2014 Spokane River

Field Sampling Report

SPOKANE RIVER REGIONAL TOXICS TASK FORCE

WASHINGTON AND IDAHO

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SRRTTF

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1. Introduction

This field sampling report provides a summary of field methods and information gathered during the August 2014 Spokane River sampling event for the Spokane River Regional Toxics Task Force (SRRTTF). This work was performed in support of the SRRTTF's development of a comprehensive plan to reduce toxic pollutants in the Spokane River and, specifically, to reduce polychlorinated biphenyls (PCBs). The 2014 sampling event was intended to address data gaps in the Spokane River upstream of Spokane Lake and will be used along with existing data collected by the Washington Department of Ecology (Ecology) to develop a mass balance assessment. The assessment is also intended to support the identification of potential PCB sources to the Spokane River ecosystem.

1.1. Project Location

The August 2014 surface water sampling event was conducted on the Spokane River from the outlet of the Lake Coeur d'Alene (River Mile 111) and downstream to below the Ninemile Dam (River Mile 58.1). Further sampling was conducted at discharge points from several major municipal and industrial facilities along this 53 mile segment of the river. The study area is depicted on Figure 1.

2. Field Sampling

Environmental specialists from Gravity Consulting, LLC (Gravity) led the sampling event and collected samples along with representatives from LimnoTech and Washington State Department of Ecology (Ecology). Sample collection commenced on August 12 and finished on August 24 of 2014. Gravity's sampling equipment, vessels, meters, personal protective equipment (PPE), high-volume water samplers, vehicles and field lab were used to support the field event. Mobilization of staff and equipment to and from the project area occurred August 11 and 25, respectively.

Surface water samples were collected at eight locations near river gages in the Spokane River (see Figure 2) on August 12, 14, 16, 18, 20, 22, and 24. One additional river sample was collected at SR-15 on August 23rd as requested by LimnoTech due to a rain event during the previous evening. High-volume water samples were collected at SR-1 and SR-15 on August 15 and 24. Water discharge samples were collected at seven municipal and industrial facilities on August 13, 19, and 21. Sample locations identifiers, descriptions, global positioning system (GPS) coordinates, and samples collected are provided in Table 1. Sample locations are depicted on Figure 2.

Unless otherwise noted, the sample collection procedures described within this Field Report were conducted in accordance with the following planning documents referenced below:

- Sampling & Analysis Plan (SAP) (LimnoTech, 2014)
- Health and Safety and Environmental Plan (Gravity, 2014a)

- Spokane River Field Implementation Plan (Gravity, 2014b)

2.1. Surface Water Collection Methods

Gravity staff collected discrete surface water grab samples at locations prescribed in the SAP (LimnoTech, 2014) and using methods consistent with those described in the standard operating procedures (SOPs) described in Appendix C of the SAP. Field sample collection forms are provided in Appendix A. At most of the prescribed locations samples were collected by hand using "clean hands" and "dirty hands" methodology combined with the direct immersion techniques. These methods reduce the likelihood of any cross-contamination from direct (e.g., handling dirty equipment) or indirect (e.g., dust or air transport) sources. Samples were collected using a dip sampler at a few of the facilities due to safety concerns with access. These sites were identified in the Field Implementation Plan (Gravity 2014b) along with justification for not using direct immersion in Table 2. As described in Section 2, samples were also collected using Gravity's high-volume water sampling equipment and methodology at two locations and on two days during the August sampling event. Appendix B provides photographic documentation taken during the sampling event.

All sample compositing and filtering occurred, as necessary, at the laboratories after samples were collected. Each sampling method used is further described below and additional details were provided in the SAP.

Direct Immersion Sampling using Modified Clean Methods – This preferred sampling method was used at the majority of sites as it reduces the potential for confounding contamination. Clean sampling procedures, developed by the U.S. Environmental Protection Agency (USEPA) and described in EPA Document 1669 (USEPA, 1996), are designed to minimize inadvertent contamination during the collection and handling of the sample in the field as well as in the laboratory by preventing contact of the sample with other materials and minimizing exposure to the air. The modified clean method used for the Spokane River sampling is virtually identical to the clean sampling; however, not all of the personnel protective equipment was used (i.e., Tyvek was not worn due to concerns with heat and dust masks were not worn as they are intended to prevent mercury contamination). Generally, under this method, the gloved "dirty hands" sampler opens a Ziploc bag so the gloved "clean hands" sampler can reach in to grab the sample container. The "clean hands" sampler submerses the container under the water surface and then opens and closes it while submersed to avoid any potential atmospheric contamination. The sampler faces upstream during the sampling to avoid any disturbed substrate from getting in the container. The container is put back into the Ziploc by the "clean hands" sampler. Therefore, only one sampler ("clean hands") touches the container and this sampler does not handle any other materials prior to sampling.

Dip Sampler using Modified Clean Methods – For effluent sample locations where access safety concerns prevented direct immersion methods, a long handled dip sampler was used. As described for direct immersion, the "clean" sampling procedures were used for this method.

High Volume Water Sampling using Modified Clean Methods – Concentrations of PCBs (if present), may be too low to be detected by standard sampling and analytical measurement techniques. Considering the PCBs concentrations historically measured in this river segment, sampling was conducted at two locations using Gravity's High Volume Water Sampling system the PR2900 and approved techniques to obtain enough mass from the water column to allow quantitation of these low level PCBs. Trace samples are collected by pumping a high volume of water – in this case 400 liters for each sample and passing this water through a vortex separator, flat fiber filter and then through a cartridge containing polyurethane foam (PUF) that binds the dissolved forms of the compound in question. The ultratrace compounds that are found on the particulate phase or that bind to the adsorbent PUF material are later extracted in the laboratory and measured on a gas chromatograph/mass spectrometer (GC/MS). Once the mass of compound on the adsorbent material has been determined, the compound concentration in water can then be calculated by dividing the total mass of the compound measured from the adsorbent material and the particulate catch by the total volume of water that was passed through the adsorbent matrix. Alternatively, the PUF and particulate can be analyzed separately to measure the dissolved and particulate-bound fractions of the compound in the water.

2.1.1. QA/QC Samples

In addition to normal grab samples, quality assurance/quality control (QA/QC) samples were collected daily. QA/QC samples included a daily blank using clean water provided by AXYS to determine whether sample procedures, equipment, or the atmosphere itself may confound the analytical results. Additionally, a blind replicate sample (i.e., duplicate) was collected daily at different locations throughout the sampling event. Daily blank and blind replicates (along with corresponding normal samples) are identified in Table 3.

2.1.2. Field Measurements

Field measurements of temperature, pH, specific conductance, turbidity, and dissolved oxygen were also collected for sample taken. Field measurement results are presented in Table 4 and Field Parameter Logs are provided in Appendix C.

2.1.3. Sample Handling, Transport and Custody

Sample handling, transport, and custody were performed as outlined in Section 5 of the SAP. After sample containers were filled, they were packed in coolers on ice obtained from freezers in Gravity's field lab. Samples were kept in a secure vehicle and repacked in ice, as necessary, until delivery or shipment to the appropriate laboratories. Coolers were transferred to laboratories using the following shipping and chain-of-custody procedures:

- Samples were packaged and shipped in accordance with U.S. Department of Transportation regulations as specified in 49 CFR 173.6 and 49 CFR 173.24;
- Individual sample containers were packed to prevent breakage;
- The coolers were clearly labeled with detailed sample collection information (name of project, time and date container was sealed, person sealing the cooler) to enable positive identification;
- Chain-of-custody forms were enclosed in a plastic bag and placed inside lid of the cooler; and
- Signed and dated chain-of-custody seals were placed on the outside of all coolers prior to shipping.

Samples analyzed for total suspended solids, total dissolved solids, total organic carbon, and dissolved organic carbon were hand delivered by Gravity staff to the Silver Valley Analytical Laboratory (SVL) in Coeur d'Alene, Idaho. Laboratory staff delivered samples on the same day to the SVL Analytical laboratory in Kellogg, Idaho. Copies of the chain-of-custody forms are provide in Appendix D.

All archived samples were also sent to SVL Analytical for storage at <4˚C. Samples to be analyzed for low level PCBs were delivered to FedEx in Spokane, Washington for shipment to the AXYS Analytical Services (AXYS) in Sidney, British Columbia.

2.1.4. Deviations from the SAP

A few minor deviations from the SAP occurred during the field activities. These include the following along with a description of any corrective actions (CA) applied (when feasible):

- It was determined during site reconnaissance that the Hayden Area Regional Sewer Board WWTP (SR-13) does not discharge to the Spokane River during the low flow season and that effluent processes are slightly different during the time when river discharge is occurring. It was determined that sampling SR-13 during August would not provide useful information for the low flow mass loading model. Therefore, LimnoTech approved a deviation from the SAP to not sample at SR-13 during the August 2014 synoptic sampling event.
- Sample at SR-4 was not collected on August 12, 2014 due to storm with strong winds and lightning; CA: sample was collected the following day on August 13, 2014;
- Samples shipped to AXYS Analytical Services on 8/18/14 were held up overnight in Memphis, Tennessee by FedEx due to a FedEx system-wide computer shutdown. These samples arrived to the lab a day later than planned and were slightly above the recommended temperature. CA: none warranted;
- Flow at SR-9 was not measured on August 12, 2014 and on August 22, 2014 due to an equipment malfunction resulting from water exposure; CA: none warranted

- AXYS notified Gravity that two samples arrived broken; the samples included one blind duplicate (Replicate #6) and the SR9 sample collected on 8/20/14 locations; CA: the SR9 archive sample was picked up from SVL later to AXYS for PCB analysis
- Sample collected at SR-15 a day (August 23, 2014) before planned due to overnight rainfall event: CA: none warranted

These deviations were observed by a LimnoTech representative and approved at the time of sample collection. With the exception of the deviations noted above, no other deviations from the sampling plan and schedule occurred. No significant deviations occurred that would be expected to impact the quality of the data obtained.

3. Surface Water Analytical Testing

Surface water sampling analysis was conducted in accordance with Section 3.3 and Tables 4 and 8 of the SAP and as summarized in Section 2 of this Field Report. Guidance included specification of methods, method report limits, and applicable QA/QC measures. Complete details are included in the SAP Tables 8, 9 and 10. The samples were analyzed for the parameters listed in Table 5. Results from the laboratory analyses are being directly sent to the SRRTTF and will be input into a database and summarized in a later report by LimnoTech. Gravity will assist Limnotech with the calculations and interpretation of the high volume water sampling results.

4. Stream Flow

A pre-sampling scoping meeting and site reconnaissance was held in Spokane, WA on July 28-29, 2014. Ecology representatives informed the group that the Greenacres river gage station (near SR-9) was inactive, but flow data should be available for all other stations. Stream flow data and river gage height data, where available, are presented in Table 5. As can be seen in Table 6, flow data were not available from all gage stations due to USGS gage malfunctions. Gravity is currently working with USGS to determine if flow data for these can be obtained, however it is not available at this time. For SR-9, Gravity performed flow measurements along the USGS transect across the Spokane River during the daily sampling. The SR-9 data were captured using a non-motorized vessel and a MF Pro flow meter. Water depth measurements were taken at approximately 8-foot intervals across the transect and velocities were measured at multiple depths at each location. Flow in CFS was calculated based on the 2/10th and 6/10th measurement methodology as promulgated by USGS. These data are included in Table 6.

5. Summary

The goal of the 2014 sampling event was to collect information necessary to address data gaps in the Spokane River upstream of Spokane Lake. Surface water samples from the Spokane River and

discharge samples from municipal and industrial effluents were collected between the Lake Coeur d'Alene outlet gage station (River Mile 111) and downstream to below the Ninemile Dam (River Mile 58.1). Samples were sent by Gravity staff to AXYS for low level PCB analysis and to SVL for TSS, TDS, TOC, and DOC analyses. Gravity also collected samples for PCB analysis by AXYS at two locations (SR1 and SR15) using high volume water sampling. Where available, stream flow data were obtained to support a future mass balance assessment.

The data obtained during the August 2014 sampling event will be used to develop a mass balance assessment and to support the identification of potential PCB sources to the Spokane River ecosystem. Additionally, the data collected will provide important information to be used to make informed planning decisions for potential future field events.

6. References

Gravity Consulting, LLC. 2014a. *Health and Safety and Environmental Plan*. Submitted to the Spokane River Regional Toxics Task Force (SRRTTF) on August 11, 2014.

Gravity Consulting, LLC. 2014b. *Field Implementation Plan*. Submitted to the Spokane River Regional Toxics Task Force (SRRTTF) on August 9, 2014.

LimnoTech. 2014. *Sampling & Analysis Plan – Spokane River Toxics Reduction Strategy Study*. Submitted to the Spokane River Regional Toxics Task Force (SRRTTF) on July 31, 2014.

U.S. Environmental Protection Agency (USEPA). 1996. *Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Levels*. July.