4.1	7.0	2.5	3.7	5.9	8.4	5.7	248.9

Notes:

1. Total PCB concentrations greater than the Site cleanup level of 62 µg/kg are shaded and **bolded**.
2. Elevated PCB concentration is not highlighted in Table 3.
The note to Table 3 (shown above) states "Total PCB concentrations greater than the Site cleanup level of 62 µg/kg are shaded and bolded." The total PCB congener concentrations of 248.9 µg/kg needs to be shown in bold in Table 3.

3. Discrepancy between Total PCB Aroclors and Total PCB Congeners for elevated sample.

There is greater than a 30-fold difference in reported total PCB concentration in Table 3 for station ST-10 between the Aroclor and Congener methods (248.9 ug/kg vs. not detected at 7 ug/kg). It may be worthwhile to note this discrepancy in the body of the report, as it could serve as an indication that one of the two reported results is anomalous.



NCASI, received via email October 26



OCTOBER 21, 2021

TO: Doug Krapas, Environmental Manager, Inland Empire Paper Company

FROM: Paul Wiegand, Vice President, Water Resources, Chemical Management and Laboratory Operations
Brad Barnhart, Ph.D., Senior Research Scientist

SUBJECT: Technical Review of Second Periodic Review: Spokane River Upriver Dam and Donkey Island PCB Sediment Site

Upon your request, NCASI staff reviewed the document entitled, "Second Periodic Review: Spokane River Upriver Dam and Donkey Island PCB Sediment Site," which was released by the State of Washington Department of Ecology (Ecology) in September 2021 and is open for public comment until October 26, 2021. Provided below are our thoughts regarding some of the technical topics included in the document.

Development/Adjustment of Clean-up Levels using Equilibrium Partitioning Theory

The document (Ecology 2021) introduces the prospect of establishing a more stringent sediment cleanup level (48 ug/kg) than the currently used cleanup level described as being consistent with the Consent Decree (62 ug/kg). While the current sediment cleanup level was stated as being based on the "lowest apparent effects threshold (AET) for use in freshwater sediments, as recommended by Michelson (2003)" (Ecology 2021, p. 12), the newly introduced cleanup level value was stated as being derived using an equilibrium partitioning model that depends upon a site-specific organic carbon partitioning value of 457,088 L/kg as well as EPA's 2002 recommended water quality criterion for total PCBs (64 pg/L) for the protection of human health. The report does not contain data describing the fraction of organic carbon used in the calculation, and therefore the calculation could not be replicated.

The report did not contain references or supporting data that would have allowed the reader to evaluate the specific applicability of the equilibrium partitioning model in this context. Caution should be taken when implementing equilibrium partitioning theoretical models, particularly in lotic ecosystems. Water temperature, flow, and depth, among other site-specific parameters, can influence the leaching of PCBs from soil into the water column and these should be carefully accounted for when using these types of models. Furthermore, Ecology should assess whether an equilibrium partitioning model would accurately produce water column concentrations of PCBs at this site over spatial and temporal scales that are relevant for the exposure pathways associated with human health-based water quality criteria. As noted above, the report provides no detail that would allow the reader to know if, or to what spatial and temporal extent, water column concentrations would be expected to approach criteria levels as a result of various clean-up thresholds.

NATIONAL COUNCIL FOR AIR
AND STREAM IMPROVEMENT, INC.

2438 NW Professional Dr.
Corvallis, OR 97330

(541) 752-8801
www.ncasi.org

Semi-permeable membrane device (SPMD) results

SPMD deployments were referred to in several portions of the document assupporting existing data collection methodologies and findings. In particular, Ecology states that “SPMD data further corroborate that, on a river reach scale, concentrations of both dissolved and total PCBs were below the 170 pg/L water quality standard but above the National Recommended Criterion of 64 pg/L under the seasonal low flow conditions sampled” (Ecology 2021, p. 11). No data are included to support this statement. Firstly, it is unclear how SPMD data (which measure primarily dissolved substances that can migrate through the bag membranes) are useful in supporting estimates of total PCBs. Secondly, reliable estimates of water column concentrations are very difficult to predict using SPMDs. The report contained no details regarding the deployment approach and data analysis techniques used in the SPMD study and thus it is not possible for the reader to assess whether the SPMD data is indeed supportive of the statement above. NCASI has conducted analyses using SPMD technology (NCASI 2002) and found location-specific environmental variables (e.g., flow velocity, degree of biofouling) to negatively influence the ability to resolve true differences in concentrations among replicated samples and, therefore, to yield any reliable estimate of water column concentration.

Blank Correction Methods

The water chemistry results were reported as “USEPA-method blank-qualified and blank-corrected values” (Ecology 2021, p. 10) as well as using an “alternative blank-corrected method” (Ecology 2021, p.10). We could not find citations or references that specified the particular correction methods used. As you know, the choice of blank correction methods can have a large impact on the resulting concentration values and therefore details describing the methods are essential when interpreting conclusions based on the data.

Comparing Aroclor and Congener Concentrations

Several passages in the report as well as Table 3 in Appendix A compare analytical results for Aroclors and analytical results for congeners to PCB cleanup targets and water quality standards. This is problematic in that the analytical procedures used to measure Aroclors and those used to measure congeners (and homologs) yield results that are not directly comparable and would not be expected to be identical (or even similar) when applied to most environmental samples. One of many examples available in the PCB literature is discussed in an EPA Region 4 Technical Services Section Issue wherein it was found that “The total PCB homolog soil concentrations vary in that for some samples the total homolog concentration data is 2+ orders of magnitude higher than the total Aroclor concentrations. In other instances the total Aroclor data is up to an order of magnitude higher in concentrations than the total homolog concentration data” (EPA 2013, p. 19). Ecology should recognize and address this issue when making comparisons between measured data, cleanup criteria, and water quality criteria.

Reference Omission

The reference “Ecology (2002)” mentioned in the document (Ecology 2021, p. 11) was not included in the References section.

If you have any further questions, please contact NCASI staff at pwiegand@ncasi.org and bbarnhart@ncasi.org.

References

EPA 2013. Wischkaemper, H.K., Beliveau, A.F., Henderson, R.W. *U.S. EPA Region 4 Technical Services Section Issue Paper for Polychlorinated Biphenyl Characterization at Region 4 Superfund and RCRA Sites*. Technical Services Section Issue. May 2013.

Michelsen, T. 2003. *Phase II Report: Development and Recommendation of SQVs for Freshwater Sediments in Washington State*. Prepared for Washington Department of Ecology Toxics Cleanup Program Sediment Management Unit. Avocet Consulting. Kenmore, WA.

Doug Krapas, Inland Empire Paper Company
October 21, 2021
Page 3

National Council for Air and Stream Improvement, Inc. (NCASI). 2002. Semipermeable membrane devices (SPMDs) for determining absolute or relative water column concentrations of non-polar chemicals in aqueous systems. Special Report No. 02-03, April 2002. Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.

State of Washington Department of Ecology (Ecology). 2021. Second Periodic Review: Spokane River Upriver Dam and Donkey Island PCB Sediment Site, Facility Site ID 65178472, Cleanup Site ID 4213. Toxics Cleanup Program, Eastern Region. September 2021.