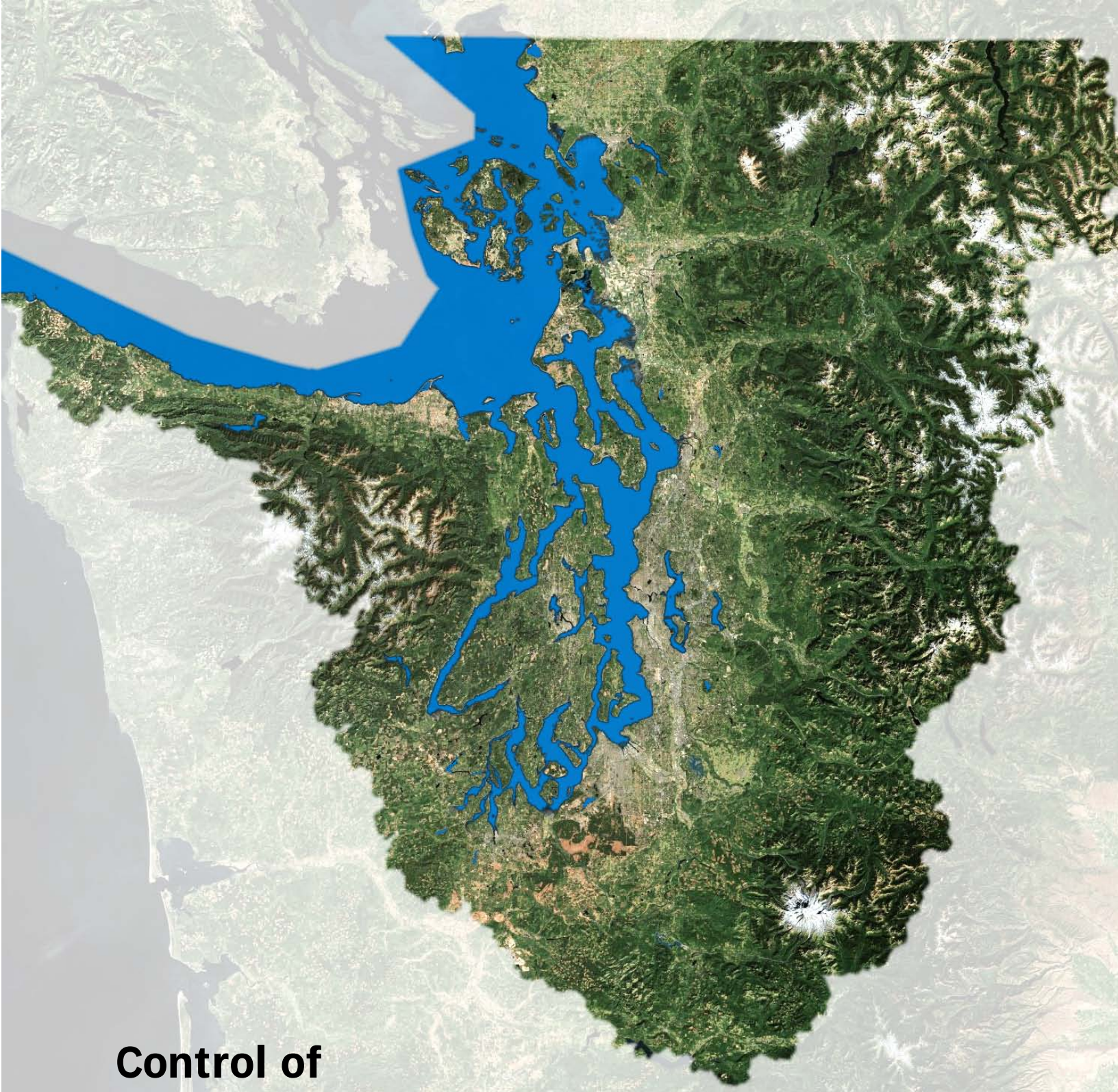

Control of Toxic Chemicals in Puget Sound

Summary Technical Report for Phase 3: Loadings from POTW Discharge of Treated Wastewater

DEPARTMENT OF ECOLOGY
State of Washington

HERRERA ENVIRONMENTAL CONSULTANTS

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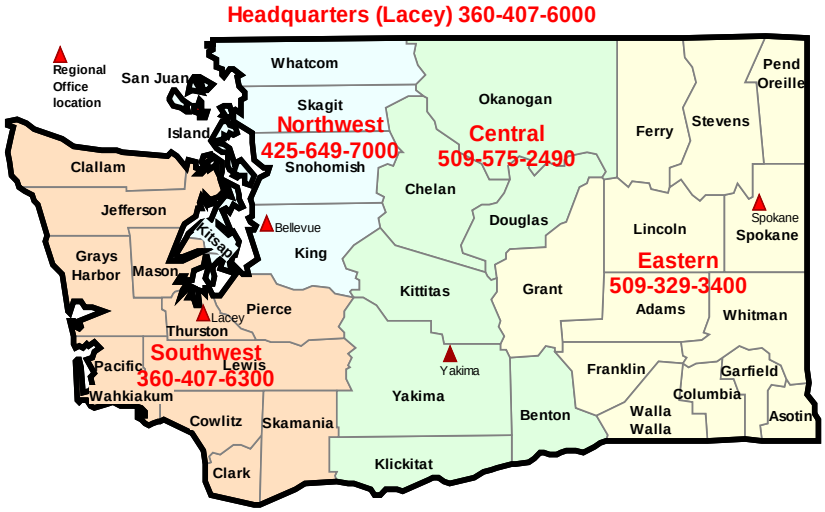

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Summary Technical Report

Control of Toxic Chemicals in Puget Sound Phase 3: Loadings from POTW Discharge of Treated Wastewater

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List of Abbreviations and Acronyms

ARI	Analytical Resources, Inc.
BNAs	base/neutral/acid extractable compounds
DDT	dichlorodiphenyltrichloroethane
DMR	discharge monitoring report
E & E	Ecology and Environment, Inc.
ECD	electron capture detector
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management database
GC	gas chromatograph
GC/ECD	gas chromatography/electron capture detector
GC/HRMS	gas chromatography/high-resolution mass spectrometry
GC/MS	gas chromatography/mass spectrometry
Herrera	Herrera Environmental Consultants, Inc.
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
kg/yr	kilograms per year
L	liter
LC/MS/MS	liquid chromatography-tandem mass spectrometry
MBR	membrane bioreactor
MDL	method detection limit
MEL	Manchester Environmental Laboratory
mgd	million gallons per day
mgy	million gallons per year
ml	milliliter
MS	mass spectrometer
ng/L	nanogram/liter (parts per trillion)
NPDES	National Pollutant Discharge Elimination System
PAH	polycyclic aromatic hydrocarbon
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl

List of Abbreviations and Acronyms
(continued)

PFC	perfluorinated compound
PFOA	perfluoroorganic acid
PFOS	perfluorosulfonate
pg/L	picograms per liter (parts per quadrillion)
POTW	publicly owned treatment works
PPCPs	pharmaceuticals and personal care products
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
ROS	regression on order statistics
SIM	selected ion monitoring
STP	Sewage Treatment Plant
µg/L	micrograms per liter (parts per billion)
U.S. EPA	United States Environmental Protection Agency
UV	ultraviolet
WWTP	wastewater treatment plant

Executive Summary

The project team's purpose was to improve the estimates of toxic chemical loadings to Puget Sound by targeted assessment of National Pollutant Discharge Elimination System (NPDES) permitted publicly owned treatment works (POTWs). Our goals were (1) to screen treated wastewater discharges for toxic chemicals that POTW operators do not routinely monitor, and (2) to improve the loading estimates for certain toxic chemicals by employing more sensitive analytical methods.

The project team identified and collected treated wastewater samples from ten POTWs of varying types of treatment process, size, and source of wastewater, distributed around the Puget Sound Basin. Two of the POTWs discharged to freshwater rivers, and the rest to Puget Sound marine waters. Together, the ten sampled POTWs discharged an average of about 48 percent of the total treated municipal wastewater discharged by all Ecology-permitted POTWs in the Puget Sound Basin. Although we collected samples only twice from each POTW (in February and July 2009), these 20 samples represented the aggregate of all treated wastewater discharged by the 106 permitted POTWs of the Puget Sound Basin.

The project team analyzed the wastewater samples for the following classes of toxic chemicals, using methods that yielded significantly lower than typical reporting limits:

- Polycyclic aromatic hydrocarbons (PAHs)
- Phthalates
- Other base/neutral/acid (BNA) extractable compounds
- Pesticides
- Herbicides
- Polybrominated diphenyl ethers (PBDEs)
- Perfluorinated compounds (PFCs)
- Polychlorinated biphenyls (PCBs)
- Metals (copper, lead, and zinc)

Following data review and validation, this project generated a total of 4,579 valid analytical results that characterized treated wastewater discharged from POTWs into the Puget Sound Basin. Toxic chemicals from each chemical class were detected in at least one sample from each of the ten sampled POTWs. We detected a total of 230 chemicals, not counting PBDE and PCB homologs. In order to evaluate the reasonableness of the results from this study, we compared the total concentrations of phthalates, PFCs, and PCBs discharged from the ten subject POTWs with those reportedly discharged to or from other POTWs in the state. The results of this study were similar to the results of those several other previous studies.

The project team determined individual annual loading rates of each of the chemicals from each of the ten sampled POTWs. Although the small number of samples precluded drawing any conclusions regarding specific POTWs, a few general findings were apparent.

- The majority of the PAHs discharged from most of the POTWs consisted primarily of five chemicals (fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene).

- The majority of the phthalates discharged from each of the ten POTWs consisted of bis(2-ethylhexyl) phthalate.

- The POTWs discharged only relatively small amounts of about a dozen pesticides and herbicides.

- Although the POTWs discharged many PBDEs, only three of them (BDE-047, BDE-099, and BDE-209) comprised almost all of the total loadings from each.

- Similarly, the POTWs discharged most of the PFCs that were analyzed, but only four of the PFCs (perfluorohexanoate, perfluorononanoate, perfluorooctane sulfonate, and perfluorooctanoate) comprised most of the total loadings from each POTW.

- Generally, as the total loadings of PCBs increased from any given POTW, so did the number of different PCB congeners that were discharged. Most of the PCB congeners were distributed among the tri-, tetra-, and penta-chlorobiphenyl homolog groups.

The project team also estimated the total loadings from POTWs to the surface waters of the Puget Sound Basin of 68 chemicals, plus two homolog groups and seven chemical classes. Chemical classifications are useful because they often indicate which chemicals might share a single source, affect environmental receptors in a similar manner, or all be amenable to particular treatments or other control actions. These estimated loadings were divided to represent the input from each of the 14 geographically distinct study areas of the basin. Due to the limited number of sampling events and atypical weather during the sampling period, we did not discern seasonal variations in loadings.

The results from this study greatly extended our understanding of chemical loadings from POTWs and were consistent with the results from Phase 2 and other recent studies conducted by Ecology and others. Future determination of the most effective and efficient actions for controlling or managing toxic threats should include evaluation of the effects of the chemicals, the new loading estimates of those chemicals, and the many other interdependent variables that characterize the pathways that facilitate chemical movement through the environment to Puget Sound.

1. Background and Purpose

1.1 Context of This Project

The Washington State Department of Ecology (Ecology) and several other groups have been working with the U.S. Environmental Protection Agency (EPA) and the Puget Sound Partnership (PSP) to restore the environmental health of Puget Sound by 2020 (PSP, 2010). This multi-year effort has required development of strategies, actions, and performance measures for restoring the Puget Sound ecosystem. Ecology has teamed with several partner organizations to study toxic chemical loadings to Puget Sound to understand the relative contributions from sources of contaminants in the Puget Sound ecosystem (Ecology, 2010). The main objectives of the "Control of Toxic Chemicals in Puget Sound" projects have included:

- Identify toxic chemicals that have harmed or threaten to harm the Puget Sound ecosystem or the beneficial uses which humans obtain from the Sound.

- Estimate the loading rates of key contaminants from their sources through their major pathways to Puget Sound.

- Provide information that will support development of a strategy to identify the actions, practices, and policies necessary to protect and restore the overall health of the Puget Sound ecosystem.

Accomplishing these objectives requires an understanding of the complex inter-relationships among the following three distinct elements of the Puget Sound ecosystem:

- The sources of pollutants.
- The pathways those pollutants take through the environment.
- The effects of those pollutants on the ecosystem.

It is important to clarify the difference between sources and pathways.

The term *source* may apply in a variety of ways with regard to chemicals in the environment. For the purpose of this project, the term source is defined as the location, object, or activity from which a pollutant is released to environmental media or released in a form that can be mobilized and transported through an environmental *pathway*. The term *primary source* identifies the initial release of a pollutant, as distinct from a *secondary source*, such as an old toxic chemical spill site, atmospheric deposition, or a publicly owned wastewater treatment plant (POTW). However, these secondary sources are more accurately described as pathways because they transport and mobilize chemicals from one location to another, or (in the case of POTWs) act as a focal point for chemical collection. Often, as also is the case for POTWs, pollutants moving along a pathway are degraded, destroyed, or permanently rendered harmless through designed or natural treatment processes.

The following examples illustrate the distinction between primary sources and secondary sources:

- Examples of *Primary Sources*:
  - Polycyclic aromatic hydrocarbons released to air from wood or petroleum burning.
  - Copper released to air, stormwater, and roadside ditches from brake pad wear.
  - Unmetabolized pharmaceuticals discharged from homes into sanitary wastewaters.
  - PCBs released to soil from transformer leakage.
  - Triclopyr applied to roadside ditches to control weeds.

- Examples of *Secondary Sources*, which are typically also pathways:
  - Atmospheric deposition of pollutants onto the surface of land or waterbodies.
  - Stormwater discharged from a municipal outfall into a stream.
  - Treated wastewater discharged from a POTW.
  - Contaminated soil leachate entering either groundwater or surface water.
  - Forest fire releasing back into the air the mercury that the growing vegetation had previously absorbed.

The toxic effects of a chemical depend on the dose (or exposure concentration), the duration of exposure, the timing of the exposure (e.g., at what stage of the lifecycle exposure occurs), the synergism and antagonism among multiple toxicants, and the harmful result of the exposure (e.g., temporary functional impairment, reduced reproductive capacity, shortened lifespan, and death). Given the goal of protecting the entire Puget Sound ecosystem, when evaluating relative toxic effects, Ecology must also consider the impacts of chemicals on the dependencies and interactions among species, such as through food chain relationships and altered predator avoidance behaviors.

Thus, while estimates of total loadings are important data, they are not particularly meaningful when considered in isolation. Loadings do not directly translate into threats, such that reducing the loading by half would reduce the threat by half. Determining the most effective and efficient actions for controlling or managing toxic threats must include evaluation of many interdependent variables and options. Management actions may occur at several different points along the pathways that facilitate chemical movement through the environment. For example, a control action may be to eliminate the initial release of the chemical by banning the primary source. Alternately, a more efficient method to reduce the threat from a chemical may be to treat a contaminated medium at a location where the pathways of several chemicals converge. Another approach for managing a toxic threat may be to establish a management zone for a small area, for example by prohibiting shellfish harvest within the vicinity of a POTW outfall. In some cases, targeting some of the available resources on limited goals may be preferable so that the remaining resources will be sufficient to ensure that other critical areas always remain healthy and usable. Final policy decisions for how to control and manage the chemicals that enter the Puget Sound ecosystem must include consideration of all these factors along with the various estimates of chemical loading.

These toxic chemical loading projects have been conducted in three phases, which are described in the following subsections. The Phase 1 study provided initial estimates of toxic chemical loadings to Puget Sound. Phase 2 projects improved those loading estimates. Phase 3 activities, of which this project is one component, target priority sources to collect and analyze environmental samples and improve the numerical model of the Sound (the Puget Sound box model) with the new data. The results of Phase 3 will help to enable Ecology and the PSP to assign the threats from toxic chemicals to specific sources and to select and implement actions to clean up and prevent contamination from those sources posing the greatest risks to Puget Sound.

Phase 1 – Initial Estimate of Toxic Chemical Loadings to Puget Sound

The purpose of this project was to assemble preliminary estimates of loadings of the most important toxic chemicals to Puget Sound via the presumed nine major pathways. These pathways were: surface runoff, aerial deposition onto Puget Sound, wastewater discharge, combined sewer overflows, direct spills to aquatic systems, groundwater discharges to marine surface waters, exchanges with the Pacific Ocean, leaching or biologically-induced movement from contaminated sediments, and migration of contaminated biota into Puget Sound. Based on data already available for the first five of these, the authors estimated the loadings of 17 chemicals (or classes of chemicals) from 14 hydrologically-based study areas that comprised the Puget Sound Basin. Depending on the contaminant, the main pathways were surface runoff and direct deposition from the air to the Sound (Hart Crowser, Inc., et al., 2007).

Phase 2 – Improve Loading Estimates

Two critical informational needs were to better understand and quantify the sources of toxic contaminants that enter Puget Sound and to improve the understanding of how toxics move within the ecosystem once they are there. The seven different projects in Phase 2 built upon the initial Phase 1 study to address these needs, and their results are available (Ecology, 2010a).

One of the Phase 2 projects focused on improving the loading estimates from permitted point source dischargers of wastewater within the Puget Sound Basin (EnviroVision Corporation, et al., 2008). While the available data were limited, the authors found that the contributions of toxic chemicals from wastewater dischargers (both publicly and privately owned) were small relative to the total loadings from all the major loading sources to Puget Sound, ranging from 1.4 to 7.0 percent of the total. The data also suggested that publicly owned treatment works (POTWs) discharged significantly more of some toxic chemicals than did the privately owned industrial point source dischargers.

Phase 3 – Targeting Priority Toxic Sources

In Phase 3, six of the 11 projects included the collection and analysis of environmental samples from within the Puget Sound Basin so that Ecology and its partners could further improve estimates of loadings from specific sources. The other projects focused on improving the Puget Sound box model with the new data and the synthesis and reporting of the results from all three phases to date. Results of the studies completed to date are available (Ecology, 2010a).

Two of the Phase 3 projects focused on POTWs regulated by Ecology through the National Pollution Elimination System (NPDES) permit program. One of these projects consisted of collecting and analyzing samples of wastewater for pharmaceuticals and personal care products

(PPCPs) (Lubliner, et al., 2010). The authors found differences in the removal efficiency of PPCPs among wastewater treatment plant processes, and that advanced nutrient reduction and tertiary filtration may provide additional PPCP removal. The other Phase 3 project that focused on POTWs is the project addressed by this report.

1.2 Purpose of This Project

One of the recommendations from one of the Phase 2 projects was:

> "If better estimates of toxic chemical loadings are necessary, Ecology should collect targeted samples and analyze them using methods that produce smaller MDLs. Also, as Ecology identifies emerging potential threats from other toxic chemicals (for example, polybrominated diphenyl ethers, fluorinated organic compounds, bisphenol A, and pharmaceuticals and personal care products), Ecology should (or should require permittees to) collect and analyze wastewater samples for those newly identified pollutants." (EnviroVision, et al., 2008)

The purpose of this project was to improve the estimates of toxic chemical loadings to Puget Sound by targeting POTWs and collecting and analyzing representative samples of the treated wastewater that they discharge. The goals of this project were (1) to screen treated wastewater discharges for toxic chemicals that POTW operators do not routinely monitor, and (2) to improve loading estimates for certain toxic chemicals by employing more sensitive analytical methods.

2. Methods

The project team consisted of the following organizations:

- Washington State Department of Ecology (Ecology)
- Herrera Environmental Consultants, Inc. (Herrera)
- Ecology and Environment, Inc. (E & E)
- Analytical Resources, Inc. (ARI)
- Axys Analytical Services, Ltd. (Axys)
- Pacific Rim Laboratories, Inc. (Pacific Rim)

Ecology was the project lead. E & E worked under contract to Ecology and was responsible for coordination of field and laboratory activities and quality assurance review of the analytical data. Herrera worked under subcontract to E & E and was responsible for sample collection and loading calculations. ARI worked under subcontract to Herrera and provided clean sample containers. Axys and Pacific Rim worked under subcontract to the Ecology Manchester Environmental Laboratory (MEL) and conducted the analyses of polybrominated diphenyl ethers, perfluorinated compounds, and polychlorinated biphenyls. MEL conducted the analyses of all the other parameters.

2.1 General Approach

The project team expected that variations in the following factors might drive differences in the loading rates of the various toxic chemicals discharged from POTWs:

- Types of treatment processes employed by the POTW.
- Rate of flow through the POTW.
- Activities of the sources in the POTW service area (e.g., residential or industrial).
- Time of day.
- Season of year.

Assessing these factors would have involved collecting samples from several POTWs that represented each type of treatment, at several different flow rates, for a variety of upstream sources located in different areas of the Puget Sound Basin, and collecting many samples from each POTW to establish how the loading rates of toxic chemicals varied at different times of the day and during the seasons of the year. However, due to a limited budget, the project team needed to produce a limited scope of work that balanced all of these factors, while maximizing the amount of usable data that this project would produce.

2.1.1 Selection of Pollutants

Ecology requires NPDES-permitted POTWs to periodically analyze their treated effluents for Priority Pollutant chemicals using standard analytical methodology and to report that data to Ecology. Review of that data in Phase 2 (EnviroVision, et al., 2008) found that most organic

analytes were not detected in the effluents discharged from the POTWs using then standard analytical methods. These organic compounds included:

- Polycyclic aromatic hydrocarbons (PAHs)
- Phthalates
- Other base/neutral/acid (BNA) extractable compounds
- Pesticides
- Herbicides
- Polychlorinated biphenyls (PCBs)

In addition, Ecology was aware that several new classes of toxic chemicals were emerging as potentially harmful components of POTW effluent. These chemicals included:

- Polybrominated diphenyl ethers (PBDEs)
- Perfluorinated compounds (PFCs)
- Pharmaceuticals and personal care products (PPCPs)

The project team chose to analyze the wastewater discharges for 390 of the compounds contained within these chemical classes, excluding PPCPs. We did not focus on PPCPs in this study because another toxics loading project was evaluating these chemicals (Lubliner, et al., 2010). The project team also analyzed the treated wastewaters for total copper, lead, and zinc to enable a better comparison of the results from this study with the previous loading estimates derived in Phase 2 (EnviroVision, et al., 2008). We employed analytical methods that were more sensitive than those which POTW operators have been required to use so that we might detect smaller concentrations of the target pollutants (i.e., to decrease the "minimum detection limits" – MDLs). We analyzed for PCBs in only the samples collected in February, and only for six of the POTWs (Bremerton STP, City of Tacoma (Central No. 1), Everett STP (Outfall 100), King County West Point, Pierce County Chambers Creek STP, and Shelton STP).

2.1.2 Selection of POTWs

General POTW Characteristics

POTWs receive the following types of wastewater for treatment:

- Raw sewage from residential toilets, showers, and sinks, including wastes from laundry, dishwashing, and food preparation activities.

- A wide variety of wastes from industrial, commercial, and institutional facilities which may or may not undergo pretreatment prior to discharge to the POTW.

- Unless collected and conveyed separately, stormwater runoff from streets, rooftops, and other impervious surfaces.

Once wastewater reaches a POTW, it undergoes treatment before it is discharged to the environment, typically a surface water body. The treatment process can involve three stages: primary, secondary, and tertiary treatment. Occasionally where stormwater and sanitary lines are combined, large storm events can produce an influx of stormwater in excess of plant capacity

that overwhelms the treatment system, resulting in the combined stormwater and sewage bypassing the treatment plant and discharging directly to surface waters untreated. This is a "combined sewer overflow" event and, except for the potentially severely impacted local areas, does not constitute a large part of the total loading of toxic chemicals to Puget Sound (Hart Crowser, et al., 2007).

For treating wastewater, the primary treatment stage employs a mechanical or physical process designed to remove solids and immiscible fats and oils. This may be accomplished in large settling tanks (usually referred to as sedimentation tanks or primary clarifiers) where solids and immiscible materials either float to the top or sink to the bottom. POTWs may also use preliminary screens to separate large objects before wastewater enters the settling tanks. The top product is skimmed off with a raking mechanism and is processed for disposal. The bottom product (or sludge) is scraped into a hopper where it is further dewatered before disposal to a landfill, biosludge composter, or waste fuel incinerator. Sludge can also be processed along with other compostable waste (grass clippings, leaves, food waste, and some cardboard products) and be sold as a biosolid fertilizer.

The purpose of secondary treatment is to meet federal and state secondary effluent standards by substantially degrading the biological or organic content of the liquid sewage effluent. These standards target biological oxygen demand and total suspended solids, typically using aerobic biological processes. The essential elements that drive the secondary treatment process are oxygen and biota, consisting of bacteria and protozoa that are capable of consuming the soluble organic contaminants (e.g., sugars, fats, and other hydrocarbons). The biota require a substrate in which they can thrive and bind much of the less soluble fractions into flocculent. Flocculation is a process of contact and adhesion whereby the particles of dispersion form larger-size clusters. Secondary clarifiers separate the flocculated solids from the wastewater stream, producing an additional sludge product that is processed in similar ways as the primary sludge product.

Some POTWs use treatment processes with the intent to address specific pollutants (e.g., organic nitrogen and phosphorus) beyond those specified in secondary water quality standards (biological oxygen demand, total suspended solids, and fecal coliform). They may employ multiple treatment processes for removing specific target pollutants. Sometimes this is called "tertiary treatment."

Prior to discharge to the environment, treated wastewater requires disinfection to inactivate pathogens that were not destroyed earlier in the treatment process. Disinfection is the additional step used to decrease the number of microorganisms. While the traditional and most common disinfection method is chlorination, ultraviolet (UV) and ozone are alternate methods.

Representative POTWs of the Puget Sound Basin

Under the NPDES permit program, Ecology has permitted approximately 106 POTWs to discharge treated wastewater in the Puget Sound Basin. Ecology had discharge flow information available in its NPDES permit management database (Ecology, 2010b) for the years 2007 through 2009 for all 106 POTWs except for the ten relatively smaller facilities operated by the U.S. Navy, U.S. Army, or Tribes. Appendix A identifies the total population of 96 candidate POTWs that the project team considered for this study. Of these 96 POTWs, 83 had flow data

for all 36 months, seven had flow data for at least 24 months but less than 36, five had flow data for at least 12 months but less than 24, and one had flow data for less than 12 months. The data were sufficient for determining average flows, and were comparable to the flows used for the prior Phase 2 loading estimation by EnviroVision, et al. (2008). The total discharge volume to the Puget Sound Basin employed for the Phase 2 estimation was 130,061 mgy, while the total volume employed in this study was 124,142 mgy.

Although the project team hoped to select a sufficient number of POTWs to represent the entire range of operating variables in Puget Sound Basin, due to the limited budget the number of POTWs that we could sample was limited to ten. Although all the variations of size, age, type of treatment process, and type of source cannot be adequately compared through evaluation of only ten facilities, by providing some representation of each we expected to cover a relatively wide range of conditions. Access to the facilities and their current operating status (e.g., no plant upgrades ongoing or planned between the two sampling events) also contributed to the final selection. Table 1 identifies the POTWs that we selected as the subjects of this study.

The project team selected POTWs to represent a flow-weighted cross-section of the 96 candidate POTWs. The percentages of the total flows to Puget Sound from the selected POTWs were roughly comparable to those of all 96 POTWs. These percentages were for small POTWs (<1 mgd) 0.5% for the ten selected POTWs versus 3.8% for all 96 Puget Sound POTWs, for medium POTWs (1 to 10 mgd) 6.0% versus 23.2%, and for large POTWs (>10 mgd) 93.5% versus 73.0%, respectively. Since the five largest sampled POTWs discharged about 46% of the total treated effluent discharged by the POTWs in the Puget Sound Basin, the project team determined that this distribution of facilities adequately represented the actual flows to the Sound. Table 2 shows the similarity between the distributions of the total flows among all 96 small, medium, and large POTWs and the distributions among the ten POTWs sampled in this project.

Nine of the ten selected POTWs used an activated sludge secondary treatment process. The remaining facility (Everett STP (Outfall 100)) was a trickling filter/solids contact system. Since at least 66 percent of the POTWs in the Puget Sound Basin used activated sludge for secondary treatment, weighting the selection toward this treatment process was appropriate.

Four POTWs in the Puget Sound Basin employed treatment processes to address pollutants beyond those specified in the secondary effluent standards. We sampled one of these, the Sumner STP, for this study. Since only four Ecology-permitted POTWs that discharged to surface waters in the Puget Sound Basin employed a membrane bioreactor (MBR) (Carnation WWTP, Duvall STP, Port Orchard WWTP, and Seashore Villa STP), and their discharges have been relatively small, with a combined total flow of 2.34 mgd, we sampled none of the MBR-equipped facilities for this study.

For disinfection, seven of the selected facilities used chlorine, and the remaining operations used UV. This distribution adequately represented the types of disinfection employed in the Puget Sound Basin because most of the older facilities there still use chlorine, while newer facilities often rely on UV.

In terms of source activities in the POTW service areas, five of the selected POTWs received a significant amount of industrial influent, two received minor amounts, and three treated practically only sanitary waste from their primarily residential service areas. The selected POTWs were distributed among seven of the 14 study areas in the Puget Sound Basin to ensure representative geographic coverage (Figure 1).

2.1.3 Seasonal and Temporal Sampling

The project team sampled each POTW twice. To maximize the potential seasonal variation in loading rates, we scheduled collection of those two samples to represent significantly different weather conditions: winter (wet season) and summer (dry season), in February and July 2009, respectively. As mentioned previously, we analyzed PCBs only once for six selected POTWs, in February 2009.

The limited budget prevented the project team from tracking the variation in loading rates that may occur during the course of a given day because doing so would have required analyses of many more samples. However, we did account for potential variations during a typical weekday by analyzing 24-hour composited samples collected Mondays through Fridays.

2.2 Field Methods

This section summarizes how the project team collected representative samples of treated wastewater from the ten POTWs. Additional details may be found in the Quality Assurance Project Plan (QAPP) (E & E and Herrera, 2009).

The project team conducted a site visit to each facility to assess site access, select the most appropriate locations for collecting samples, and evaluate equipment installation needs. The following bullet items describe the general sampling site location at each POTW.

- Bellingham STP – Automated and grab samples were collected from the outfall flume downstream of the chlorination and dechlorination facility.

- Bremerton STP – Automated and grab samples were collected from contact tanks downstream of the chlorination and dechlorination facility, just upstream of the outfall.

- Burlington WWTP – Automated and grab samples were collected from the inlet to the outfall pipe downstream of the UV radiation treatment.

- City of Tacoma (Central No. 1) – Automated and grab samples were collected from the contact tank near the outfall.

- Everett STP (Outfall 100) – The automated sample was collected by way of an access stand pipe located downstream of the first chlorination facility. This represented the permit compliance point for the Everett POTW for all parameters except residual chlorine and fecal coliform. This location was upstream of the comingling with the Marysville STP effluent and upstream of a pump station where additional chlorination may occur.

The grab sample was collected from a sampling spigot located downstream of this pump station at the compliance point for residual chlorine and fecal coliform. Grab samples could not be collected from the same location as the automated samples due to physical constraints.

- Gig Harbor STP – Automated and grab samples were collected from a mixed effluent contact tank downstream of the chlorination and dechlorination facility. The grab samples were collected slightly downstream of the automated sampler location.

- King County West Point – Automated and grab samples were collected from the effluent wet well downstream of the chlorination and dechlorination facility.

- Pierce County Chambers Creek STP – Automated and grab samples were collected from the contact tank mixing area downstream of the chlorination and dechlorination facility, just upstream of the outfall.

- Shelton STP – Automated and grab samples were collected from contact tanks downstream of the chlorination and dechlorination facility.

- Sumner STP – Automated and grab samples were collected near the outfall.

The project team collected all 20 treated wastewater samples as specified in the QAPP (E & E and Herrera, 2009). The 24-hour composite samples represented the treated effluent discharged during one full weekday. Tables 3 and 4 provide the specific sampling schedules for each of the ten POTWs, winter and summer, respectively. We used automated samplers to collect time-weighted composite samples for all analytes except PFCs and metals. Since parts of the automated sampling equipment were composed of Teflon and glass, we collected the aliquots for PFCs and metals analyses as discrete grab samples in appropriate containers. We collected these grab samples at two times to represent both the high and low daily flow at each POTW. We sampled all ten POTWs within a narrow time frame so that the samples represented similar weather conditions.

The project team cleaned the sample bottles (including the 9-liter [L] glass jar, the 1-L polypropylene bottle, and the 500-milliliter [ml] Teflon bottle for metals) as described in the QAPP (E & E and Herrera, 2009). Sample bottles and tubing were kept tightly sealed, and the ends of the tubing were covered with aluminum foil and placed into a pre-marked sealable plastic bag until installation at the facility.

The project team programmed the automated, refrigerated sampling devices (ISCO Avalanche®) to collect a 175-ml aliquot every 30 minutes, for a total of 48 sample aliquots collected from each POTW over the 24-hour sampling period. On the scheduled sampling day, we installed each sampling device at the site and verified the program. We then operated the sampling device manually, collecting and discharging effluent, to rinse the intake hosing and verify that the device collected 175 ml of effluent. To verify that the program had started and the automatic sampling device was working correctly, before moving to the next POTW, we waited while the ISCO-Avalanche collected at least two sample aliquots.

Upon completion of the automated collection of the 24-hour composite sample, project personnel checked the equipment to verify that no sampling errors had occurred. We capped the sample jar, removed it from the sampling device, and placed it on ice. At this time, we manually operated the sampling device to collect an aliquot of effluent to verify that 175 ml of effluent was still being collected.

The project team transported bottles for the grab portions of each sample in single resealable plastic bags. We collected grab samples from all the POTWs using the modified one-person clean hands/dirty hands procedure. In most cases it was necessary to use an extension pole and attach the sample bottle with zip ties to reach the effluent stream. We then rinsed the extension pole with deionized water before using it at the next POTW.

Once project personnel had collected both the grab and composite aliquots, we immediately capped, labeled, and put them on ice in a cooler. We then transported the samples to the Ecology Field Operations Center in Lacey and refrigerated them until delivering them the following morning to MEL for analysis.

Winter sampling occurred during the week of February 9, 2009. However, the project team resampled two of the POTWs (Tacoma Central and Chambers Creek) the following week due to the partial failure of two of the automated samplers and damage to the field duplicate sample. Thus the grab samples for these two POTWs were not collected on the same day as the composites. We successfully collected the entire set of 48 aliquots at nine of the ten facilities. However, the Burlington POTW shut down in the final hour of the sampling effort and resulted in collection of only 47 aliquots from this facility.

Summer sampling occurred during the week of July 13, 2009. All 48 aliquot were collected at all ten POTWs, and there were no irregularities associated with this event.

The project team obtained daily flow rate information from the operators of each of the POTWs for the days when samples were collected. We also reviewed the flow data that the POTWs had submitted to Ecology via their discharge monitoring reports for the 3 years from January 2007 through December 2009.

2.3 Laboratory Methods

The Ecology MEL analyzed the wastewater samples for all of the targeted toxic chemicals except PBDEs, PFCs, and PCBs. Pacific Rim analyzed its portion of the samples for PBDEs and PCBs. Axys analyzed its portion of the samples for PFCs. The analytical methods identified in the following subsection are described in detail in U.S. EPA 1999a, 2004, and 2007.

2.3.1 Analytical Methods

PAHs were analyzed using U.S. EPA SW-846 Method 8270 SIM. Method 8270 SIM is a modification of Method 8270. Selected ion monitoring (SIM) enhances sensitivity by setting the mass spectrometer (MS) to detect specific ions rather than a range of ions. Sensitivity is

generally increased by a factor of 10 over standard MS measurements. The primary disadvantage of SIM is a loss of qualitative information (unable to compare spectra).

BNAs and herbicides were analyzed using U.S. EPA SW-846 Method 8270. BNA extractable compounds included the phthalates chemical class. Samples were analyzed by gas chromatography/mass spectrometry (GC/MS) following extraction and, if necessary, appropriate sample cleanup and derivatization procedures. Sample extracts were injected into a gas chromatograph (GC) equipped with a capillary column that utilized a temperature program to separate analytes that were then detected with an MS. Analytes were identified by comparing electron impact spectra to the spectra of known standards. Analytes were quantified by comparing the response of a major ion relative to an internal standard using a calibration curve developed for each analyte.

Pesticides were analyzed using U.S. EPA SW-846 Method 8081. Samples were analyzed by gas chromatography/electron capture detector (GC/ECD) following extraction and, if necessary, appropriate sample cleanup procedures. Sample extracts were injected into a GC equipped with a capillary column, which utilized a temperature program to separate analytes that were then detected with an electron capture detector (ECD). Analytes were identified by comparing the retention time of target compounds with retention times of known standards on two dissimilar columns. Analytes were quantified by comparing the sample peak response using a calibration curve developed for each target compound.

PBDEs were analyzed using U.S. EPA method GC/HRMS 1614. Samples were analyzed using gas chromatography/high-resolution mass spectrometry (GC/HRMS) following extraction and, if necessary, appropriate sample cleanup procedures. Sample extracts were injected into a GC equipped with a capillary column, which utilized a temperature program to separate analytes that were then detected with an HRMS. Individual compounds (i.e., congeners) were identified by comparing the retention time and ion-abundance ratio of target compounds and associated labeled analog compounds with retention times and ion-abundance ratios of known standards. Congeners were quantified using the isotopic dilution quantitation technique, comparing the area of the quantification ion to that of the 13C-labeled standard and correcting for response factors.

PFCs were analyzed using Axys Method MLA-060 (Axys Analytical Services, Ltd., 2008). Samples were analyzed by liquid chromatography-tandem mass spectrometry (LC/MS/MS) following solid-phase extraction and selective elution procedures. Sample extracts were analyzed on a high-performance liquid chromatograph coupled to a triple quadrupole mass spectrometer. Target compounds were quantified using the internal standard method, comparing the area of the quantification ion to that of the 13C-labeled standard and correcting for response factors.

PCBs were analyzed using U.S. EPA method GC/HRMS 1668A. Samples were analyzed using gas chromatography/high-resolution mass spectrometry (GC/HRMS) following extraction and, if necessary, appropriate sample cleanup procedures. Sample extracts were injected into a GC equipped with a capillary column, which utilized a temperature program to separate analytes that were then detected with an HRMS. Individual compounds (i.e., congeners) were identified by comparing the retention time and ion-abundance ratio of target compounds and associated

labeled analog compounds with retention times and ion-abundance ratios of known standards. Congeners were quantified using the isotopic dilution quantitation technique, comparing the area of the quantification ion to that of the 13C-labeled standard and correcting for response factors.

Metals were analyzed using U.S. EPA Method 200.8. Samples were analyzed by inductively coupled plasma-mass spectrometry (ICP-MS) following acid extraction. Sample extracts injected into the ICP-MS were quantified by comparing instrument response to a calibration curve developed for each analyte. Results were reported for total (unfiltered) copper, lead, and zinc.

2.3.2 Data Review and Validation

The project team conducted data review and validation in general accordance with the detailed quality control (QC) procedures documented in the MEL Quality Assurance Manual (Manchester Environmental Laboratory, 2007) and Lab Users Manual (Manchester Environmental Laboratory, 2008), and in each subcontracted laboratory's quality assurance (QA) manual. One QC target for this project was for each laboratory to extract and analyze all the samples collected during each event in a single batch. By doing this, a single set of QC parameters would be applicable to all samples collected during each sampling event.

2.4 Data Analysis

2.4.1 Quality Assurance Review

The project team validated analytical data to verify they met project data quality objectives and to identify any limitations of the data, following the process outlined in Ecology QA1 review guidelines (PTI Environmental Services, 1989). Validation consisted of comparing calibration, accuracy, and precision results to the QC criteria listed in the method, the laboratory standard operating procedure, and the QAPP. If no QA guidelines existed for specific analytes, then the project team used applicable U.S. EPA national and regional data review guidelines (U.S. EPA, 1999b).

Since the Ecology MEL employs standardized analyte lists that partially overlap, they analyzed the following six chemicals with more than one method.

- 2,3,4,6-Tetrachlorophenol
- 2,4,5-Trichlorophenol
- 2,4,6-Trichlorophenol
- Dacthal
- Hexachlorobenzene
- Pentachlorophenol

For example, the laboratory used U.S. EPA Method SW-846 8270 (for semivolatile [BNA extractable] organic compounds by GC/MS) and 8270 (chlorinated herbicides by solid-phase extraction and GC/MS) to quantify the amount of pentachlorophenol in the samples. Thus, the laboratory reported more than one result for these six chemicals (i.e., two results for each sample). For each chemical, the project team selected only one of the results for use in estimating loadings – the one obtained with the more sensitive method which provided the smaller reporting limit.

The generally accepted practice is that concentrations between the method detection limit (MDL) and the reporting limit are reported as detected but not quantified, due to the potential for misuse of low-level data with relatively high quantitative uncertainty. However, for this investigation concentrations of all analytes reported between the MDL and reporting limit have been quantified and annotated with a "J" qualifier (estimated concentration), indicating a higher level of uncertainty in the quantitative value. Statistical evaluations of data whose uncertainties are "high" can lead to erroneous conclusions, especially if the sample populations are limited in size or are highly censored (high percentages of non-detect data – results where analytes are not present at detectable concentrations).

For this study, only wastewater sample results quantified at concentrations at least three times greater than the corresponding results in the method blank and in the field blank samples were considered "detected." Wastewater sample results that were not at least three times greater than the corresponding results in the method blank were qualified with a "U" to indicate "not detected." Wastewater sample results that were not at least three times greater than the corresponding results in the field or rinseate blank samples were qualified with a "UFB" to indicate "not detected due to contamination of the field or rinseate blank" for the purposes of this project only. The qualifier "U" subsequently replaced "UFB" in the data uploaded to the Ecology Environmental Information Management (EIM) system database.

2.4.2 Estimated Discharge from POTWs

The project team reviewed the wastewater discharge rates reported for January 2007 through December 2009 by the 96 POTWs listed in Appendix A (raw data in Ecology, 2010b), and determined the average annual discharge rate for each POTW. For estimating chemical loadings, we employed the average flows self-reported by the POTWs via their discharge monitoring reports.

2.4.3 Estimated Loadings of Toxic Chemicals from Each of the Ten POTWs

Using the toxic chemical concentration data obtained through this study, the project team developed annual loading rates for each of the ten sampled POTWs. We calculated annual loading rates by multiplying the average annual discharge rate from each facility by the average concentration for each toxic chemical. The average concentration depended on the number of detect and non-detect values from the two sampling events. We used the following procedures to compute annual loading rates for each POTW:

- If a chemical were detected during both sampling events, an average concentration was computed using the two detect values. We then used this average in the subsequent loading calculation.

- If a chemical were analyzed during only one sampling event and were detected, we used the reported concentration in the subsequent loading calculation.

- If a chemical were analyzed during both sampling events and were detected during only one of them, we computed an average concentration using the detect value and one-half the reporting limit for the non-detect value. We then used this average in the subsequent loading calculation.

- If a chemical were analyzed during both sampling events and were not detected during either of them, we did not generate a loading estimate.

2.4.4 Estimated Total Loadings to Puget Sound

The project team computed annual loading rates of each toxic chemical or chemical class for each of the 14 study areas in Puget Sound by multiplying the average annual volume of treated wastewater discharged from all the POTWs located in each study area by a representative concentration for each toxic chemical or chemical class. The average annual discharge volume for each study area was the sum of the discharge volumes from the POTWs located within the area. Table 6 identifies the average annual total discharge of wastewater from POTWs for each study area and compares the values used in this Phase 3 study with those that were used and that should have been used in the Phase 2 study (EnviroVision, et al., 2008). The discharge volumes were quite similar after correction for the mis-location of several POTWs in the Phase 2 study.

In determining some of the representative concentrations, the project team employed Regression on Order Statistics (ROS) to account for non-detect results, as described in the calculation steps provided later in this section. ROS is a commonly used procedure for estimating summary statistics from data sets that contain below-detection-limit (censored) observations (Helsel, 2005). The procedure first computes the Weibull-type plotting positions of the combined uncensored and censored observations. A linear regression model is then generated from the plotting positions of the uncensored observations and their normal quantiles. This linear regression model is the basis for estimating the concentration of the censored observations as a function of their normal quantiles. Finally, the observed uncensored values are combined with the modeled censored values to estimate summary statistics for the entire population. In this application, the project team used ROS to estimate summary statistics (i.e., 5th, 25th, 50th, 75th, and 95th percentiles) for individual and classes of toxic chemicals.

The project team compared the summary statistics derived from the treatment of non-detect results using the ROS method with those derived from three simpler substitution methods. They employed substitutions of non-detect data with zero, half the reporting limit, and the full reporting limit.

Individual Chemicals

To obtain representative concentrations for each toxic chemical, the project team pooled the data from samples collected at all ten POTWs during both the winter and summer sampling events. After pooling the data, we used different procedures to obtain a representative concentration for each chemical. The selected procedure for each chemical depended on the total number of results and the number of detect and non-detect values. We used the following steps to calculate representative concentrations if ten or more results were available for a given chemical:

1. Compute the detection frequency for each chemical by dividing the number of detect values by the total number of valid values, after excluding from both counts any rejected results. The number of valid values varied for each chemical because some values were rejected for quality assurance reasons, and some chemicals were analyzed a different number of times. Appendix D summarizes these detection frequencies.

2. Screen the frequencies from Step 1 to identify only those chemicals that had a detection frequency of 50 percent or greater. Given that the maximum number of results possible for any chemical was 20, this 50 percent detection frequency was the minimum likely to provide meaningful loading rate estimates.

3. Calculate the 5th, 25th, 50th, 75th, and 95th percentiles from the subset of chemicals identified in Step 2 using ROS, a statistical method for calculating summary statistics on censored datasets. Appendix E summarizes these percentiles.

4. Use the 25th, 50th, and 75th percentiles from Step 3 as the representative concentrations in the loading calculations to provide a measure of the central tendency and overall variability of the loading rates.

If fewer than ten results were available for a given chemical, the project team used the following steps to compute representative concentrations:

1. Compute the detection frequency for each chemical by dividing the number of detect values by the total number of valid values, after excluding from both counts any rejected results. The number of valid values varied for each chemical because some values were rejected for quality assurance reasons, and some chemicals were analyzed a different number of times. Appendix D summarizes these detection frequencies.

2. Screen the frequencies from Step 1 to identify only those chemicals that had a detection frequency of 65 percent or greater. For chemicals with fewer than ten results, this 65 percent detection frequency was the minimum likely to provide meaningful loading rate estimates.

3. Calculate the 5th, 25th, 50th, 75th, and 95th percentiles for each of the chemicals identified in Step 2, substituting one-half the reporting limit for all non-detect values in the data. Appendix E summarizes these percentiles.

4. Use the 25th, 50th, and 75th percentiles from Step 3 as the representative concentrations in the loading calculations to provide a measure of the central tendency and overall variability of the loading rates.

Further statistical and loading calculations employed only those chemicals selected by one of the two options described above.

Classes of Toxic Chemicals

Chemical classifications reflect the general internal structure of a group of chemicals or the reactive groups attached to that general structure. Aggregating chemicals into groups or classes with similar structures or reactive groups is sometimes useful because chemical classifications often indicate that the chemicals within such a group might share a single source, behave or affect environmental receptors in a similar manner, or all be amenable to particular treatments or other control actions that remove them from the waste stream.

The specific analytical method by which a chemical may be measured need not correspond with how that chemical may be "classified." For this study, the project team grouped the toxic chemicals of concern into classifications that did not necessarily reflect the analytical method that the laboratories used. Thus, for example, although pentachlorophenol is one of the BNA extractable analytes and is also detectable using the chlorinated herbicides method, we reported it, only once, as a member of the class of other BNA extractables and used the herbicide result because it was derived from the more sensitive analytical method.

The project team grouped the toxic chemicals into the 11 different classes listed below. Where we had sufficient data, we calculated the summary statistics and loading rates for individual chemicals. Where we had sufficient data, we also calculated the summary statistics and loading rates for certain chemical classes, comprised of specific individual compounds, as shown below. A "congener" is an example of a specific compound. For this project, a "homolog" is the group of compounds that contains a specific number of chlorine or bromine atoms. For example, the dibrominated diphenyl ether homolog group consists of the three individual congeners BDE-007, BDE-010, and BDE-015. Carcinogenic PAHs (cPAHs) constituted a subset of the heavy PAHs (HPAHs). A complete list of the chemicals and classes is provided in Appendix C.

Chemical Class	Number of Chemicals	Loading for Chemicals	Loading for Class
PAHs (light, heavy, and carcinogenic)	16 (6, 10, 7)	Yes	Yes
Phthalates	6	Yes	Yes
Other Base/Neutral/Acid Extractables	55	Yes	No
Pesticides	34	Yes	No
Herbicides	18	Yes	No
PBDEs (congeners)	38	Yes	Yes
PBDEs (homologs)	9	Yes	No
PFCs	13	Yes	Yes
PCBs (congeners)	209	Yes	Yes
PCBs (homologs)	10	Yes	No
Metals (copper, lead, and zinc)	3	Yes	No

To determine a representative concentration for each toxic chemical class, the project team pooled the data from all the samples collected from all ten POTWs during both the winter and summer sampling events. We summed the reported concentrations of each chemical within each class of chemicals for each sampling event at each POTW. We used the following steps to derive representative concentrations for each class of toxic chemicals:

1. For these summations, substitute zero for all non-detect values of individual chemicals unless all the reported values of the individual chemicals of a given chemical class/event/POTW combination were non-detects. In that case, use the highest reporting limit of all the individual chemicals within that chemical class/event/POTW combination to represent the non-detect concentration for that chemical class/event/POTW combination.

2. If none of the summed concentrations for a chemical class were non-detect, calculate the 5th, 25th, 50th, 75th, and 95th percentiles from those summed concentrations. If any of the

summed concentrations were non-detect, calculate the 5th, 25th, 50th, 75th, and 95th percentiles using ROS. Appendix E summarizes these percentiles.

3. Use the 25th, 50th, and 75th percentiles from Step 2 as the representative concentrations in the loading calculations to provide a measure of the central tendency and overall variability of the loading rates.

3. Results

3.1 Field Work

Table 5 shows the average daily flows for 2007 through 2009 compared with the average of measured discharge flow rates that each POTW operator provided for the two sampling events, and presents the annual flows that we used in calculating toxic chemical loadings. The flow values that the project team selected for loading calculations were based on the more representative monthly monitoring results reported by the POTWs to Ecology to comply with their NPDES permits.

3.2 Laboratory Work

3.2.1 Review of Data Quality

Appendix B contains copies of the Data Usability Summary Reports that document the results of the Level 1 data quality review. Brief descriptions of the data quality are provided below for each analytical method.

Polycyclic Aromatic Hydrocarbons

The Ecology MEL analyzed samples from February and July for PAHs using U.S. EPA Method SW-846 Method 8270D SIM (Polycyclic Aromatic Hydrocarbons by GC/MS) in accordance with the QAPP. The 320 PAH results generally met the project data quality objectives for reporting and QC limits. The project team qualified 35 percent of the results with a "J" qualifier to indicate uncertainty in the quantitative measurements. Of the results that indicated a detectable amount of pollutant ("detect results"), 52 percent were qualified with a "J."

Base/Neutral/Acid Extractable Compounds

The Ecology MEL analyzed samples from February and July for BNAs using U.S. EPA Method SW-846 Method 8270 (Semivolatile Organic Compounds by GC/MS) in accordance with the QAPP. BNA extractable compounds included the phthalates chemical class. The 1,160 BNA results generally met the project data quality objectives for reporting and QC limits. The project team qualified 30 percent of the results with a "J" qualifier to indicate uncertainty in the quantitative measurements. Of the detect results, 60 percent were qualified with a "J." Four of the detect results were also qualified as tentatively identified when qualitative QC criteria were not met. We rejected 70 results for failing to meet QC criteria (6.0 percent of the total possible BNA results). The following ten compounds had rejected results:

- 2,4-Dimethylphenol..... 2 Rejects
- 2-Nitroaniline ..... 5 Rejects
- 3,3'-Dichlorobenzidine.....11 Rejects
- 3-Nitroaniline ..... 5 Rejects
- 4-Chloroaniline.....20 Rejects
- 4-Nitroaniline .....10 Rejects
- 4-Nonylphenol..... 4 Rejects
- bis(2-Chloroethoxy) methane... 5 Rejects
- Bisphenol A..... 5 Rejects
- Caffeine ..... 3 Rejects

The Ecology MEL analyzed all of the required BNAs with the exception of benzidine (in both events) and N-nitrosodimethylamine (in July). In both February and July, the laboratory also provided data for the following five chemicals, not specified in the QAPP.

- 2-Methylphenol
- 4-Methylphenol
- Caffeine
- Triclosan
- Triethyl citrate

In July only, the laboratory provided data for the following five chemicals, also not specified in the QAPP.

- 3B-Coprostanol
- Benzoic acid
- Benzyl alcohol
- Cholesterol
- 2-Chloroethanol phosphate (3:1)

The BNA data met the project data quality objectives, although the reporting limits for several of the analytes were slightly greater than the values identified in the QAPP.

Pesticides

The Ecology MEL analyzed samples from February and July for pesticides using U.S. EPA Method SW-846 Method 8081 (Chlorinated Pesticide Compounds by GC/ECD) in accordance with the QAPP. The 650 pesticide results generally met the project data quality objectives for reporting and QC limits. The project team qualified 43 percent of the results with a "J" qualifier to indicate uncertainty in the quantitative measurements. Of the detect results, 62 percent were qualified with a "J."

In July only, the Ecology MEL provided data for the following seven chemicals that were not specified in the QAPP.

- 2,4'-DDD
- 2,4'-DDE
- 2,4'-DDT
- Chlordane, technical
- DDMU
- Mirex
- Pentachloroanisole

Herbicides

The Ecology MEL analyzed samples from February and July for herbicides using U.S. EPA Method SW-846 Method 535/8270 (Chlorinated Herbicides by Solid-Phase Extraction and GC/MS) in accordance with the QAPP. The 360 herbicide results generally met the project data quality objectives for reporting and QC limits. The project team qualified 12 percent of the results with a "J" qualifier to indicate uncertainty in the quantitative measurements. Of the detect results, 79 percent were qualified with a "J." Eleven of the detect results were also qualified as tentatively identified when qualitative QC criteria were not met. We rejected five results for failing to meet QC criteria (1.4 percent of the total possible herbicide results). The following four compounds had rejected results:

- 2,4-DB.....1 Reject
- Acifluorfen.....1 Reject
- Dinoseb .....1 Reject
- Picloram ..... 2 Rejects

Polybrominated Diphenyl Ethers
Pacific Rim analyzed samples from February and July for PBDE congeners using U.S. EPA SW-846 Method 1614 (Brominated Diphenyl Ethers in Water, Soil, Sediment, and Tissue by HRGC/HRMS) rather than U.S. EPA Method 1668 as specified in the QAPP. This variation was acceptable because it provided equivalent or better data than required to meet project data quality objectives.

The 710 PBDE results generally met the project data quality objectives for reporting and QC limits. The project team qualified 37 percent of the results with a "J" qualifier to indicate uncertainty in the quantitative measurements. Of the detect results, 23 percent were qualified with a "J." Ten of the detect results were also qualified as tentatively identified when qualitative QC criteria were not met.

Pacific Rim analyzed all the required congeners, except that in both February and July the results for BDE-197 and BDE-204 were reported as a total value rather than separately, and in February the results for BDE-049 and BDE-071 were reported as a total value rather than separately. The inability of the laboratory to separate these very similar congeners did not negatively impact the data usability. In addition, Pacific Rim provided data for the following three congeners that were not specified in the QAPP.

- BDE-007
- BDE-010
- BDE-015

Perfluorinated Organic Compounds
Axys analyzed samples from February and July for PFCs using Method MLA-060 (Analytical Procedure for Perfluorinated Organic Compounds in Aqueous Samples by LC-MS/MS) in accordance with the QAPP. In addition, the laboratory provided data for perfluorooctane sulfonamide (PFOSA).

Although the 260 PFC results complied with all other project data quality objectives, Axys employed reporting limits that were approximately an order of magnitude greater than the reporting limits identified in the QAPP. While this made no difference for detected congeners, and the quality of the non-detect results was acceptable, a possibility exists that the actual total concentrations of PFCs, and thus their loadings to Puget Sound, was greater than the estimate provided by this study.

Polychlorinated Biphenyls
Pacific Rim analyzed samples from February for PCB congeners using U.S. EPA Method 1668 (Chlorinated Biphenyl Congeners by HRGC/HRMS) in accordance with the QAPP. The 1,134 PCB results generally met the project data quality objectives for reporting and QC limits. The project team qualified less than 0.1 percent of the results with a "J" qualifier to indicate uncertainty in the quantitative measurements. None of the detect results were qualified with a "J." Seventeen of the detect results were also qualified as tentatively identified when qualitative QC criteria were not met.

Metals
The Ecology MEL analyzed samples for total metals (copper, lead, and zinc) using U.S. EPA Method 200.8 (Inductively Coupled Plasma – Mass Spectrometry) in accordance with the QAPP. The 60 metals results met the project data quality objectives for reporting and QC limits, and none of them were qualified.

3.2.2 Summary of Analytical Results

Excluding duplicate and field blank/rinseate samples, this project generated a total of 4,579 valid analytical results that characterized 20 samples of treated wastewater from ten subject POTWs (two samples from each POTW). Through data review and validation, the project team qualified 95 results as non-detects (with the "UFB" qualifier) due to potential contamination during handling based on the results of field/rinseate samples. A detectable amount of target analyte was present from every class of toxic chemicals that the project team assessed in one or more of the treated wastewater discharges. We detected a total of 230 chemicals, not counting PBDE and PCB homologs (212 chemicals if PCB co-elutants are considered individual analytes). Except for the PFC class, the range (i.e., variability) of the total concentrations of each chemical class among the POTWs was greater in summer than in winter. Appendix C summarizes all of the results from the chemical analyses. Appendix D summarizes for each analyzed chemical the number of valid results and the percentage of those results that indicated the detectable presence of that chemical. Table 7 shows the number of chemicals detected within each of the chemical classes. Note that all data provided in the text, tables, and appendices are precise to only two significant figures.

Polycyclic Aromatic Hydrocarbons
The project team analyzed for 16 PAHs, consisting of six low molecular weight compounds (LPAHs) and ten high molecular weight compounds (HPAHs). The greatest number of PAHs detected in any of the 20 samples was eight, and the largest single PAH concentration was 0.37 micrograms per liter (μg/L) of naphthalene. The most frequently detected PAHs were fluorene, fluoranthene, phenanthrene, and pyrene.

Each one of the six LPAHs was detected in effluent samples from at least one POTW. LPAHs were detected in all but four samples and in all but one POTW, and the largest concentration of total LPAHs in any sample was 0.79 μg/L. For the ten samples collected in February, the number of detected LPAHs ranged from zero to five, and the largest sum of the LPAHs was 0.14 μg/L. For the ten samples collected in July, the number of detected LPAHs ranged from zero to six, and the largest sum of the LPAHs was 0.79 μg/L.

Seven of the ten HPAHs were detected in effluent samples from at least one POTW. HPAHs were detected in all but two samples, those from a single POTW. The number of detected HPAHs ranged from zero to five, and the largest sum of the HPAHs was 0.076 μg/L. For the ten samples collected in February, the number of detected HPAHs ranged from zero to four, and the largest sum of the HPAHs ranged was 0.047 μg/L. For the ten samples collected in July, the number of detected HPAHs ranged from zero to five, and the largest sum of the HPAHs was 0.076 μg/L.

The effluent samples from only two POTWs contained detectable carcinogenic PAHs (cPAHs).

Phthalates
The project team analyzed for six phthalates. For the ten samples collected in February, the number of detected phthalates ranged from one to three, and the sum of phthalates ranged from 0.31 to 3.4 μg/L. For the ten samples collected in July, only bis(2-ethylhexyl) phthalate phthalate was detected, at concentrations ranging from 0.19 to 5.3 μg/L.

Other Base/Neutral/Acid Extractables
The project team analyzed 55 semi-volatile compounds (BNA extractables) that were not grouped within another chemical class. Thirty of these compounds were detected in the wastewater samples, and each of the 20 samples contained detectable concentrations of from four to 15 of them. The three chemicals that typically showed the greatest concentrations were 3B-coprostanol, caffeine, and cholesterol. When these three compounds were excluded (due to absent analyses or rejected results for the February samples), the results for the remaining 27 compounds did not indicate the existence of a seasonal pattern.

Pesticides
The project team analyzed 20 samples for 34 pesticides and detected six. Endosulfan I and alpha-BHC were detected only in winter, at three and two POTWs, respectively. Chlorpyriphos, pentachloroanisole, and toxaphene were detected only in summer, at one, three, and two POTWs, respectively. Hexachlorobenzene was detected in the wastewater from one POTW in the summer, and from another POTW in the winter.

Herbicides
The project team analyzed 20 samples for 18 herbicides and detected only five, generally more frequently in the summer than in the winter. Detectable concentrations of MCPP and triclopyr were present in only five of the wastewater samples. Detectable concentrations of 2,4-D; Dicamba I; and MCPA were present in three samples.

Polybrominated Diphenyl Ethers
Congeners
The project team analyzed for 38 PBDE congeners, with six of them co-eluting with another congener, producing three combinations. Considering the co-eluting congener combinations to be individual analytes, for the ten samples collected in February, the number of detected PBDEs ranged from 11 to 25, and the sum of PBDEs ranged from 9,100 to 125,000 picograms per liter (pg/L). For the ten samples collected in July, the number of detected PBDEs ranged from 11 to 31, and the sum of PBDEs ranged from 8,600 to 135,000 pg/L.

Homologs
The project team calculated concentrations for the nine PBDE homologs based upon the congener data. PBDEs from each homolog group were detected, and four of the homolog groups were detected in every sample (the hexa-, penta-, tetra-, and tri-BDEs).

Perfluorinated Compounds
The project team analyzed for 13 PFCs and detected from six to ten of these toxic chemicals in each of the wastewater samples. The four compounds that were typically present in the greatest concentrations were perfluorohexanoate (maximum of 52 nanograms per liter (ng/L)), perfluorononanoate (maximum of 134 ng/L), perfluorooctane sulfonate (maximum of 55 ng/L), and perfluorooctanoate (maximum of 70 ng/L). All 20 samples contained detectable concentrations of these four chemicals.

Polychlorinated Biphenyls
Congeners
The project team analyzed the six wastewater samples collected in February for 209 PCB congeners, with 37 of them co-eluting in one or another of 17 combinations. Considering the 17 co-eluting congener combinations to be individual analytes, the number of detected PCB congeners ranged from five to 105, and the sum of PCB congeners ranged from 69 to 15,400 pg/L. Every effluent sample contained PCBs.

Homologs
The MEL calculated concentrations for the ten PCB homologs based upon the congener data. PCBs in each homolog group were detected, and eight of the homologs were detected in at least half of the samples.

Metals
The project team detected copper, lead, and zinc in all 20 samples of wastewater. The smallest reported concentrations were 2.6 μg/L for copper, 0.15 μg/L for lead, and 13 μg/L for zinc. The two greatest concentrations of copper were in the wastewaters from the King County West Point and Sumner POTWs (14 and 17 μg/L, respectively). The two greatest concentrations of lead were in the wastewaters from the Everett STP and City of Tacoma (Central No. 1) POTWs (1.2 and 0.72 μg/L, respectively). The two greatest concentrations of zinc were in the wastewaters from the Gig Harbor STP (95 and 76 μg/L, for summer and winter, respectively).

Summary Statistics
Using the calculation methods described in Section 2.4.4, the project team quantified the variability of the results of each chemical and class of chemicals for which Puget Sound-wide loadings were later calculated. Appendix E summarizes these summary statistics, listing the expected concentration of each chemical and class of chemicals at the 5th, 25th, 50th, 75th, and 95th percentiles.

When comparing the methods for handling non-detect data, the project team found that the median concentrations obtained by substituting half the reporting limit were the most similar to those derived by the ROS method. Of the 63 chemicals and chemical classes where ROS was used, the corresponding median concentrations for 60 of them were the same or within a 10% relative difference, and for two others were within a 15% relative difference. Substituting half the reporting limit gave median values slightly larger than the ROS method for 4-methylphenol (58% relative difference). These results were consistent with those of Antweiler and Taylor, 2008. Appendix F contains additional details of this comparison.

3.3 Estimated Loadings of Toxic Chemicals from Each of the POTWs

The project team multiplied the average flows of wastewater discharge shown in Table 5 by the chemical concentrations selected as described in Section 2.4.3 to estimate rough annual loading rates from each of the ten subject POTWs. Appendix G summarizes the annual loadings from each POTW to the Puget Sound Basin.

Polycyclic Aromatic Hydrocarbons
Of the 16 PAHs analyzed among the ten POTWs, the number of PAHs detected in the discharge from any given POTW ranged from two to eight. Only five chemicals (fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene) comprised almost all of the total PAH loadings (61 to 100 percent) from nine of the POTWs. The effluent from one of the POTWs (Everett (outfall 100)) contained five PAHs not usually found in the other discharges, among which were four cPAHs.

Phthalates
Of the six phthalates analyzed among the ten POTWs, the number of phthalates detected at any given POTW ranged from one to three. All ten POTWs discharged bis(2-ethylhexyl) phthalate, which constituted 52 to 100 percent of their total loadings of phthalates via treated effluent.

Other Base/Neutral/Acid Extractables
Of the 55 miscellaneous BNA extractable chemicals discharged by the ten subject POTWs, the project team detected seven of them in all 20 samples of wastewater. These were 1,4-dichlorobenzene; 2,4,6-trichlorophenol; 2-chloroethanol phosphate; cholesterol; dibenzofuran; triclosan; and triethyl citrate. The three chemicals discharged in the greatest amounts were 3B-coprostanol (ranging from not detectable to 1,100 kilograms per year (kg/year)), caffeine (ranging from not detectable to 54 kg/year), and cholesterol (ranging from 14 to 1,500 kg/year).

Pesticides
Of the ten POTWs, the treated wastewater discharges of three of them contained no detectable amount of the 34 analyzed pesticides. Only five chemicals (chlorpyriphos, endosulfan I, hexachlorobenzene, pentachloroanisole, and toxaphene) comprised 96 to 100 percent of the total pesticide loadings from each of the other seven POTWs.

Herbicides
Of the ten POTWs, the treated wastewater discharges of three of them contained no detectable amount of the 18 analyzed herbicides. Only four chemicals (2,4-D; MCPA; MCPP; and triclopyr) comprised 84 to 100 percent of the total herbicide loadings from each of the other seven POTWs.

Polybrominated Diphenyl Ethers
Congeners
Of the 38 PBDEs analyzed among the ten POTWs, the number of PBDEs detected at any given POTW ranged from 18 to 32 (when considering the three co-eluting congener combinations as

individual analytes). Only three congeners (BDE-047, BDE-099, and BDE-209) comprised 69 to 82 percent of the total PBDE loadings from each of the ten POTWs.

Homologs

The two homologs that constituted the greatest portion of the PBDE loadings (from 45 to 81 percent) were the penta- and tetra-bromodiphenyl ethers. Decabromodiphenyl ether represented 43 percent of the total loading discharged by the Gig Harbor STP. The Everett STP (Outfall 100), King County West Point, and City of Tacoma (Central No. 1) facilities discharged the largest amounts of PBDEs annually, from 2.6 to 64 times as much as any of the other POTWs.

Perfluorinated Compounds

Of the 13 PFCs analyzed among the ten POTWs, the number detected at any given POTW ranged from eight to ten. Five of these compounds were detected in every one of the 20 sample analyzed. Only four chemicals (perfluorohexanoate, perfluorononanoate, perfluorooctane sulfonate, and perfluorooctanoate) comprised 56 to 87 percent of the total PFCs discharged from each of the POTWs.

Polychlorinated Biphenyls

Congeners

Of the 209 PCB congeners analyzed among the six sampled POTWs, the number detected at any given POTW ranged from five to 105 (when considering the 17 co-eluting congener combinations as individual analytes). The variety of congeners detected at a given POTW generally corresponded with their total loadings. The five congeners that the six POTWs discharged in the greatest amounts were PCBs-004, 052/064, 118, and 138. The total loading of these five congeners constituted about 19 percent of the total loading of PCB congeners.

Homologs

Of the ten homolog groups, the number detected at the six sampled POTWs ranged from one to nine. For three of the POTWs, the tetra-, penta-, and hexa-chlorobiphenyl homologs constituted 63 to 70 percent of their discharges. For the Shelton STP, the tri-, tetra-, and hepta-chlorobiphenyl homologs constituted 94 percent of its discharge. For the Pierce County Chambers Creek STP, the di-, tri, and tetra-chlorobiphenyl homologs constituted 93 percent of its discharge.

Metals

The ranges of the loadings of the three analyzed metals from the ten sampled POTWs varied considerably. The median annual loading of copper was 59 kg/year, within an 180-fold high-to-low range. The median annual loading of lead was 4.3 kg/year, within a 90-fold high-to-low range. The median annual loading of zinc was 240 kg/year, within a 48-fold high-to-low range.

3.4 Estimated Total Loadings to Puget Sound

Based on the total number of valid analyses and the frequencies of detection, the project team identified 68 individual chemicals, discounting PBDE and PCB homologs, for which we could reliably estimate total loadings to Puget Sound (using the method described in Section 2.4.4).

The data also allowed calculation of estimates for the total loadings of 13 PBDE and PCB homologs and seven chemical classes. Appendix E identifies the summary statistics (the 5th, 25th, 50th, 75th, and 95th percentiles) for these individual chemicals and chemical classes. Appendix H summarizes the estimated loadings of these chemicals and chemical classes in the 14 study areas of Puget Sound (25th, 50th, and 75th percentiles only).

Since the available data required the grouping of chemical results from all ten of the subject POTWs, the areal distribution of loadings to the Puget Sound Basin directly corresponded to the total discharge rates from the POTWs within each study area. Since no POTWs were located within the Elliott Bay study area, the loadings from that study area were zero. The following bullets identify the estimated ranges of total loadings for toxic chemical classes and the three metals to the Puget Sound Basin from all the POTWs in the 14 study areas, shown as from the 25th to the 75th percentiles. Appendix H presents additional details along with the loading estimates for the other chemicals.

- Total PAHs: 7.6 to 46 kg/year.
  LPAHs comprised from 43 to 76 percent of the total PAHs annually discharged to Puget Sound. The amount of LPAHs ranged from 3.3 to 35 kg/year.

- Total phthalates: 220 to 910 kg/year.
  Bis(2-ethylhexyl) phthalate comprised 80 to 100 percent of the total phthalates annually discharged to Puget Sound. The amount of bis(2-ethylhexyl) phthalate ranged from 220 to 900 kg/year.

- Total PBDEs: 7.0 to 21 kg/year.
  From 71 to 79 percent of the PBDE congeners annually discharged to Puget Sound were BDE-047, BDE-099, and BDE-209, constituents within the tetra-, penta-, and deca-bromodiphenyl ether homolog groups, respectively.

- Total PFCs: 31 to 59 kg/year.
  From 39 to 49 percent of the PFCs annually discharged to Puget Sound consisted of perfluorohexanoate and perfluorooctanoate.

- Total PCBs: 0.13 to 1.8 kg/year.
  Approximately 55 percent of the PCB congeners annually discharged to Puget Sound were distributed among the tri-, tetra-, and penta-chlorobiphenyl homolog groups.

- Copper: 2,500 to 5,500 kg/year.

- Lead: 140 to 250 kg/year.

- Zinc: 16,000 to 24,000 kg/year.

4. Discussion

4.1 Comparison with Results from Phase 2

Most of the difference in estimated loadings between the Phase 2 study in 2008 and this Phase 3 study appeared to be due to variations in the concentrations rather than total discharge volume of treated wastewater. Table 6 shows the similarity between the Phase 2 and Phase 3 studies of the average total flows from POTWs to the 14 Puget Sound study areas.

Based on the limited suite of NPDES self-monitoring analytes and the use of standard analytical reporting limits (i.e., larger than those used for this study), the Phase 2 study provided estimates of total loadings for seven chemicals: copper, lead, mercury, zinc, chloroform, bis(2-ethylhexyl) phthalate, and phenolics. The total estimated loadings of copper and zinc to Puget Sound from this study were about 70 and 97 percent, respectively, of the Phase 2 study estimates. The estimated loadings of lead and bis(2-ethylhexyl)phthalate from this study were 18 and 17 percent, respectively, of the Phase 2 study estimates. For each of the 14 Puget Sound study areas, Table 8 compares the loading rate estimates of the four chemicals that we assessed in Phase 2 with the results from this study.

In general, the current study has improved and extended the results from Phase 2, and has clearly demonstrated that POTWs discharge toxic chemicals in their treated wastewater effluents.

4.2 Comparison with Results from Other Studies

The project team evaluated whether the results from this study for these particular ten POTWs were similar to or differed from the discharges of treated effluents from other POTWs in Washington State. We focused primarily on PCBs, which are legacy pollutants, and PFCs, which are pollutants of emerging concern.

Polychlorinated Biphenyls
PCBs are the class of toxic organic chemicals for which Ecology had the greatest amount of historical data. The following studies addressed historical discharges of PCBs from POTWs:

- Albion, Colfax, Pullman — Lubliner, 2009.
- College Place, Walla Walla — Lubliner, 2007.
- Liberty Lake, Spokane — Golding, 2002.
- Okanogan, Omak, Oroville — Serdar, 2003.
- 18 POTWs in the Yakima River watershed — Johnson, et al., 2009.

For all of these studies, the analytical laboratories employed methods that reduced the final detection limits to values lower than normal, similar to this study. Figure 2 illustrates the total concentrations of PCBs discharged from these facilities and shows that the results found in this study were similar to results from elsewhere. This study found that the concentrations of total PCBs from the Everett STP (Outfall 100) and City of Tacoma (Central No. 1) facilities were

greater than the other POTWs shown in Figure 2. However, these results were based upon only a single composite sample from each facility. Further analyses are required to support any conclusions.

Ten of the PCB congeners (and their three co-elutants) detected most frequently and at the greatest concentrations in this study were the same PCB congeners that Ross, et al. (2000) found at the greatest concentrations in blubber tissue samples from the northern and southern resident populations of Orca whales. These ten congeners were PCBs-052, 099, 101, 105, 118, 138, 149, 153, 180, and 187. They and their co-elutants were among the top 12 percent of all PCB congeners ranked according to the greatest average concentration discharged from the six POTWs and among the top 25 percent frequency of detection, and contributed 31 percent of the total average concentration of all the PCB congeners. Four of the 21 congeners for which Ecology estimated loadings were among the ten that Ross, et al. identified as the greatest in the Orca whales. These congeners and their two co-elutants comprised from 9.7 to 23 percent of the total loading of PCBs from POTWs to Puget Sound.

Since the manufacture of PCBs ceased several decades ago, the frequent detection of PCBs in POTW wastewaters indicated that legacy contamination remains a significant source of PCBs. The presence of PCBs in a variety of building materials (e.g., caulking, paint, insulation, roofing, siding, and asphalt) is an ongoing source that slowly and continually releases small amounts of PCBs into the environment and the regional wastewater infrastructure. The U.S. EPA (1997) summarized data that indicated that 32 to 65 metric tons of PCBs had been incorporated into caulking materials alone in the Puget Sound region (Ecology, 2011 in preparation). Since PCBs degrade very slowly and adhere to organic matter, the majority of residual PCBs appear to have bound to particles, and some have become trapped in wastewater systems (i.e., in the sediments in the piping). Therefore, uncontrolled construction or cleaning activities may mobilize these residuals and release additional pulses of PCBs into the environment for many more years.

Perfluorinated Compounds

Ecology has only recently begun to acquire monitoring data concerning PFCs in wastewater discharges. A recent study (Furl and Meredith, 2010) assessed the PFCs discharged in 2008 from four Washington state POTWs. Figure 3 illustrates the concentrations of total PFCs discharged from those four facilities and compares them with the results from the ten POTWs sampled in this study. The results from the two studies were similar. Almost all the total PFC concentrations in the treated wastewaters were between 50 and 200 ng/L.

Phthalates

Information about discharges of phthalates from POTWs in Washington state is limited. One study estimated the loading of bis(2-ethylhexyl) phthalate to POTWs in the Puget Sound region (Washington Toxics Coalitions and People for Puget Sound, 2009). Based upon analyses of residential dust and laundry wastewaters, the authors determined that approximately 959 kg of bis(2-ethylhexyl) phthalate flows annually from residences to POTWs in the Puget Sound region. This loading is consistent with our estimate in this study that POTWs discharge from 220 to 900 kg of bis(2-ethylhexyl) phthalate. The smaller amount discharged <u>from</u> POTWs than discharged <u>to</u> POTWs likely indicates that POTWs successfully treat or remove some of the phthalates in their wastewaters.

4.3 Seasonal Comparisons

The original intent for collecting treated effluent samples in February and July was to characterize possible differences in the concentrations and loadings of toxic chemicals during the wet and dry seasons. The project team suspected that a greater amount of precipitation and a higher groundwater table in the winter might increase the flow to POTWs and possibly affect the contaminant loads entering the POTWs and the degree of treatment they experienced prior to discharge. Also seasonal differences in the activities of wastewater producers may have caused the loadings of certain toxic chemicals to vary from one part of the year to another.

Unfortunately, the weather did not cooperate, and January to early February 2009 was an unusually dry period. Although some precipitation did occur in mid-February when samples were collected, the flow volumes from several of the POTWs were less in February than in July (Table 5).

Given that the measured effluent concentrations and flows varied substantially among the POTWs and that one day of sampling could not represent an entire season, this study could not distinguish a seasonal pattern. However, the winter samples from the three largest facilities (based on flow) contained from two to seven times as many detected PAHs and total concentrations from four to 19 times as great as the other POTWs. Whether this variation was due to a seasonal difference is not clear. Additional study may be warranted in the future.

4.4 Limitations

1. Based on 4,579 valid concentration results for toxic chemicals in 20 samples of wastewater, the results represented only a small portion of the total amount of wastewater treated and discharged by the POTWs in the Puget Sound Basin. Some comparisons are:

    - The Puget Sound Basin contained 106 permitted POTWs, and flow information was available for 96 of them.
      However, the project team collected samples from only ten POTWs and based loading estimates for the entire Sound on only 20 samples (six samples for PCBs).

    - The total flow from the 96 Puget Sound POTWs was approximately 124,140 mgy.
      However, the project team collected samples from POTWs whose discharges totaled 59,900 mgy (Table 5) – only 48 percent of the total POTW discharge to the Sound.

    - The rates of toxic chemical loadings from POTW discharges vary day-to-day throughout the year.
      However, the project team collected samples that represented only two days of the year (one day for PCBs).

2. Almost 73 percent of the analytical results were "non-detects." As a consequence, the project team did not estimate loadings from all 96 Puget Sound POTWs for 303 of the total 371 individual chemicals that we analyzed, not counting the PBDE and PCB homologs and

PCB co-elutants. However, a non-detect result did not mean that the amount of a particular chemical in a given wastewater sample was zero. Thus, this study could not support conclusions about whether any of these 303 chemicals were or were not threats to the health of the Puget Sound ecosystem.

3. The project team used the ROS method to "fill in" values for 48 individual chemicals, eight homolog groups, and seven chemical classes for which only some of the results were non-detect (less than 35 percent for individual chemicals with fewer than ten results, and less than 50 percent for the other individual chemicals). Therefore, the concentration summary statistics in Appendix E and the loading estimates in Appendix H were accurate only to the extent that the assumptions behind the ROS method were true for these data.

5. Conclusions

The goals of this project were (1) to screen treated wastewater discharges for toxic chemicals that POTW operators do not routinely monitor, and (2) to improve the loading estimates for certain toxic chemicals by employing more sensitive analytical methods.

This study developed improved estimates for the loadings of toxic chemicals discharged from permitted POTWs into the surface waters of the Puget Sound Basin. These new loading estimates are improved and more accurate than the Phase 2 estimates because the project team:

(a) Sampled from facilities that employed a wide variety of treatment techniques.

(b) Applied uniform and approved methods for sampling and analyses.

(c) Used more recent data than in prior studies.

(d) Covered a much broader list of chemicals than normally monitored.

(e) Employed more sensitive analytical methods than normally used.

POTWs are a significant secondary source of toxic chemicals. The results from this study will support development and prioritization of future control actions to improve and protect the Puget Sound ecosystem.

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Tables

Table 1. Characteristics of the Ten Subject POTWs

POTW Name	Permit Number	Study Area	Treatment Process	Industrial Influent	Max Month Avg Design Flow (MGD)	Representative Flow (MGD)
Bellingham STP	WA0023744	Strait of Georgia	Secondary oxygen-activated sludge with chlorine.	Yes	37	12.3
Bremerton STP	WA0029289	Sinclair-Dyes Inlet	Secondary activated sludge with chlorine.	Yes	10.1	4.30
Burlington WWTP	WA0020150	Whidbey Basin	Secondary activated sludge with UV disinfection.	Negligible	3.79	1.64
City of Tacoma (Central No.1)	WA0037087	Commencement Bay	Secondary activated sludge with chlorine.	Yes	60	19.9
Everett STP (Outfall 100)	WA0024490	Port Gardner	Trickling filter and solids contact with chlorine.	Yes	21.0	10.6
Gig Harbor STP	WA0023957	South Sound East	Secondary activated sludge with chlorine.	Negligible	1.6	0.809
King County West Point	WA0029181	Main Basin	Secondary activated sludge with chlorine.	Yes	215	92.5
Pierce County Chambers Creek STP	WA0039624	South Sound East	Secondary activated sludge (aerobic and anoxic) with UV.	Minimal	28.7	17.9
Shelton STP	WA0023345	South Sound East	Secondary activated sludge in oxidation ditch with chlorine.	Negligible	4.02	1.99
Sumner STP	WA0023353	Commencement Bay	Activated sludge with UV disinfection and anaerobic sludge digestion.	Minimal	4.59	2.01

Key:

MGD = Million gallons per day.
POTW = Publicly Owned Treatment Works.
STP = Sewage Treatment Plant.
UV = Ultraviolet.
WWTP = Wastewater Treatment Plant.

Table 2. Comparison of Sampled POTWs with All POTWs in the Puget Sound Basin

Size of the Average Flow	POTWs in the Puget Sound Basin (a)			POTWs Sampled in This Project		
	Number	Total Flow from POTWs Considered (MGY)	Percentage of Total Flow	Number	Total Flow from POTWs Sampled (MGY)	Percentage of Total Flow
Small (<1 MGD)	60	4,710	3.8%	1	295	0.5%
Medium (1 to 10 MGD)	29	28,770	23.2%	4	3,630	6.0%
Large (>10 MGD)	7	90,660	73.0%	5	56,900 (b)	93.5%
Total =	96	124,140	100.0%	10	60,800 (c)	100.0%

Key:

The precision of the data in this table is only two significant figures.

The flows may not add up due to rounding.

The flows are based upon the average monthly flows self-reported by each POTW from January 2007 through December 2009 (Ecology, 2010b).

MGD = Million gallons per day.

MGY = Million gallons per year.

POTW = Publicly Owned Treatment Works.

(a) = Excluding the ten small facilities operated by the U.S. Army and Navy and the Tribes.

(b) = Includes only the sampled Outfall 100 at the Everett STP.

(c) = This value differs from the corresponding total in Table 5 due to rounding.

Table 3. Summary of Winter Samples

POTW Name	Composite Samples					Grab Samples	
	Volume Submitted to Laboratory (Liter)	Number of Aliquots	Start (date/time)	End (date/time)	Collected (date/time)	Grab 1 (date/time)	Grab 2 (date/time)
Bellingham STP	8.4	48	2/11/09 09:35	2/12/09 09:06	2/12/09 09:30	2/11/09 07:15	2/12/09 10:40
Bremerton STP	8.3	48	02/09/09 09:30	2/10/09 09:01	2/10/09 10:00	02/09/09 08:45	2/10/09 10:45
Burlington WWTP	9	47	2/09/09 10:40	2/10/09 10:10	2/10/09 10:40	2/10/09 0735	2/10/09 10:10
City of Tacoma (Central No. 1)	8.4	48	2/18/09 10:44	2/19/09 10:15	2/19/09 10:30	2/11/09 05:45	2/12/09 14:15
Field Duplicate	8.4	48	2/18/09 11:08	2/19/09 10:39	2/19/09 10:45	NA	NA
Lab Duplicate	8.4	48	2/18/09 11:30	2/19/09 11:03	2/19/09 11:15	NA	NA
Everett STP (Outfall 100)	8.5	48	2/11/2009 12:06	2/12/09 11:37	2/12/2009 12:40	2/11/09 12:20	2/12/09 13:00
Gig Harbor STP	8.3	48	2/09/09 07:05	2/10/09 06:35	2/12/09 12:15	2/09/09 05:55	2/10/09 12:25
King County West Point	8.8	48	2/09/2009 07:20	2/10/2009 06:50	2/10/2009 12:30	2/09/09 05:30	02/09/09 13:35
Field Duplicate	NA	NA	NA	NA	NA	2/09/09 05:30	02/09/09 13:35
Lab Duplicate	NA	NA	NA	NA	NA	2/09/09 05:30	02/09/09 13:35
Pierce County Chambers Creek STP	8.4	48	2/18/09 14:34	2/19/09 14:05	2/19/09 14:30	2/11/09 07:30	2/12/09 16:30
Shelton STP	8.4	48	2/09/09 12:37	2/10/09 12:08	2/10/09 16:00	2/09/09 12:10	2/10/09 06:00
Sumner STP	8.4	48	2/11/09 10:00	2/12/09 09:30	2/12/2009 12:00	2/11/09 10:40	2/12/09 06:15

Key:
NA = Not applicable.
POTW = Publicly Owned Treatment Works.
STP = Sewage Treatment Plant.
WWTP = Wastewater Treatment Plant.

Table 4. Summary of Summer Samples

POTW Name	Composite Samples					Grab Samples	
	Volume Submitted to Laboratory (Liter)	Number of Aliquots	Start (date/time)	End (date/time)	Collected (date/time)	Grab 1 (date/time)	Grab 2 (date/time)
Bellingham STP	9	48	7/15/2009 07:10	7/16/2009 07:20	7/16/2009 09:20	7/15/2009 07:20	7/16/2009 09:24
Bremerton STP	9	48	7/13/2009 10:00	7/14/2009 09:30	7/14/2009 09:30	7/13/2009 08:35	7/14/2009 10:30
Burlington WWTP	9	48	7/13/2009 11:25	7/14/2009 10:54	7/14/2009 08:15	7/13/2009 10:00	7/14/2009 08:20
City of Tacoma (Central No. 1)	9	48	7/15/2009 06:50	7/16/2009 06:10	7/16/2009 07:30	7/15/2009 06:00	7/16/2009 14:40
Everett STP (Outfall 100)	9	48	7/15/2009 10:59	7/16/2009 10:29	7/16/2009 12:28	7/15/2009 10:30	7/16/2009 12:37
Gig Harbor STP	9	48	7/13/2009 06:28	7/14/2009 06:00	7/14/2009 11:30	7/13/2009 06:00	7/14/2009 12:15
King County West Point	9	48	7/13/2009 07:44	7/14/2009 07:12	7/14/2009 13:25	7/13/2009 05:55	7/14/2009 13:30
Field Duplicate	9	48	7/13/2009 07:50	7/14/2009 07:17	7/14/2009 13:25	7/13/2009 05:40	NA
Pierce County Chambers Creek STP	9	48	7/15/2009 15:30	7/16/2009 15:00	7/16/2009 16:00	7/16/2009 07:25	7/16/2009 16:14
Shelton STP	9	48	7/14/2009 07:50	7/15/2009 07:20	7/15/2009 12:45	7/13/2009 12:45	7/14/2009 07:30
Sumner STP	9	48	7/16/2009 06:30	7/17/2009 06:00	7/17/2009 06:00	7/15/2009 10:35	7/16/2009 06:15

Key:

NA = Not applicable.
POTW = Publicly Owned Treatment Works.
STP = Sewage Treatment Plant.
WWTP = Wastewater Treatment Plant.

Table 5. Average Flow Volumes for the Ten POTWs

	Phase 2 (a) (MGD / MGY)	Self-Reported via DMRs (b) (MGD)	Phase 3 (this study)			
			February Event (MGD)	July Event (MGD)	Average (MGD / MGY)	Value Used for Loading Estimates (MGD / MGY)
Bellingham STP	12.1 / 4,430	12.3 (c)	10.94	9.98 (d)	10.5 / 3,820	12.3 / 4,490
Bremerton STP	5.04 / 1,840	4.30 (e)	3.71	4.91	4.31 / 1,570	4.30 / 1,570
Burlington WWTP	1.56 / 569	1.64 (e)	no data	no data	no data	1.64 / 599
City of Tacoma (Central No. 1)	19.7 / 7,190	19.9 (e)	17.28	16.25	16.8 / 6,120	19.9 / 7,260
Everett STP (Outfall 100)	12.6 / 4,620	10.6 (e)	11.98	14.58	13.3 / 4,470 (f)	10.6 / 3,870
Gig Harbor STP	0.800 / 292	0.809 (e)	0.7133	0.6725	0.693 / 253	0.809 / 295
King County West Point	102 / 37,400	92.5 (g)	110.9	66.24	88.6 / 32,300	92.5 / 33,800
Pierce County Chambers Creek STP	17.8 / 6,480	17.9 (e)	8.52	15.72	12.1 / 4,420	17.9 / 6,530
Shelton STP	2.13 / 776	1.99 (e)	2.13	no data	2.13 / 777 (h)	1.99 / 726
Sumner STP	1.89 / 690	2.01 (e)	1.95	1.96	1.96 / 714	2.01 / 734

Key:

DMR = Discharge Monitoring Report required by NPDES permit.

MGD = Million gallons per day.

MGY = Million gallons per year.

POTW = Publicly Owned Treatment Works.

STP = Sewage Treatment Plant.

WWTP = Wastewater Treatment Plant.

(a) = From EnviroVision, et al., 2008.

(b) = From Ecology PARIS database of permittee-reported monitoring results (Ecology, 2010b).

(c) = December 2007 through December 2009.

(d) = Average of daily flows for July 15 and 16, 2009 (Wendling, 2010).

(e) = January 2007 through December 2009.

(f) = Annual flow was adjusted to account for an average of 29 days per year out of service.

(g) = July 2009 through December 2009.

(h) = Only one data point.

Table 6. Average Total POTW Flow Volumes for the 14 Puget Sound Study Areas

Study Area	Average Total POTW Flows (MGY)			Comparison Phase 3 versus Phase 2 (corrected) (percent)
	Phase 2	Phase 2 (corrected)	Phase 3 (this study)	
Admiralty Inlet	338	338	332	- 1.8
Commencement Bay	12,126	12,162	12,169	+ 0.058
Elliott Bay	0	0	0	0
Hood Canal (North)	4	270	73.4	- 73.
Hood Canal (South)	0	5.9	5.9	0
Main Basin	77,329	77,161	72,543	- 6.0
Port Gardner	12,634	12,935	11,736	- 9.3
San Juan Islands	1,529	858	828	- 3.5
Sinclair-Dyes Inlet	3,798	3,796	3,624	- 4.5
South Sound (East)	7,832	7,062	7,097	- 0.50
South Sound (West)	4,243	4,904	4,731	- 3.5
Strait of Georgia	5,943	5,943	6,068	- 2.1
Strait of Juan de Fuca	1,160	1,160	1,110	- 4.3
Whidbey Basin	3,126	3,701	3,825	- 3.4
Total =	**130,061**	**130,296**	**124,142**	**- 4.7**

Key:

The precision of the data in this table is only two significant figures.
Values may not appear to sum correctly due to rounding.

MGY = Million gallons per year.

POTW = Publicly Owned Treatment Works.

The POTWs reassigned to their correct Study Areas were:

Alderbrook Resort and Spa
Carnation WWTP
Granite Falls STP STP
Messenger House Care Center
North Bend STP
Oak Harbor STP
Olympic Water and Sewer, Inc.
Penn Cove WWTP
Pope Resources
Rainier State School
Shelton STP
Taylor Bay STP

Table 7. Number of Chemicals Detected within Each Chemical Class

Chemical Class	Number of Chemicals			
	Analyzed	Detected (a)	Detected >= 50% (b)	Detected >= 65% (b)
Polycyclic Aromatic Hydrocarbons (PAHs)	16	13	4	nc
Phthalates	6	4	1	nc
Other Base/Neutral/Acid Extractables	55	30	(c)	nc
Pesticides	34	6	0	nc
Herbicides	18	5	0	nc
Polybrominated Diphenyl Ethers (PBDE Congeners)	38	33	18	nc
Polybrominated Diphenyl Ethers (PBDE Homologs)	9	9	8	nc
Perfluorinated Compound (PFCs)	13	12	9	nc
Polychlorinated Biphenyls (Congeners) (PCB Congeners)	209	124	nc	21
Polychlorinated Biphenyls (Homologs) (PCB Homologs)	10	10	nc	5
Metals (Copper, Lead, and Zinc)	3	3	nc	nc

Key:

nc = Not calculated.
(a) = Derived from data in Appendix C; used for determining loadings by chemical class.
(b) = Derived from Percent Detection column in Appendix D; used for determining loadings for individual chemicals.
(c) = Total loading rates were not determined for these groups of chemicals.

Table 8. Comparison of Estimated Loadings from Phase 1 and Phase 2

Study Area	Copper				Lead				Zinc				bis(2-Ethylhexyl) Phthalate			
	Phase 2 (a) Best Estimate (kg/year)	Phase 3 (this study)			Phase 2 (a) Best Estimate (kg/year)	Phase 3 (this study)			Phase 2 (a) Best Estimate (kg/year)	Phase 3 (this study)			Phase 2 (a) Best Estimate (kg/year)	Phase 3 (this study)		
		25th Percentile (kg/year)	50th Percentile (kg/year)	75th Percentile (kg/year)		25th Percentile (kg/year)	50th Percentile (kg/year)	75th Percentile (kg/year)		25th Percentile (kg/year)	50th Percentile (kg/year)	75th Percentile (kg/year)		25th Percentile (kg/year)	50th Percentile (kg/year)	75th Percentile (kg/year)
Admiralty Inlet	1.32E+01	6.69E+00	1.16E+01	1.47E+01	1.41E+00	3.74E-01	4.96E-01	6.79E-01	5.88E+01	4.29E+01	5.08E+01	6.37E+01	4.16E+00	5.78E-01	1.18E+00	2.42E+00
Elliott Bay	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commencement Bay	5.25E+02	2.45E+02	4.25E+02	5.40E+02	1.07E+02	1.37E+01	1.82E+01	2.49E+01	2.03E+03	1.57E+03	1.86E+03	2.33E+03	1.85E+02	2.12E+01	4.31E+01	8.87E+01
Hood Canal (North)	1.60E-01	1.48E+00	2.56E+00	3.26E+00	1.70E-02	8.27E-02	1.10E-01	1.50E-01	7.00E-01	9.48E+00	1.12E+01	1.41E+01	5.00E-02	1.28E-01	2.60E-01	5.35E-01
Hood Canal (South)	0	1.18E-01	2.05E-01	2.61E-01	0	6.61E-03	8.78E-03	1.20E-02	0	7.58E-01	8.98E-01	1.13E+00	0	1.02E-02	2.08E-02	4.28E-02
Main Basin	3.81E+03	1.46E+03	2.53E+03	3.22E+03	3.19E+02	8.17E+01	1.08E+02	1.48E+02	9.29E+03	9.37E+03	1.11E+04	1.39E+04	5.58E+02	1.26E+02	2.57E+02	5.29E+02
Port Gardner	2.75E+02	2.36E+02	4.10E+02	5.21E+02	1.53E+02	1.32E+01	1.75E+01	2.40E+01	1.07E+03	1.52E+03	1.79E+03	2.25E+03	3.41E+02	2.04E+01	4.15E+01	8.55E+01
San Juan Islands	6.74E+01	1.67E+01	2.89E+01	3.67E+01	3.04E+00	9.32E-01	1.24E+00	1.69E+00	1.71E+02	1.07E+02	1.27E+02	1.59E+02	6.73E+00	1.44E+00	2.93E+00	6.03E+00
Sinclair-Dyes Inlet	6.08E+01	7.30E+01	1.26E+02	1.61E+02	2.01E+02	4.08E+00	5.42E+00	7.41E+00	1.12E+03	4.68E+02	5.54E+02	6.95E+02	1.01E+02	6.31E+00	1.28E+01	2.64E+01
South Sound (East)	5.64E+02	1.43E+02	2.48E+02	3.15E+02	1.57E+02	7.99E+00	1.06E+01	1.45E+01	2.19E+03	9.17E+02	1.09E+03	1.36E+03	3.76E+02	1.24E+01	2.51E+01	5.17E+01
South Sound (West)	2.87E+02	9.53E+01	1.65E+02	2.10E+02	1.00E+01	5.33E+00	7.07E+00	9.67E+00	1.43E+03	6.11E+02	7.24E+02	9.07E+02	6.57E+02	8.24E+00	1.67E+01	3.45E+01
Strait of Georgia	4.93E+02	1.22E+02	2.12E+02	2.69E+02	9.62E+01	6.83E+00	9.07E+00	1.24E+01	1.38E+03	7.84E+02	9.28E+02	1.16E+03	3.04E+02	1.06E+01	2.15E+01	4.42E+01
Strait of Juan de Fuca	4.54E+01	2.24E+01	3.87E+01	4.93E+01	4.83E+00	1.25E+00	1.66E+00	2.27E+00	2.02E+02	1.43E+02	1.70E+02	2.13E+02	9.98E+00	1.93E+00	3.93E+00	8.09E+00
Whidbey Basin	9.55E+01	7.71E+01	1.33E+02	1.70E+02	1.07E+01	4.31E+00	5.72E+00	7.82E+00	6.49E+02	4.94E+02	5.85E+02	7.33E+02	2.78E+01	6.66E+00	1.35E+01	2.79E+01
Puget Sound Total	**6.23E+03**	**2.50E+03**	**4.33E+03**	**5.51E+03**	**1.06E+03**	**1.40E+02**	**1.86E+02**	**2.54E+02**	**1.96E+04**	**1.60E+04**	**1.90E+04**	**2.38E+04**	**2.57E+03**	**2.16E+02**	**4.39E+02**	**9.05E+02**

Key:

The precision of the data in this table is only two significant figures.

The loadings from POTWs to the Elliott Bay Study Area was zero because this area of Puget Sound had no POTWs discharging to it.

kg/year = Kilograms per year.

(a) = From EnviroVision, et al., 2008; and Maroncelli, James, 2009.
The estimated loadings were based on: (1) Replacement of non-detect results with one-half the method detection limit or method reporting limit; and (2) Extrapolations for those POTWs without analytical results by using the median concentration of all POTWs.

Figures

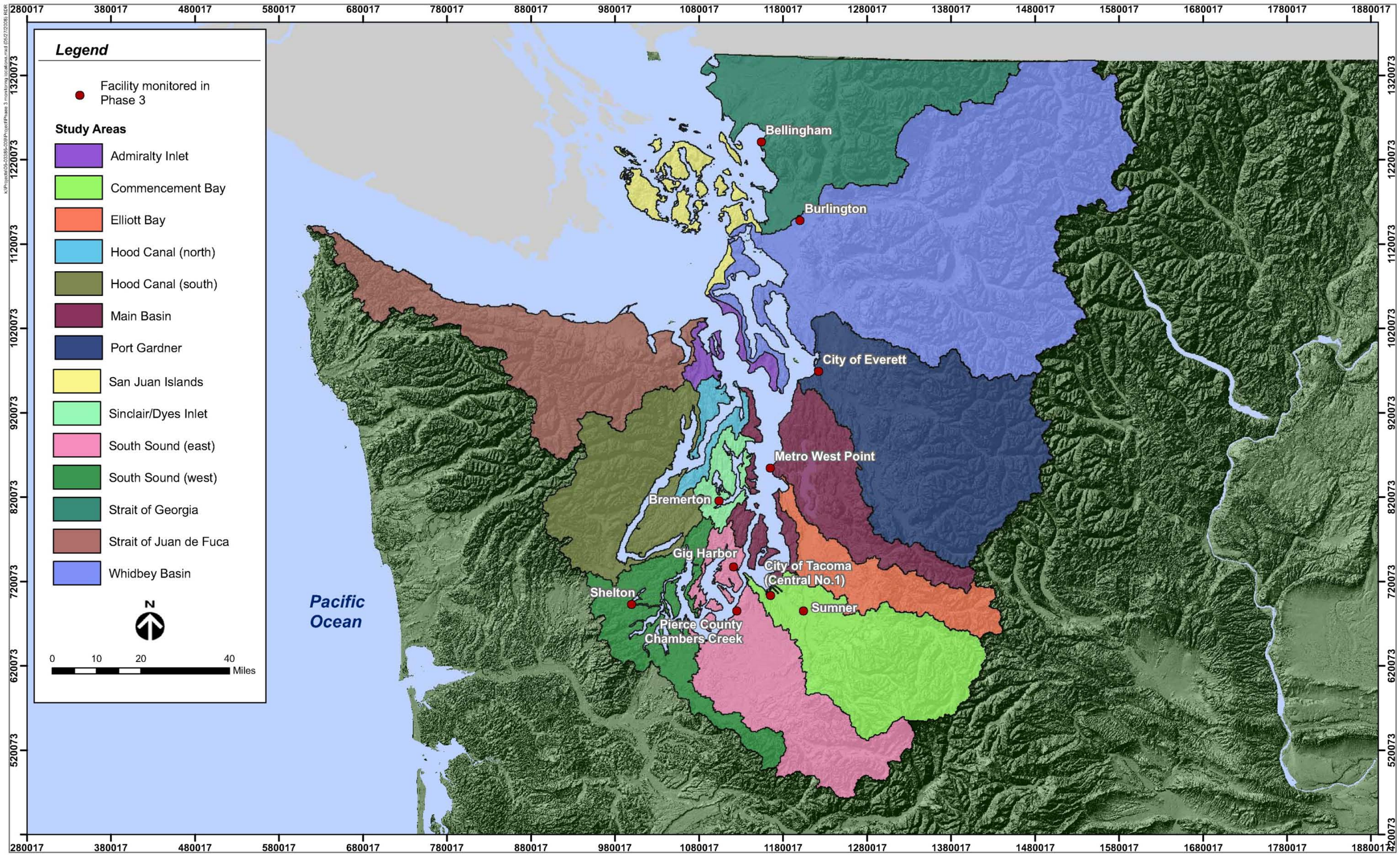

Figure 1. Location Map of the Ten Publicly Owned Treatment Works.

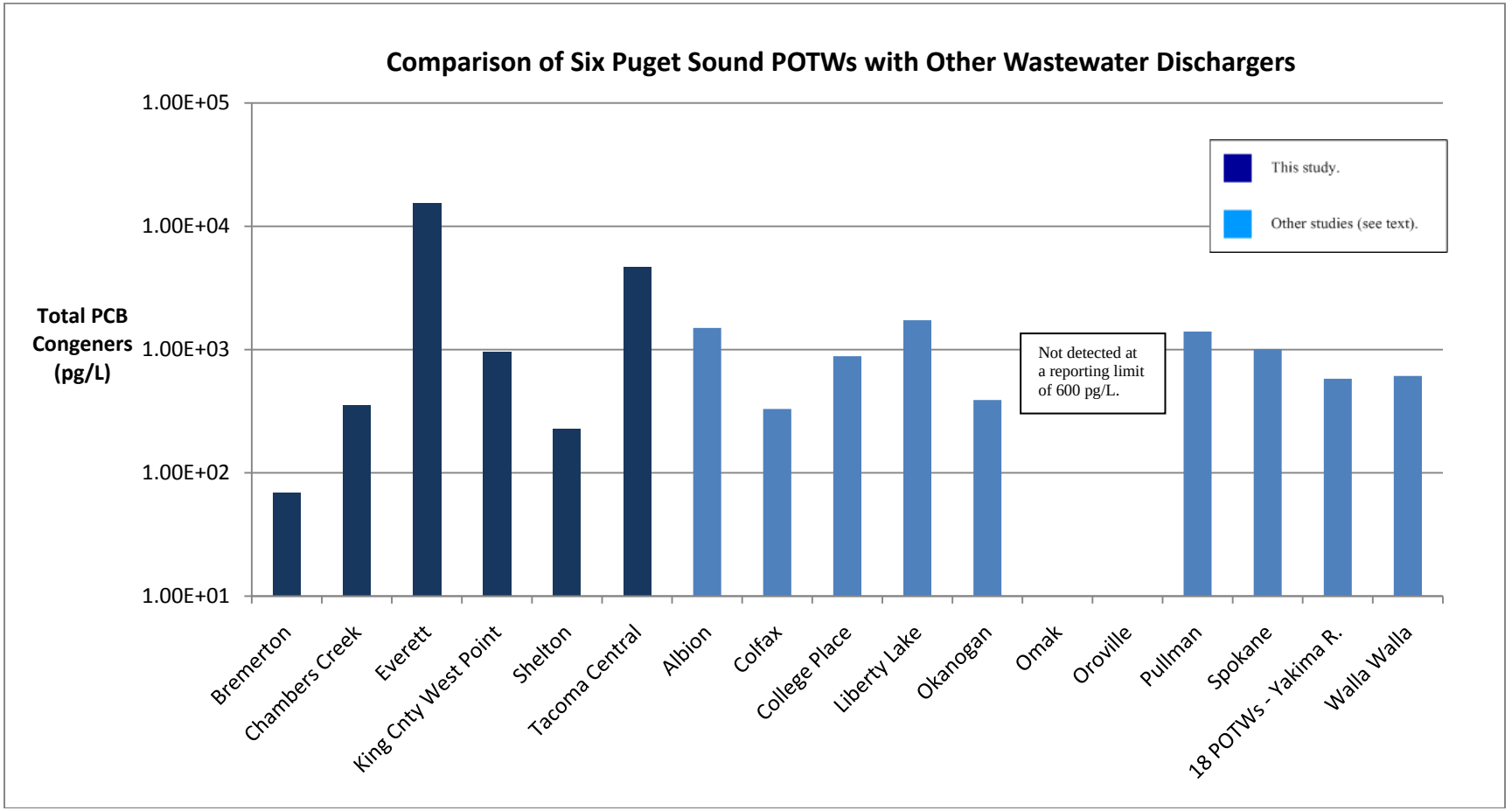

Figure 2. Comparison of Average Total PCB Results among Several POTWs

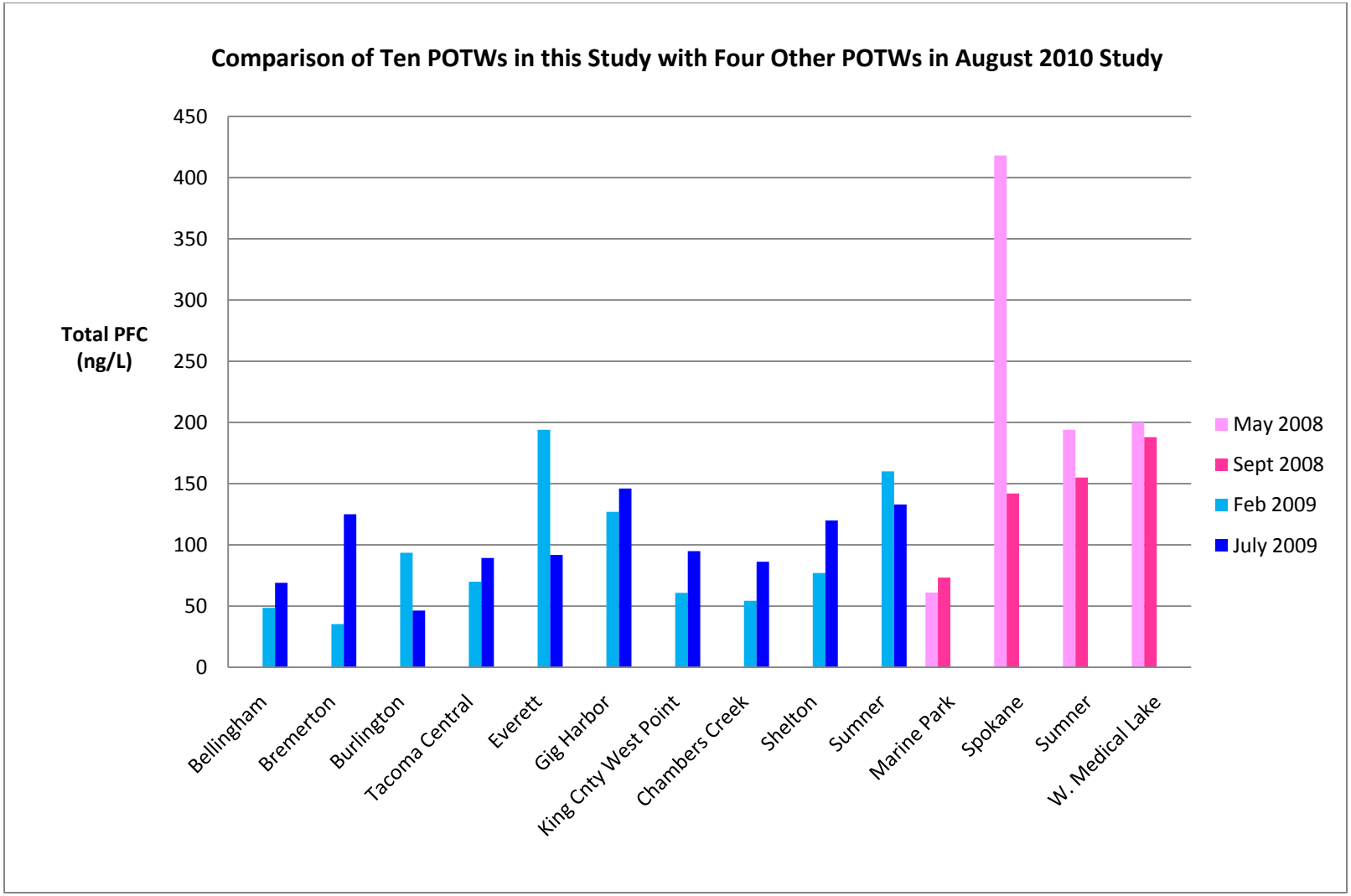

Figure 3. Comparison of Average Total PFC Results among Several POTWs

Appendix A.

List of the POTWs in the Puget Sound Basin

Appendix A. List of POTWs in the Puget Sound Basin

Study Area	POTW Name	Permit Number	Average Flow: Reported 2007 - 2009 (MGD)
Admiralty Inlet	Port Townsend STP (Biosolids Facility)	WA0037052	0.9089
Commencement Bay	Buckley STP	WA0023361	0.5633
	Carbonado STP	WA0020834	0.02422
	Cherrywood Mobile Home Manor	WA0037079	0.01175
	City of Tacoma Central No. 1	WA0037087	19.87
	City of Tacoma North No. 3	WA0037214	4.475
	Enumclaw STP	WA0020575	1.572
	Orting STP	WA0020303	0.5762
	Puyallup STP	WA0037168	4.039
	Rainier State School	WA0037923	0.112
	South Prairie STP	WA0040479	0.02736
	Sumner STP	WA0023353	2.006
	Wilkeson STP	WA0023281	0.04119
Elliott Bay	none		
Hood Canal (north)	Olympic Water and Sewer, Inc.	WA0021202	0.1893
	Pope Resources (a)	WA0022292	0.0118
Hood Canal (south)	Alderbrook Resort and Spa	WA0037753	0.01607
Main Basin	Alderwood WTP	WA0020826	2.085
	Bainbridge Island City WWTP	WA0020907	0.5251
	Edmonds STP	WA0024058	5.488
	Kitsap County Kingston WWTP	WA0032077	0.1042
	Kitsap County Manchester	WA0023701	0.2066
	Lakehaven Utility District (Lakota STP)	WA0022624	5.2
	Lynnwood STP	WA0024031	4.065
	King County Renton (South Treatment Plant)	WA0029581	74.9
	King County West Point	WA0029181	92.46
	Messenger House Care Center	WA0023469	0.005892
	Midway Sewer District	WA0020958	4.136
	Miller Creek WWTP	WA0022764	2.797
	Mukilteo Water District (Olympus Terrace STP)	WA0023396	1.609
	Redondo WWTP	WA0023451	2.694
	Salmon Creek WWTP (Burien)	WA0022772	2.25
	Vashon STP	WA0022527	0.09314

Appendix A. List of POTWs in the Puget Sound Basin

Study Area	POTW Name	Permit Number	Average Flow: Reported 2007 - 2009 (MGD)
Port Gardner	Carnation WWTP	WA0032182	0.0907
	Duvall STP	WA0029513	0.5366
	Everett STP (all outfalls)	WA0024490	20.02
	Granite Falls STP	WA0021130	0.2921
	Lake Stevens Sewer District	WA0020893	2.12
	Marysville STP	WA0022497	4.538
	Monroe WWTP	WA0020486	1.526
	North Bend STP	WA0029351	0.4658
	Snohomish STP	WA0029548	1.192
	Snoqualmie WWTP	WA0022403	0.9815
	Sultan WWTP	WA0023302	0.3696
San Juan Islands	Anacortes WWTP	WA0020257	1.821
	Eastsound Orcas Village	WA0030911	0.003354
	Eastsound Water District	WA0030571	0.09869
	Fisherman Bay STP	WA0030589	0.01658
	Friday Harbor STP	WA0023582	0.2696
	Roche Harbor Resort	WA0021822	0.03388
	Rosario WWTP	WA0029891	0.0241
Sinclair/Dyes Inlet	Bremerton STP	WA0029289	4.304
	Kitsap County Central Kitsap	WA0030520	3.83
	Kitsap County Sewer District 7	WA0030317	0.08297
	Port Orchard WWTP	WA0020346	1.704
South Sound (east)	Eatonville STP	WA0037231	0.2073
	Gig Harbor STP	WA0023957	0.8088
	Pierce County Chambers Creek STP	WA0039624	17.89
	WA DOC McNeil Island STP	WA0040002	0.2264
	Yelm STP	WA0040762	0.2986
South Sound (west)	Boston Harbor STP	WA0040291	0.03061
	Carlyon Beach STP	WA0037915	0.02169
	Hartstene Pointe STP	WA0038377	0.06468
	LOTT WWTP	WA0037061	10.77
	Rustlewood STP	WA0038075	0.02942
	Seashore Villa STP	WA0037273	0.01229
	Shelton STP	WA0023345	1.988
	Tamoshan STP	WA0037290	0.02594
	Taylor Bay STP	WA0037656	0.01095

Appendix A. List of POTWs in the Puget Sound Basin

Study Area	POTW Name	Permit Number	Average Flow: Reported 2007 - 2009 (MGD)
Strait of Georgia	Bellingham STP	WA0023744	12.3
	Birch Bay STP	WA0029556	0.849
	Blaine STP	WA0022641	0.539
	Everson STP	WA0020435	0.2556
	Ferndale STP	WA0022454	1.533
	Lynden STP	WA0022578	1.131
	WA Parks Larrabee State Park	WA0023787	0.006589
Strait of Juan de Fuca	Clallam Bay STP	WA0024431	0.02675
	Port Angeles STP	WA0023973	2.324
	Sekiu STP	WA0024449	0.06453
	Sequim STP	WA0022349	0.4912
	WA DOC Clallam Bay Corrections Center	WA0039845	0.1314
Whidbey Basin	Arlington STP	WA0022560	1.203
	Burlington WWTP	WA0020150	1.637
	Concrete STP	WA0020851	0.08774
	Coupeville STP	WA0029378	0.1628
	Indian Ridge Youth Camp	WA0029424	0.00005325
	La Conner STP	WA0022446	0.2365
	Langley STP	WA0020702	0.07734
	Mt Vernon WWTP	WA0024074	3.674
	Oak Harbor STP	WA0020567	1.839
	Penn Cove WWTP	WA0029386	0.02442
	Seattle City Light Diablo	WA0029858	0.006129
	Seattle City Light Newhalem	WA0029670	0.005357
	Sedro Woolley STP	WA0023752	0.8123
	Skagit County Sewer District 2 (Big Lake)	WA0030597	0.1318
	Stanwood STP	WA0020290	0.5494
	Warm Beach Campground & Conference Center	WA0029904	0.02604
Puget Sound Total =		**MGY =**	**124,143**

Key:

The precision of the data in this table is only two significant figures.

MGD = Million gallons per day.

MGY = Million gallons per year.

POTW = Publicly Owned Treatment Works.

(a) = Although the Pope Resources facility treats Port Gardner's sanitary wastewater, it is privately owned.

Appendix B.

Data Usability Summary Reports

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: March 31, 2008	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance level 1 review (QA1) (PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0902008	Water	Sumner	0902008-01	02/12/2009		None
0902008	Water	Gig Harbor	0902008-02	02/10/2009		None
0902008	Water	Shelton	0902008-03	02/10/2009		None
0902008	Water	Everett	0902008-04	02/12/2009		None
0902008	Water	Burlington	0902008-05	02/10/2009		None
0902008	Water	Bremerton	0902008-06	02/10/2009		None
0902008	Water	Tacoma	0902008-07	02/19/2009	MS/MSD	None
0902008	Water	Chambers Creek	0902008-08	02/19/2009		None
0902008	Water	Metro West Point	0902008-09	02/10/2009		None
0902008	Water	Bellingham	0902008-10	02/12/2009		None
0902008	Water	Field Blank	0902008-11	02/12/2009		None

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples
0902008	Water	SW846 8270 SIM	Polycyclic Aromatic Hydrocarbons by Gas Chromatography/Mass Spectrometry-SIM	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes
Did coolers arrive at lab between 0 °C and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes
Frequency of Field QC Samples Correct? Field Duplicate – Not required. Field Blank – 1/20 samples. MS/MSD samples – 1/20 samples.	Yes
Case narrative present and complete?	Yes
Any holding time violations?	No - All samples were prepared and analyzed within holding times.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);

- Surrogates Outside Limits (Table 4);
- MS/MSD Outside Limits (Table 5);
- LCS Outside Limits (Table 6); and
- Re-analysis Results (Table 7).

The PAH data was originally reviewed Dickey Huntamer, Manchester Environmental Laboratory (MEL) on March 10, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided by the laboratory.

Polycyclic Aromatic Hydrocarbons (PAHs) by GC/MS SIM	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks?	Yes, refer to Table 3.
For samples, if associated results are <5 times the method blank or <3 times the field blank then "U" flag data.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Surrogate standard recovery values for samples, MS/MSD, method blanks, and LCS/LCSD samples within laboratory QC limits?	No, please refer to Table 4. No action was taken for one surrogate outlier.
Internal standard recovery values for samples, MS/MSD, method blanks, and LCS/LCSD samples within laboratory QC limits?	Yes.
MS/MSD percent recovery values within laboratory QC criteria?	Yes.
MS/MSD relative percent difference values within QC criteria (see Table 4) of <35%?	Yes.
LCS percent recovery values within laboratory QC criteria (see Table 5)? If the value is high with no positive values in the associated data; then no data qualification is required.	Yes.
Is initial calibration for target compounds <20 % RSD or curve fit?	Yes
Is initial calibration verification standard for target compounds <30 %?	Yes.
Is continuing calibration for target compounds < 20%?	Yes
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	No

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Samples results below the PQL are reported at the PQL and flagged not detected (U) due to method blank contamination. Matrix spike (B09B138-MS1, parent sample Tacoma) percent recovery values were outside QC limits, the sample results were qualified (refer to Table 4). Laboratory control sample percent recovery values were outside QC limits, associated samples were qualified (refer to Table 5).

Table 3 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Units	PQL	MDL
SW846 8270SIM	B09B099-BLK1	MBLK	1-Methylnaphthalene	0.0048	J	µg/L	0.010	0.0016
SW846 8270SIM	B09B099-BLK1	MBLK	2-Methylnaphthalene	0.0048	J	µg/L	0.010	0.0015

Method	SampleID	SampType	Analyte	Result	Qual	Units	PQL	MDL
SW846 8270SIM	B09B099-BLK1	MBLK	Naphthalene	0.0051	J	µg/L	0.010	0.0011
SW846 8270SIM	B09B115-BLK1	MBLK	1-Methylnaphthalene	0.0048	J	µg/L	0.010	0.0016
SW846 8270SIM	B09B115-BLK1	MBLK	2-Methylnaphthalene	0.0048	J	µg/L	0.010	0.0015
SW846 8270SIM	B09B115-BLK1	MBLK	Fluorene	0.0015	J	µg/L	0.010	0.0014
SW846 8270SIM	B09B115-BLK1	MBLK	Naphthalene	0.0051	J	µg/L	0.010	0.0011
SW846 8270SIM	B09B139-BLK1	MBLK	1-Methylnaphthalene	0.0052	J	µg/L	0.010	0.0016
SW846 8270SIM	B09B139-BLK1	MBLK	2-Methylnaphthalene	0.0049	J	µg/L	0.010	0.0015
SW846 8270SIM	B09B139-BLK1	MBLK	Fluorene	0.0027	J	µg/L	0.010	0.0014
SW846 8270SIM	B09B139-BLK1	MBLK	Naphthalene	0.0053	J	µg/L	0.010	0.0011
SW846 8270SIM	B09B139-BLK1	MBLK	Phenanthrene	0.0022	J	µg/L	0.010	

Table 3A - List of Samples Qualified for Method Blank Contamination

Method	Sample ID	Analyte	Result	Qual
SW846 8270SIM	Gig Harbor	1-Methylnaphthalene	0.012	U
SW846 8270SIM	Gig Harbor	2-Methylnaphthalene	0.0094	U
SW846 8270SIM	Shelton	1-Methylnaphthalene	0.0084	U
SW846 8270SIM	Shelton	2-Methylnaphthalene	0.0090	U
SW846 8270SIM	Shelton	Naphthalene	0.025	U
SW846 8270SIM	Burlington	1-Methylnaphthalene	0.012	U
SW846 8270SIM	Burlington	2-Methylnaphthalene	0.0082	U
SW846 8270SIM	Bremerton	1-Methylnaphthalene	0.012	U
SW846 8270SIM	Bremerton	2-Methylnaphthalene	0.011	U
SW846 8270SIM	Metro Point West	1-Methylnaphthalene	0.020	U
SW846 8270SIM	Metro Point West	2-Methylnaphthalene	0.022	U
SW846 8270SIM	Sumner	1-Methylnaphthalene	0.012	U
SW846 8270SIM	Sumner	2-Methylnaphthalene	0.0090	U
SW846 8270SIM	Everett	Naphthalene	0.018	U
SW846 8270SIM	Bellingham	1-Methylnaphthalene	0.0099	U
SW846 8270SIM	Bellingham	2-Methylnaphthalene	0.010	U
SW846 8270SIM	Field Blank	Naphthalene	0.017	U
SW846 8270SIM	Tacoma	1-Methylnaphthalene	0.015	U
SW846 8270SIM	Tacoma	2-Methylnaphthalene	0.018	U
SW846 8270SIM	Tacoma	Phenanthrene	0.0080	U
SW846 8270SIM	Chambers Creek	2-Methylnaphthalene	0.014	U

Table 4 - List of Samples with Surrogates outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	QC Limit	Sample Qualification
SW846 8270SIM	Everett	Benzo(a)pyrene- d12	43	50 - 150	None
SW846 8270SIM	Tacoma	Benzo(a)pyrene- d12	42	50 - 150	None
SW846 8270SIM	Tacoma MS	Benzo(a)pyrene- d12	28	50 - 150	None
SW846 8270SIM	Tacoma MSD	Benzo(a)pyrene- d12	34	50 - 150	None
SW846 8270SIM	Chambers Creek	Benzo(a)pyrene- d12	34	50 - 150	None

Table 5 - List MS/MSD Percent Recovery Values and RPDs outside Control Limits
None

Table 6 - List LCS Percent Recovery Values outside Control Limits
None

Table 7 –Samples that were Reanalyzed
None

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference

Data Validation Qualifiers:

Code	Description
B	Analyte detected in sample and method blank. Reported result is sample concentration without blank correction or associated quantitation limit.
JG	Analyte was positively identified. Value may be greater than the reported estimate.
JK	Analyte was positively identified. Reported result is an estimate with unknown bias.
JL	Analyte was positively identified. Value may be less than the reported estimate.
JT	Analyte was positively identified. Reported result is an estimate below the associated quantitation limit but above the MDL.
JTG	Analyte was positively identified. Value may be greater than the reported result, which is an estimate below the associated quantitation limit but above the MDL.
JTK	Analyte was positively identified. Reported result is an estimate with unknown bias, below the associated quantitation limit but above the MDL.
JTL	Analyte was positively identified. Value may be less than the reported result which is an estimate below associated quantitation limit but above MDL.
NJ	There is evidence that the analyte is present in the sample. Reported result for the tentatively identified analyte is an estimate.
NJT	There is evidence the analyte is present in the sample. Reported result for the tentatively identified analyte is an estimate below the associated quantitation limit but above the MDL.
NU	There is evidence the analyte is present in the sample. Tentatively identified analyte was not detected at or above the reported result.
NUJ	There is evidence the analyte is present in the sample. Tentatively identified analyte was not detected at or above the reported estimate.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	Analyte was not detected at or above the reported result.
UJ	Analyte was not detected at or above the reported estimate
UJG	Analyte was not detected at or above the reported estimate with likely low bias.
UJK	Analyte was not detected at or above the reported estimate with unknown bias.
UJL	Analyte was not detected at or above the reported estimate with likely high bias.

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Gig Harbor

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1500 mL
Final Vol: 1 mL

Lab ID #: 0902008-02
Collected: 2/10/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B099
Prepared: 2/12/2009
Analyzed: 2/18/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	1-Methylnaphthalene	0.012	~~UT~~ U	0.0067	0.0010
91-58-7	2-Chloronaphthalene	0.0067	U	0.0067	0.0008
91-57-6	2-Methylnaphthalene	0.0094	~~UT~~ U	0.0067	0.0010
83-32-9	Acenaphthene	0.0067	U	0.0067	0.0016
208-96-8	Acenaphthylene	0.0067	U	0.0067	0.0009
120-12-7	Anthracene	0.0067	U	0.0067	
56-55-3	Benzo(a)anthracene	0.0067	U	0.0067	0.0007
50-32-8	Benzo(a)pyrene	0.0067	U	0.0067	0.0007
205-99-2	Benzo(b)fluoranthene	0.0067	U	0.0067	0.0012
191-24-2	Benzo(ghi)perylene	0.0067	U	0.0067	0.0007
207-08-9	Benzo(k)fluoranthene	0.0067	U	0.0067	0.0014
86-74-8	Carbazole	0.0067	U	0.0067	0.0010
218-01-9	Chrysene	0.0067	U	0.0067	0.0008
53-70-3	Dibenzo(a,h)anthracene	0.0067	U	0.0067	0.0010
132-64-9	Dibenzofuran	0.0067	U	0.0067	0.0008
206-44-0	Fluoranthene	0.0067	U	0.0067	0.0010
86-73-7	Fluorene	0.0067	U	0.0067	0.0009
193-39-5	Indeno(1,2,3-cd)pyrene	0.0067	U	0.0067	0.0021
91-20-3	**Naphthalene**	**0.13**		0.0067	0.0007
85-01-8	**Phenanthrene**	**0.0061**	JT	0.0067	
129-00-0	**Pyrene**	**0.0043**	JT	0.0067	0.0011
483-65-8	Retene	0.0067	U	0.0067	

Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.254		0.267	95	30-115
93951-97-4	Acenaphthylene-D8	0.209		0.267	78	50-150
1719-06-8	Anthracene-D10	0.224		0.267	84	50-150
63466-71-7	Benzo(a)pyrene-D12	0.141		0.267	53	50-150
81103-79-9	Fluorene-D10	0.214		0.267	80	50-150
1718-52-1	Pyrene-D10	0.254		0.267	95	50-150
1718-51-0	Terphenyl-D14	0.181		0.267	68	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Shelton

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1580 mL
Final Vol: 1 mL

Lab ID #: 0902008-03
Collected: 2/10/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B099
Prepared: 2/12/2009
Analyzed: 2/18/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	1-Methylnaphthalene	0.0084	~~U~~ J	0.0063	0.0010
91-58-7	**2-Chloronaphthalene**	**0.0047**	J	0.0063	0.0008
91-57-6	2-Methylnaphthalene	0.0090	~~U~~ J	0.0063	0.0009
83-32-9	Acenaphthene	0.0063	U	0.0063	0.0015
208-96-8	Acenaphthylene	0.0063	U	0.0063	0.0009
120-12-7	Anthracene	0.0063	U	0.0063	
56-55-3	Benzo(a)anthracene	0.0063	U	0.0063	0.0007
50-32-8	Benzo(a)pyrene	0.0063	U	0.0063	0.0007
205-99-2	Benzo(b)fluoranthene	0.0063	U	0.0063	0.0011
191-24-2	Benzo(ghi)perylene	0.0063	U	0.0063	0.0006
207-08-9	Benzo(k)fluoranthene	0.0063	U	0.0063	0.0014
86-74-8	Carbazole	0.0063	U	0.0063	0.0009
218-01-9	Chrysene	0.0063	U	0.0063	0.0008
53-70-3	Dibenzo(a,h)anthracene	0.0063	U	0.0063	0.0010
132-64-9	**Dibenzofuran**	**0.0056**	J	0.0063	0.0007
206-44-0	Fluoranthene	0.0063	U	0.0063	0.0009
86-73-7	**Fluorene**	**0.0057**	J	0.0063	0.0009
193-39-5	Indeno(1,2,3-cd)pyrene	0.0063	U	0.0063	0.0019
91-20-3	**Naphthalene**	**0.025**	U	0.0063	0.0007
85-01-8	**Phenanthrene**	**0.0051**	J	0.0063	
129-00-0	Pyrene	0.0063	U	0.0063	0.0011
483-65-8	Retene	0.0063	U	0.0063	

(1) no peak

Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.223		0.253	88	30-115
93951-97-4	Acenaphthylene-D8	0.196		0.253	77	50-150
1719-06-8	Anthracene-D10	0.213		0.253	84	50-150
63466-71-7	Benzo(a)pyrene-D12	0.181		0.253	72	50-150
81103-79-9	Fluorene-D10	0.195		0.253	77	50-150
1718-52-1	Pyrene-D10	0.231		0.253	91	50-150
1718-51-0	Terphenyl-D14	0.198		0.253	78	18-137

Authorized by: _____ Release Date: 5/20/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs **Field ID: Burlington**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1660 mL
Final Vol: 1 mL

Lab ID #: 0902008-05
Collected: 2/10/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B099
Prepared: 2/12/2009
Analyzed: 2/19/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	1-Methylnaphthalene	0.0097	~~JU~~	0.0060	0.0009
91-58-7	2-Chloronaphthalene	0.0060	U	0.0060	0.0007
91-57-6	2-Methylnaphthalene	0.0082	~~JU~~	0.0060	0.0009
83-32-9	Acenaphthene	0.0060	U	0.0060	0.0015
208-96-8	Acenaphthylene	0.0060	U	0.0060	0.0008
120-12-7	Anthracene	0.0060	U	0.0060	
56-55-3	Benzo(a)anthracene	0.0060	U	0.0060	0.0007
50-32-8	Benzo(a)pyrene	0.0060	U	0.0060	0.0006
205-99-2	Benzo(b)fluoranthene	0.0060	U	0.0060	0.0011
191-24-2	Benzo(ghi)perylene	0.0060	U	0.0060	0.0006
207-08-9	Benzo(k)fluoranthene	0.0060	U	0.0060	0.0013
86-74-8	Carbazole	0.0060	U	0.0060	0.0009
218-01-9	Chrysene	0.0060	U	0.0060	0.0007
53-70-3	Dibenzo(a,h)anthracene	0.0060	U	0.0060	0.0009
132-64-9	**Dibenzofuran**	**0.0061**		0.0060	0.0007
206-44-0	**Fluoranthene**	**0.0037**	J T	0.0060	0.0009
86-73-7	**Fluorene**	**0.011**		0.0060	0.0008
193-39-5	Indeno(1,2,3-cd)pyrene	0.0060	U	0.0060	0.0019
91-20-3	**Naphthalene**	**0.027**		0.0060	0.0007
85-01-8	Phenanthrene	0.0060	U	0.0060	
129-00-0	**Pyrene**	**0.0045**	J T	0.0060	0.0010
483-65-8	Retene	0.0060	U	0.0060	

<u>Surrogate Recovery:</u>

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.219		0.241	91	30-115
93951-97-4	Acenaphthylene-D8	0.185		0.241	77	50-150
1719-06-8	Anthracene-D10	0.209		0.241	87	50-150
63466-71-7	Benzo(a)pyrene-D12	0.164		0.241	68	50-150
81103-79-9	Fluorene-D10	0.183		0.241	76	50-150
1718-52-1	Pyrene-D10	0.220		0.241	91	50-150
1718-51-0	Terphenyl-D14	0.184		0.241	76	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Bremerton

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1540 mL
Final Vol: 1 mL

Lab ID #: 0902008-06
Collected: 2/10/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B099
Prepared: 2/12/2009
Analyzed: 2/19/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	**1-Methylnaphthalene**	**0.012**	**U**	0.0065	0.0010
91-58-7	2-Chloronaphthalene	0.0065	U	0.0065	0.0008
91-57-6	**2-Methylnaphthalene**	**0.011**	**U**	0.0065	0.0010
83-32-9	Acenaphthene	0.0065	U	0.0065	0.0016
208-96-8	Acenaphthylene	0.0065	U	0.0065	0.0009
120-12-7	Anthracene	0.0065	U	0.0065	
56-55-3	Benzo(a)anthracene	0.0065	U	0.0065	0.0007
50-32-8	Benzo(a)pyrene	0.0065	U	0.0065	0.0007
205-99-2	Benzo(b)fluoranthene	0.0065	U	0.0065	0.0012
191-24-2	Benzo(ghi)perylene	0.0065	U	0.0065	0.0006
207-08-9	Benzo(k)fluoranthene	0.0065	U	0.0065	0.0014
86-74-8	Carbazole	0.0065	U	0.0065	0.0009
218-01-9	Chrysene	0.0065	U	0.0065	0.0008
53-70-3	Dibenzo(a,h)anthracene	0.0065	U	0.0065	0.0010
132-64-9	**Dibenzofuran**	**0.0062**	**JT**	0.0065	0.0008
206-44-0	**Fluoranthene**	**0.0037**	**JT**	0.0065	0.0009
86-73-7	**Fluorene**	**0.0069**		0.0065	0.0009
193-39-5	Indeno(1,2,3-cd)pyrene	0.0065	U	0.0065	0.0020
91-20-3	**Naphthalene**	**0.040**		0.0065	0.0007
85-01-8	**Phenanthrene**	**0.0054**	**JT**	0.0065	
129-00-0	**Pyrene**	**0.0060**	**JT**	0.0065	0.0011
483-65-8	Retene	0.0065	U	0.0065	

(1) 1 of April, 2009

Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.233		0.26	90	30-115
93951-97-4	Acenaphthylene-D8	0.192		0.26	74	50-150
1719-06-8	Anthracene-D10	0.227		0.26	87	50-150
63466-71-7	Benzo(a)pyrene-D12	0.156		0.26	60	50-150
81103-79-9	Fluorene-D10	0.194		0.26	75	50-150
1718-52-1	Pyrene-D10	0.243		0.26	94	50-150
1718-51-0	Terphenyl-D14	0.191		0.26	74	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Metro West Point

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1700 mL
Final Vol: 1 mL

Lab ID #: 0902008-09
Collected: 2/10/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B099
Prepared: 2/12/2009
Analyzed: 2/19/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	1-Methylnaphthalene	0.020	J	0.0059	0.0009
91-58-7	2-Chloronaphthalene	0.0059	U	0.0059	0.0007
91-57-6	2-Methylnaphthalene	0.022	J	0.0059	0.0009
83-32-9	Acenaphthene	0.012		0.0059	0.0014
208-96-8	Acenaphthylene	0.0051	JT	0.0059	0.0008
120-12-7	Anthracene	0.0039	JT	0.0059	
56-55-3	Benzo(a)anthracene	0.0059	U	0.0059	0.0006
50-32-8	Benzo(a)pyrene	0.0059	U	0.0059	0.0006
205-99-2	Benzo(b)fluoranthene	0.0059	U	0.0059	0.0011
191-24-2	Benzo(ghi)perylene	0.0059	U	0.0059	0.0006
207-08-9	Benzo(k)fluoranthene	0.0059	U	0.0059	0.0013
86-74-8	Carbazole	0.0059	U	0.0059	0.0008
218-01-9	Chrysene	0.0059	U	0.0059	0.0007
53-70-3	Dibenzo(a,h)anthracene	0.0059	U	0.0059	0.0009
132-64-9	Dibenzofuran	0.021		0.0059	0.0007
206-44-0	Fluoranthene	0.0075		0.0059	0.0009
86-73-7	Fluorene	0.025		0.0059	0.0008
193-39-5	Indeno(1,2,3-cd)pyrene	0.0047	JT	0.0059	0.0018
91-20-3	Naphthalene	0.044		0.0059	0.0007
85-01-8	Phenanthrene	0.016		0.0059	
129-00-0	Pyrene	0.014		0.0059	0.0010
483-65-8	Retene	0.0059	U	0.0059	

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Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.224		0.235	95	30-115
93951-97-4	Acenaphthylene-D8	0.193		0.235	82	50-150
1719-06-8	Anthracene-D10	0.199		0.235	84	50-150
63466-71-7	Benzo(a)pyrene-D12	0.118		0.235	50	50-150
81103-79-9	Fluorene-D10	0.195		0.235	83	50-150
1718-52-1	Pyrene-D10	0.207		0.235	88	50-150
1718-51-0	Terphenyl-D14	0.145		0.235	62	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Sumner

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1615 mL
Final Vol: 1 mL

Lab ID #: 0902008-01
Collected: 2/12/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B115
Prepared: 2/17/2009
Analyzed: 2/18/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	1-Methylnaphthalene	0.012	~~BU~~	0.0062	0.0010
91-58-7	2-Chloronaphthalene	0.0062	U	0.0062	0.0008
91-57-6	2-Methylnaphthalene	0.0090	~~BU~~	0.0062	0.0009
83-32-9	**Acenaphthene**	**0.0055**	J	0.0062	0.0015
208-96-8	**Acenaphthylene**	**0.0032**	J	0.0062	0.0009
120-12-7	Anthracene	0.0062	U	0.0062	
56-55-3	Benzo(a)anthracene	0.0062	U	0.0062	0.0007
50-32-8	Benzo(a)pyrene	0.0062	U	0.0062	0.0007
205-99-2	Benzo(b)fluoranthene	0.0062	U	0.0062	0.0011
191-24-2	Benzo(ghi)perylene	0.0062	U	0.0062	0.0006
207-08-9	Benzo(k)fluoranthene	0.0062	U	0.0062	0.0013
86-74-8	Carbazole	0.0062	U	0.0062	0.0009
218-01-9	Chrysene	0.0062	U	0.0062	0.0007
53-70-3	Dibenzo(a,h)anthracene	0.0062	U	0.0062	0.0009
132-64-9	**Dibenzofuran**	**0.0081**		0.0062	0.0007
206-44-0	**Fluoranthene**	**0.0049**	J	0.0062	0.0009
86-73-7	**Fluorene**	**0.0090**		0.0062	0.0008
193-39-5	Indeno(1,2,3-cd)pyrene	0.0062	U	0.0062	0.0019
91-20-3	**Naphthalene**	**0.030**		0.0062	0.0007
85-01-8	**Phenanthrene**	**0.0060**	J	0.0062	
129-00-0	**Pyrene**	**0.0043**	J	0.0062	0.0010
483-65-8	Retene	0.0062	U	0.0062	

Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.216		0.248	87	30-115
93951-97-4	Acenaphthylene-D8	0.180		0.248	73	50-150
1719-06-8	Anthracene-D10	0.207		0.248	83	50-150
63466-71-7	Benzo(a)pyrene-D12	0.179		0.248	72	50-150
81103-79-9	Fluorene-D10	0.178		0.248	72	50-150
1718-52-1	Pyrene-D10	0.226		0.248	91	50-150
1718-51-0	Terphenyl-D14	0.204		0.248	82	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Everett

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1520 mL
Final Vol: 1 mL

Lab ID #: 0902008-04
Collected: 2/12/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B115
Prepared: 2/17/2009
Analyzed: 2/18/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	1-Methylnaphthalene	0.0066	U	0.0066	0.0010
91-58-7	2-Chloronaphthalene	0.0066	U	0.0066	0.0008
91-57-6	2-Methylnaphthalene	0.0066	U	0.0066	0.0010
83-32-9	Acenaphthene	0.0066	U	0.0066	0.0016
208-96-8	Acenaphthylene	0.0066	U	0.0066	0.0009
120-12-7	Anthracene	0.0066	U	0.0066	
56-55-3	Benzo(a)anthracene	0.0066	U	0.0066	0.0007
50-32-8	Benzo(a)pyrene	0.0066	U	0.0066	0.0007
205-99-2	Benzo(b)fluoranthene	0.0066	U	0.0066	0.0012
191-24-2	**Benzo(ghi)perylene**	**0.0059**	J+	0.0066	0.0007
207-08-9	Benzo(k)fluoranthene	0.0066	U	0.0066	0.0014
86-74-8	Carbazole	0.0066	U	0.0066	0.0009
218-01-9	Chrysene	0.0066	U	0.0066	0.0008
53-70-3	Dibenzo(a,h)anthracene	0.0066	U	0.0066	0.0010
132-64-9	Dibenzofuran	0.0066	U	0.0066	0.0008
206-44-0	**Fluoranthene**	**0.0087**		0.0066	0.0010
86-73-7	Fluorene	0.0066	U	0.0066	0.0009
193-39-5	**Indeno(1,2,3-cd)pyrene**	**0.016**		0.0066	0.0020
91-20-3	**Naphthalene**	**0.018**	U	0.0066	0.0007
85-01-8	Phenanthrene	0.0066	U	0.0066	
129-00-0	**Pyrene**	**0.016**		0.0066	0.0011
483-65-8	Retene	0.0066	U	0.0066	

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Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.252		0.263	96	30-115
93951-97-4	Acenaphthylene-D8	0.194		0.263	74	50-150
1719-06-8	Anthracene-D10	0.206		0.263	78	50-150
63466-71-7	Benzo(a)pyrene-D12	0.113		0.263	43	50-150
81103-79-9	Fluorene-D10	0.201		0.263	76	50-150
1718-52-1	Pyrene-D10	0.198		0.263	75	50-150
1718-51-0	Terphenyl-D14	0.139		0.263	53	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Bellingham

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1650 mL
Final Vol: 1 mL

Lab ID #: 0902008-10
Collected: 2/12/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B115
Prepared: 2/17/2009
Analyzed: 2/18/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	1-Methylnaphthalene	0.0099	U	0.0061	0.0010
91-58-7	2-Chloronaphthalene	0.0086		0.0061	0.0007
91-57-6	2-Methylnaphthalene	0.010	U	0.0061	0.0009
83-32-9	Acenaphthene	0.0061	U	0.0061	0.0015
208-96-8	Acenaphthylene	0.0061	U	0.0061	0.0008
120-12-7	Anthracene	0.0061	U	0.0061	
56-55-3	Benzo(a)anthracene	0.0061	U	0.0061	0.0007
50-32-8	Benzo(a)pyrene	0.0061	U	0.0061	0.0006
205-99-2	Benzo(b)fluoranthene	0.0061	U	0.0061	0.0011
191-24-2	Benzo(ghi)perylene	0.0061	U	0.0061	0.0006
207-08-9	Benzo(k)fluoranthene	0.0061	U	0.0061	0.0013
86-74-8	Carbazole	0.0061	U	0.0061	0.0009
218-01-9	Chrysene	0.0061	U	0.0061	0.0007
53-70-3	Dibenzo(a,h)anthracene	0.0061	U	0.0061	0.0009
132-64-9	Dibenzofuran	0.011		0.0061	0.0007
206-44-0	Fluoranthene	0.0084		0.0061	0.0009
86-73-7	Fluorene	0.011		0.0061	0.0008
193-39-5	Indeno(1,2,3-cd)pyrene	0.0061	U	0.0061	0.0019
91-20-3	Naphthalene	0.037		0.0061	0.0007
85-01-8	Phenanthrene	0.011		0.0061	
129-00-0	Pyrene	0.0078		0.0061	0.0010
483-65-8	Retene	0.0061	U	0.0061	

Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.211		0.242	87	30-115
93951-97-4	Acenaphthylene-D8	0.176		0.242	73	50-150
1719-06-8	Anthracene-D10	0.208		0.242	86	50-150
63466-71-7	Benzo(a)pyrene-D12	0.134		0.242	55	50-150
81103-79-9	Fluorene-D10	0.182		0.242	75	50-150
1718-52-1	Pyrene-D10	0.217		0.242	90	50-150
1718-51-0	Terphenyl-D14	0.159		0.242	66	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Field Blank

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1505 mL
Final Vol: 1 mL

Lab ID #: 0902008-11
Collected: 2/12/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B115
Prepared: 2/17/2009
Analyzed: 2/18/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	1-Methylnaphthalene	0.0066	U	0.0066	0.0010
91-58-7	2-Chloronaphthalene	0.0066	U	0.0066	0.0008
91-57-6	2-Methylnaphthalene	0.0066	U	0.0066	0.0010
83-32-9	Acenaphthene	0.0066	U	0.0066	0.0016
208-96-8	Acenaphthylene	0.0066	U	0.0066	0.0009
120-12-7	Anthracene	0.0066	U	0.0066	
56-55-3	Benzo(a)anthracene	0.0066	U	0.0066	0.0007
50-32-8	Benzo(a)pyrene	0.0066	U	0.0066	0.0007
205-99-2	Benzo(b)fluoranthene	0.0066	U	0.0066	0.0012
191-24-2	Benzo(ghi)perylene	0.0066	U	0.0066	0.0007
207-08-9	Benzo(k)fluoranthene	0.0066	U	0.0066	0.0014
86-74-8	Carbazole	0.0066	U	0.0066	0.0010
218-01-9	Chrysene	0.0066	U	0.0066	0.0008
53-70-3	Dibenzo(a,h)anthracene	0.0066	U	0.0066	0.0010
132-64-9	Dibenzofuran	0.0066	U	0.0066	0.0008
206-44-0	Fluoranthene	0.0066	U	0.0066	0.0010
86-73-7	Fluorene	0.0066	U	0.0066	0.0009
193-39-5	Indeno(1,2,3-cd)pyrene	0.0066	U	0.0066	0.0020
91-20-3	**Naphthalene**	**0.017**	**u**	0.0066	0.0007
85-01-8	Phenanthrene	0.0066	U	0.0066	
129-00-0	Pyrene	0.0066	U	0.0066	0.0011
483-65-8	Retene	0.0066	U	0.0066	

Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.227		0.266	86	30-115
93951-97-4	Acenaphthylene-D8	0.221		0.266	83	50-150
1719-06-8	Anthracene-D10	0.215		0.266	81	50-150
63466-71-7	Benzo(a)pyrene-D12	0.226		0.266	85	50-150
81103-79-9	Fluorene-D10	0.207		0.266	78	50-150
1718-52-1	Pyrene-D10	0.230		0.266	87	50-150
1718-51-0	Terphenyl-D14	0.221		0.266	83	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs — Field ID: Tacoma

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1360 mL
Final Vol: 1 mL

Lab ID #: 0902008-07
Collected: 2/19/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B139
Prepared: 2/24/2009
Analyzed: 2/24/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	**1-Methylnaphthalene**	**0.015**	U	0.0074	0.0012
91-58-7	2-Chloronaphthalene	0.0074	U	0.0074	0.0009
91-57-6	2-Methylnaphthalene	0.0082	U	0.0074	0.0011
83-32-9	**Acenaphthene**	**0.011**		0.0074	0.0018
208-96-8	**Acenaphthylene**	**0.0058**	J	0.0074	0.0010
120-12-7	Anthracene	0.0074	U	0.0074	
56-55-3	Benzo(a)anthracene	0.0074	U	0.0074	0.0008
50-32-8	Benzo(a)pyrene	0.0074	U	0.0074	0.0008
205-99-2	Benzo(b)fluoranthene	0.0074	U	0.0074	0.0013
191-24-2	Benzo(ghi)perylene	0.0074	U	0.0074	0.0007
207-08-9	Benzo(k)fluoranthene	0.0074	U	0.0074	0.0016
86-74-8	Carbazole	0.0074	U	0.0074	0.0011
218-01-9	Chrysene	0.0074	U	0.0074	0.0009
53-70-3	Dibenzo(a,h)anthracene	0.0074	U	0.0074	0.0011
132-64-9	**Dibenzofuran**	**0.019**		0.0074	0.0009
206-44-0	**Fluoranthene**	**0.015**		0.0074	0.0011
86-73-7	**Fluorene**	**0.022**		0.0074	0.0010
193-39-5	Indeno(1,2,3-cd)pyrene	0.0074	U	0.0074	0.0023
91-20-3	**Naphthalene**	**0.036**		0.0074	0.0008
85-01-8	**Phenanthrene**	**0.0080**	U	0.0074	
129-00-0	**Pyrene**	**0.018**		0.0074	0.0012
483-65-8	Retene	0.0074	U	0.0074	

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Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.287		0.294	97	30-115
93951-97-4	Acenaphthylene-D8	0.246		0.294	84	50-150
1719-06-8	Anthracene-D10	0.245		0.294	83	50-150
63466-71-7	Benzo(a)pyrene-D12	0.123		0.294	42	50-150
81103-79-9	Fluorene-D10	0.251		0.294	85	50-150
1718-52-1	Pyrene-D10	0.249		0.294	85	50-150
1718-51-0	Terphenyl-D14	0.162		0.294	55	18-137

Authorized by: _____ Release Date: 3/26/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
PAHs SIM list

Project: Phase 3: Priority Pollutant Scans of Ten POTWs **Field ID: Chambers Creek**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1540 mL
Final Vol: 1 mL

Lab ID #: 0902008-08
Collected: 2/19/2009
Prep Method: SW3510A
Analysis Method: SW8270

Batch ID: B09B139
Prepared: 2/24/2009
Analyzed: 2/24/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
90-12-0	**1-Methylnaphthalene**	**0.025**		0.0065	0.0010
91-58-7	2-Chloronaphthalene	0.0065	U	0.0065	0.0008
91-57-6	**2-Methylnaphthalene**	**0.014**	J	0.0065	0.0010
83-32-9	**Acenaphthene**	**0.014**		0.0065	0.0016
208-96-8	Acenaphthylene	0.0065	U	0.0065	0.0009
120-12-7	Anthracene	0.0065	U	0.0065	
56-55-3	Benzo(a)anthracene	0.0065	U	0.0065	0.0007
50-32-8	Benzo(a)pyrene	0.0065	U	0.0065	0.0007
205-99-2	Benzo(b)fluoranthene	0.0065	U	0.0065	0.0012
191-24-2	Benzo(ghi)perylene	0.0065	U	0.0065	0.0006
207-08-9	Benzo(k)fluoranthene	0.0065	U	0.0065	0.0014
86-74-8	Carbazole	0.0065	U	0.0065	0.0009
218-01-9	Chrysene	0.0065	U	0.0065	0.0008
53-70-3	Dibenzo(a,h)anthracene	0.0065	U	0.0065	0.0010
132-64-9	**Dibenzofuran**	**0.016**		0.0065	0.0008
206-44-0	**Fluoranthene**	**0.0085**		0.0065	0.0009
86-73-7	**Fluorene**	**0.018**		0.0065	0.0009
193-39-5	Indeno(1,2,3-cd)pyrene	0.0065	U	0.0065	0.0020
91-20-3	**Naphthalene**	**0.063**		0.0065	0.0007
85-01-8	**Phenanthrene**	**0.016**		0.0065	
129-00-0	**Pyrene**	**0.0068**		0.0065	0.0011
483-65-8	Retene	0.0065	U	0.0065	

Surrogate Recovery:

CAS#	Analyte	Result	Qualifier	Spike Level	% Recovery	%Rec.Limits
321-60-8	2-Fluorobiphenyl	0.232		0.26	89	30-115
93951-97-4	Acenaphthylene-D8	0.194		0.26	75	50-150
1719-06-8	Anthracene-D10	0.226		0.26	87	50-150
63466-71-7	Benzo(a)pyrene-D12	0.124		0.26	48	50-150
81103-79-9	Fluorene-D10	0.194		0.26	75	50-150
1718-52-1	Pyrene-D10	0.231		0.26	89	50-150
1718-51-0	Terphenyl-D14	0.163		0.26	63	18-137

Authorized by: _____ Release Date: 3/26/09

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 14, 2009	Completed by: Mark Woodke

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0907021	Gig Harbor	0907021-01	07/14/2009	Batch	
0907021	Bremerton	0907021-02	07/14/2009		
0907021	West Point	0907021-04	07/14/2009		
0907021	Burlington	0907021-05	07/14/2009		
0907021	Tacoma	0907021-06	07/16/2009		
0907021	Chambers Creek	0907021-07	07/16/2009		
0907021	Sumner	0907021-08	07/17/2009		
0907021	Bellingham	0907021-09	07/16/2009		
0907021	Everett	0907021-10	07/16/2009		
0907021	Shelton	0907021-13	07/15/2009		
0907021	Rinsate	0907021-12	07/10/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
0907021	Water	EPA 8270D SIM	Polycyclic Aromatic Hydrocarbons by GC/MS	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes.
Did coolers arrive at lab less than 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Assumed based on the data review memoranda by Dickey Huntamer.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes
Case narrative present and complete?	Yes.
Any holding time violations?	Yes according to the data review memorandum by Dickey Huntamer. Sample extracts for Gig Harbor and Burlington were re-analyzed after the extraction holding time. Associated sample results were qualified estimated biased low (JG or UJG).

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);
- Surrogates Outside Limits (Table 4);
- MS/MSD Outside Limits (Table 5);
- LCS Outside Limits (Table 6); and
- Re-analysis Results (Table 7)

The semivolatile organic analyses (BNAs) data was originally reviewed by Dickey Huntamer, Manchester Environmental Laboratory (MEL) on October 22, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

Polycyclic Aromatic Hydrocarbons by GC/MS-SIM	
Description	**Notes and Qualifiers**
Any compounds present in method, trip, and field blanks (see Table 3)?	Yes.
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data. Qualification also applies to TICs.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one method blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes
Surrogate recovery values for method blanks and LCS/LCSD samples within laboratory QC limits?	No
Surrogate recovery values for samples and MS/MSD within laboratory QC limits? All samples should be re-analyzed for VOCs? Samples should be re-analyzed if >1 BN and/or AP for SVOCs is out.	No
MS/MSD percent recovery values within laboratory QC criteria (see Table 5)?	No – Several compounds were outside QC limits. The analytes were qualified in the parent sample "JG" and "UJG" for low MS/MSD recovery. If both MS/MSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ".
MS/MSD relative percent difference values within QC criteria (see Table 5) of <35%?	No – Several compounds were outside QC limits. The analytes were qualified in the parent sample "JK" and "UJK" for relative percent difference outliers.
LCS percent recovery values within Laboratory QC criteria (see Table 6)?	No – Several compounds were outside QC limits. All analytes were qualified in associated samples "JG" and "UJG" for low LCS/LCSD recovery. If LCS/LCSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ".
Do internal standards areas and retention time meet criteria? If not was sample re-analyzed to establish matrix?	No, several IS were outside QC limits in all samples except Burlington; associated sample results were flagged as estimated by Dickey Huntamer.
Is initial calibration for target compounds <20 % RSD or curve fit?	No – several compounds were above the QC limit, all associated samples results were qualified "JK or UJK".
Is continuing calibration for target compounds < 20%?	No – several compounds were above the QC limit, all associated samples results were qualified "JK or UJK".

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 14, 2009	Completed by: Mark Woodke

Polycyclic Aromatic Hydrocarbons by GC/MS-SIM	
Description	**Notes and Qualifiers**
Were any samples re-analyzed or diluted (see Table 7)? For any sample re-analysis and dilutions is only one reportable result by flagged?	Yes.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Analytes were detected in the method and field blanks. The associated sample results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U. Several MS/MSD compound percent recovery values were outside QC limits. The analytes were qualified in the parent sample "JG" and "UJG" for low MS/MSD recovery. If both MS/MSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ". Several LCS/LCSD compound percent recovery values were outside QC limits. All analytes were qualified in associated samples "JG" and "UJG" for low LCS/LCSD recovery. If both LCS/LCSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ". Several compounds were above the initial and continuing calibrations QC limit, all associated samples results were qualified estimated quantities (UJK, JH, JTK, or JK). Sample results greater than MDL and less than PQL are flagged estimated (JT). Sample results associated with internal standard outliers were qualified as estimated quantities with an unknown bias (JK or UJK). Sample results associated with holding time exceedances were qualified as estimated quantities with a low bias (JG or UJG).

Table 3 – List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Units	PQL
SW846 8270	B09G136-BLK1	MBLK	Carbazole	0.012	J	µg/L	0.010
SW846 8270	B09G203-BLK1	MBLK	Carbazole	0.013		µg/L	0.010

Table 3A - List of Samples Qualified for Method Blank Contamination
None

Table 4 - List of Samples with Surrogates outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	QC Limit	Sample Qualification
SW846 8270	Chambers Creek	2-Fluorobiphenyl	12	30 - 115	None
SW846 8270	Bellingham	2-Fluorobiphenyl	9	30 – 115	None
SW846 8270	Shelton	2-Fluorobiphenyl	17	30 – 115	None
SW846 8270	B09G136-MS1	2-Fluorobiphenyl	17	30 – 115	None
SW846 8270	B09G203-BLK1	2-Fluorobiphenyl	25	30 – 115	None
SW846 8270	B09G203-BS1	2-Fluorobiphenyl	17	30 – 115	None
SW846 8270	Rinsate	2-Fluorobiphenyl	124	30 – 115	None
SW846 8270	Chambers Creek	Acenaphthylene-d8	29	50 - 150	None
SW846 8270	Bellingham	Acenaphthylene-d8	28	50 - 150	None
SW846 8270	Everett	Acenaphthylene-d8	39	50 - 150	None
SW846 8270	Shelton	Acenaphthylene-d8	30	50 - 150	None

Method	Sample ID	Analyte	Percent Recovery	QC Limit	Sample Qualification
SW846 8270	B09G136-MS1	Acenaphthylene-d8	27	50 - 150	None
SW846 8270	B09G203-BLK1	Acenaphthylene-d8	32	50 - 150	None
SW846 8270	B09G203-BS1	Acenaphthylene-d8	35	50 - 150	None
SW846 8270	B09G136-MS1	Anthracene-d10	49	50 - 150	None
SW846 8270	Gig Harbor	Benzo(a)pyrene-d12	37	50 - 150	None
SW846 8270	Bremerton	Benzo(a)pyrene-d12	44	50 - 150	None
SW846 8270	West Point	Benzo(a)pyrene-d12	49	50 - 150	None
SW846 8270	Burlington	Benzo(a)pyrene-d12	37	50 - 150	None
SW846 8270	Tacoma	Benzo(a)pyrene-d12	47	50 - 150	None
SW846 8270	B09G136-MS1	Benzo(a)pyrene-d12	49	50 - 150	None
SW846 8270	B09G136-MSD1	Benzo(a)pyrene-d12	48	50 - 150	None

Table 5 - List MS/MSD Percent Recovery Values and RPDs outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	West Point MS/MSD	Naphthalene	0/18	NA	50 – 150	JG/UJG
SW846 8270	West Point MS/MSD	2-Methylnaphthalene	4/18	NA	50 – 150	JG/UJG
SW846 8270	West Point MS/MSD	1-Methylnaphthalene	4/18	NA	50 – 150	JG/UJG
SW846 8270	West Point MS/MSD	2-Chloronaphthalene	3/9	NA	50 – 150	JG/UJG
SW846 8270	West Point MS/MSD	Acenaphthene	5/23	NA	50 – 150	JG/UJG
SW846 8270	West Point MS/MSD	Indeno(1,2,3-cd)pyrene	48/44	NA	50 – 150	JG/UJG
SW846 8270	West Point MS/MSD	Dibenzo(a,h)anthracene	44/41	NA	50 – 150	JG/UJG
SW846 8270	West Point MS/MSD	Benzo(g,h,i)perylene	45/42	NA	50 – 150	JG/UJG
SW846 8270	West Point MS	Acenaphthylene	17	NA	50 – 150	None
SW846 8270	West Point MS	Dibenzofuran	17	NA	50 – 150	None
SW846 8270	West Point MS	Fluorene	35	NA	50 – 150	None
SW846 8270	West Point MS	Phenanthrene	42	NA	50 – 150	None
SW846 8270	West Point MS	Anthracene	37	NA	50 – 150	None
SW846 8270	West Point MS/MSD	Naphthalene	Not Calculated	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	2-Methylnaphthalene	127	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	1-Methylnaphthalene	130	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	2-Chloronaphthalene	89	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	Acenaphthylene	111	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	Acenaphthene	125	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	Dibenzofuran	111	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	Fluorene	70	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	Phenanthrene	53	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	Anthracene	72	40	NA	JK/UJK
SW846 8270	West Point MS/MSD	Retene	64	40	NA	JK/UJK

Table 6 - List LCS Percent Recovery Values outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	B09G136-BS1/BSD1	Naphthalene	10/16	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	2-Methylnaphthalene	11/16	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	1-Methylnaphthalene	11/17	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	2-Chloronaphthalene	9/11	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	Acenaphthylene	28/45	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	Acenapthene	12/18	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	Dibenzofuran	27/43	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	Indeno(1,2,3-cd)pyrene	44/42	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	Dibenzo(a,h)anthracene	43/41	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1/BSD1	Benzo(g,h,i)perylene	45/43	NA	50 – 150	JG/UJG
SW846 8270	B09G136-BS1	Fluorene	43	NA	50 – 150	None
SW846 8270	B09G136-BS1	Phenanthrene	48	NA	50 – 150	None
SW846 8270	B09G136-BS1	Anthracene	44	NA	50 – 150	None
SW846 8270	B09G136-BS1/BSD1	Naphthalene	NA	43	<40	JK/UJK
SW846 8270	B09G136-BS1/BSD1	2-Methylnaphthalene	NA	40	<40	JK/UJK
SW846 8270	B09G136-BS1/BSD1	1-Methylnaphthalene	NA	41	<40	JK/UJK
SW846 8270	B09G136-BS1/BSD1	Acenaphthylene	NA	45	<40	JK/UJK
SW846 8270	B09G136-BS1/BSD1	Acenaphthene	NA	42	<40	JK/UJK
SW846 8270	B09G136-BS1/BSD1	Dibenzofuran	NA	43	<40	JK/UJK

Table 7 –Samples that were Reanalyzed

Sample ID	Reason for Reanalysis
Gig Harbor	Sample was reanalyzed due to initial poor analysis.

Data Validation Qualifiers:

Code	Description
G	Value is likely greater than the reported result. Reported result may be biased low.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
K	Bias could not be determined.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
T	The associated positive result is less than the quantitation limit.
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

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Date Completed: June 12, 2009	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0902008	Sumner	0902008-01	02/12/2009		
0902008	Gig Harbor	0902008-02	02/10/2009		
0902008	Shelton	0902008-03	02/10/2009		
0902008	Everett	0902008-04	02/12/2009		
0902008	Burlington	0902008-05	02/10/2009		
0902008	Bremerton	0902008-06	02/10/2009		
0902008	Tacoma	0902008-07	02/19/2009	MS/MSD	
0902008	Chambers Creek	0902008-08	02/19/2009		
0902008	Metro West Point	0902008-09	02/10/2009		
0902008	Bellingham	0902008-10	02/12/2009		
0902008	Field Blank	0902008-11	02/12/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
0902008	Water	EPA 8270	Semivolatile Organic Compounds by GC/MS	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes.
Did coolers arrive at lab less than 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, according to the data review memoranda by Dickey Huntamer.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes
Case narrative present and complete?	Yes.
Any holding time violations?	Yes, according to the data review memoranda by Dickey Huntamer. Sample extracts for Sumner, Everett, and Field blank were analyzed after the extraction holding time. Associated sample results were qualified estimated biased low (JG or UJG).

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);
- Surrogates Outside Limits (Table 4);
- MS/MSD Outside Limits (Table 5);
- LCS Outside Limits (Table 6); and
- Re-analysis Results (Table 7)

The semivolatile organic analyses (BNAs) data was originally reviewed by Dickey Huntamer, Manchester Environmental Laboratory (MEL) on May 22, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

Semivolatile Organics (including organotins) by GCMS	
Description	**Notes and Qualifiers**
Any compounds present in method, trip, and field blanks (see Table 2)?	Yes.
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data. Qualification also applies to TICs.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one method blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes
Surrogate recovery values for method blanks and LCS/LCSD samples within laboratory QC limits?	Yes
Surrogate recovery values for samples and MS/MSD within laboratory QC limits? All samples should be re-analyzed for VOCs? Samples should be re-analyzed if >1 BN and/or AP for SVOCs is out.	Yes
MS/MSD percent recovery values within laboratory QC criteria (see Table 4)?	No – Several compounds were outside QC limits. The analytes were qualified in the parent sample "JG" and "UJG" for low MS/MSD recovery. If MS/MSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ".
MS/MSD relative percent difference values within QC criteria (see Table 4) of <35%?	No – Several compounds were outside QC limits. No action was taken.
LCS percent recovery values within Laboratory QC criteria (see Table 5)?	No – Several compounds were outside QC limits. All analytes were qualified in associated samples "JG" and "UJG" for low LCS/LCSD recovery. If LCS/LCSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ".
Do internal standards areas and retention time meet criteria? If not was sample re-analyzed to establish matrix (see Table 6)?	No, several IS were low in samples Sumner, Everett, Bellingham, and Field blank; associated sample results were flagged as estimated, biased high (UJ or J) by Dickey Huntamer.
Is initial calibration for target compounds <20 % RSD or curve fit?	No – several compounds were above the QC limit, all associated samples results were qualified "JK or UJK".
Is continuing calibration for target compounds < 20%?	No – several compounds were above the QC limit, all associated samples results were qualified "JK or UJK".

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Date Completed: June 12, 2009	Completed by: David Ikeda

Semivolatile Organics (including organotins) by GCMS	
Description	**Notes and Qualifiers**
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	Yes.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Analytes were detected in the method and field blanks. The associated amples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U. Several MS/MSD compound percent recovery valuess were outside QC limits. The analytes were qualified in the parent sample "JG" and "UJG" for low MS/MSD recovery. If MS/MSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ". Several LCS/LCSD compound percent recovery values were outside QC limits. All analytes were qualified in associated samples "JG" and "UJG" for low LCS/LCSD recovery. If LCS/LCSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ". Several IS recovery were low in samples Sumner, Everett, Bellingham, and Field blank; associated sample results were flagged as estimated, biased high (UJ or J) y Dickey Huntamer. Several compounds were above the initial and continuing calibrations QC limit, all associated samples results were qualified estimated, bias unknown (UJK, JTK, or JK). Sample results greater than MDL and less than PQL are flagged estimated (JT).

Table 3 – List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Units	PQL
SW846 8270	B09B100-BLK1	MBLK	Di-n-butylphthalate	0.25	J	µg/L	0.25
SW846 8270	B09B100-BLK1	MBLK	Bis(2-hexylethyl)phthalate	0.007	J	µg/L	0.50
SW846 8270	B09B116-BLK1	MBLK	Butylbenzylphthalate	0.62	J	µg/L	0.50
SW846 8270	B09B116-BLK1	MBLK	Bis(2-hexylethyl)phthalate	0.78	J	µg/L	0.50
SW846 8270	Field Blank	FBLK	1,2-Dichlorobenzene	0.02	J	µg/L	0.16
SW846 8270	Field Blank	FBLK	1,3-Dichlorobenzene	0.01	J	µg/L	0.16
SW846 8270	Field Blank	FBLK	4-Nonylphenol	0.28	J	µg/L	0.64
SW846 8270	Field Blank	FBLK	Bis(2-hexylethyl)phthalate	0.47	J	µg/L	0.32
SW846 8270	Field Blank	FBLK	Dimethylphthalate	0.58	J	µg/L	0.32
SW846 8270	Field Blank	FBLK	Phenol	0.19	J	µg/L	0.64

Table 3A - List of Samples Qualified for Method Blank Contamination

Method	Sample ID	Analyte	Result	Qual
SW846 8270	Sumner	1,2-Dichlorobenzene	0.15	U
SW846 8270	Sumner	Butylbenzylphthalate	0.62	U
SW846 8270	Sumner	Bis(2-hexylethyl)phthalate	1.1	U
SW846 8270	Sumner	Phenol	0.62	U
SW846 8270	Gig Harbor	1,2-Dichlorobenzene	0.16	U
SW846 8270	Gig Harbor	1,3-Dichlorobenzene	0.16	U
SW846 8270	Gig Harbor	Di-n-butylphthalate	0.22	U
SW846 8270	Gig Harbor	Bis(2-hexylethyl)phthalate	1.4	U

Method	Sample ID	Analyte	Result	Qual
SW846 8270	Shelton	1,2-Dichlorobenzene	0.16	U
SW846 8270	Shelton	1,3-Dichlorobenzene	0.16	U
SW846 8270	Shelton	Di-n-butylphthalate	0.43	U
SW846 8270	Shelton	Bis(2-hexylethyl)phthalate	1.0	U
SW846 8270	Shelton	Phenol	0.63	U
SW846 8270	Everett	4-Nonylphenol	0.65	U
SW846 8270	Everett	Bis(2-hexylethyl)phthalate	3.4	U
SW846 8270	Everett	Phenol	0.78	U
SW846 8270	Burlington	Di-n-butylphthalate	0.24	U
SW846 8270	Burlington	Bis(2-hexylethyl)phthalate	0.53	U
SW846 8270	Burlington	Phenol	0.56	U
SW846 8270	Bremerton	Di-n-butylphthalate	0.36	U
SW846 8270	Bremerton	Bis(2-hexylethyl)phthalate	2.4	U
SW846 8270	Bremerton	Phenol	0.86	U
SW846 8270	Tacoma	4-Nonylphenol	1.0	U
SW846 8270	Tacoma	Di-n-butylphthalate	0.28	U
SW846 8270	Tacoma	Bis(2-hexylethyl)phthalate	2.8	U
SW846 8270	Tacoma	Phenol	0.72	U
SW846 8270	Chambers Creek	4-Nonylphenol	0.68	U
SW846 8270	Chambers Creek	Bis(2-hexylethyl)phthalate	1.2	U
SW846 8270	Chambers Creek	Phenol	0.68	U
SW846 8270	Metro West Point	Di-n-butylphthalate	0.38	U
SW846 8270	Metro West Point	Bis(2-hexylethyl)phthalate	1.4	U
SW846 8270	Metro West Point	Phenol	0.94	U

Table 4 - List of Samples with Surrogates outside Control Limits
None

Table 5 - List MS/MSD Percent Recovery Values and RPDs outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	Tacoma MS	Phenol	39	NA	50 – 150	None
SW846 8270	Tacoma MSD	Phenol	36	NA	50 – 150	None
SW846 8270	Tacoma MS	4-Methylphenol	41	NA	50 – 150	JG
SW846 8270	Tacoma MSD	4-Methylphenol	45	NA	50 – 150	JG
SW846 8270	Tacoma MS	4-Nitrophenol	0	NA	50 – 150	REJ
SW846 8270	Tacoma MSD	4-Nitrophenol	0	NA	50 – 150	REJ
SW846 8270	Tacoma MS	Hexachloroethane	43	NA	50 – 150	UJG
SW846 8270	Tacoma MSD	Hexachloroethane	31	NA	50 – 150	UJG
SW846 8270	Tacoma MS	Hexachlorobutadiene	49	NA	50 – 150	UJG
SW846 8270	Tacoma MSD	Hexachlorobutadiene	37	NA	50 – 150	UJG
SW846 8270	Tacoma MS	2-Nitroaniline	22	NA	50 – 150	UJG
SW846 8270	Tacoma MSD	2-Nitroaniline	37	NA	50 – 150	UJG
SW846 8270	Tacoma MSD	2-Nitroaniline	NA	43	<40	None

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	Tacoma MS	3-Nitroaniline	23	NA	50 – 150	UJG
SW846 8270	Tacoma MSD	3-Nitroaniline	39	NA	50 – 150	UJG
SW846 8270	Tacoma MSD	3-Nitroaniline	NA	46	<40	None
SW846 8270	Tacoma MS	4-Nitroaniline	0	NA	50 – 150	REJ
SW846 8270	Tacoma MSD	4-Nitroaniline	0	NA	50 – 150	REJ
SW846 8270	Tacoma MS	n-Nitrosodiphenylamine	41	NA	50 – 150	JG
SW846 8270	Tacoma MSD	n-Nitrosodiphenylamine	62	NA	50 – 150	None
SW846 8270	Tacoma MS	4-Nonylphenol	30	NA	50 – 150	None
SW846 8270	Tacoma MSD	4-Nonylphenol	39	NA	50 – 150	None
SW846 8270	Tacoma MS	Bisphenol A	3	NA	50 – 150	REJ
SW846 8270	Tacoma MSD	Bisphenol A	0	NA	50 – 150	REJ

Table 6 - List LCS Percent Recovery Values outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	B09B100-BS1	Hexachlorocyclopentadiene	46	NA	50 – 150	UJG
SW846 8270	B09B100-BSD1	Hexachlorocyclopentadiene	51	NA	50 – 150	None
SW846 8270	B09B100-BS1	4-Chloroaniline	0	NA	50 – 150	REJ
SW846 8270	B09B100-BSD1	4-Chloroaniline	0	NA	50 – 150	REJ
SW846 8270	B09B100-BS1	4-Nonylphenol	0	NA	50 – 150	REJ
SW846 8270	B09B100-BSD1	4-Nonylphenol	0	NA	50 – 150	REJ
SW846 8270	B09B116-BS1	Benzyl alcohol	NA	44	<40	None
SW846 8270	B09B116-BS1	Benzoic acid	NA	64	<40	None
SW846 8270	B09B116-BS1	4-Chloroaniline	0	NA	50 – 150	REJ
SW846 8270	B09B116-BSD1	4-Chloroaniline	0	NA	50 – 150	REJ
SW846 8270	B09B116-BS1	3,3'-Dichlorobenzidine	0	NA	50 – 150	REJ
SW846 8270	B09B116-BSD1	3,3'-Dichlorobenzidine	0	NA	50 – 150	REJ
SW846 8270	B09B116-BS1	2-Nitroaniline	7.7	NA	50 – 150	REJ
SW846 8270	B09B116-BSD1	2-Nitroaniline	29	NA	50 – 150	None
SW846 8270	B09B116-BS1	2-Nitroaniline	NA	118	<40	None
SW846 8270	B09B116-BSD1	3-Nitroaniline	0	NA	50 – 150	REJ
SW846 8270	B09B116-BS1	3-Nitroaniline	29	NA	50 – 150	None
SW846 8270	B09B116-BSD1	3-Nitroaniline	NA	114	<40	None
SW846 8270	B09B116-BS1	4-Nitroaniline	0	NA	50 – 150	REJ
SW846 8270	B09B116-BSD1	4-Nitroaniline	22	NA	50 – 150	None
SW846 8270	B09B116-BS1	n-Nitrosodiphenylamine	41	NA	50 – 150	UJG or JTG
SW846 8270	B09B116-BSD1	n-Nitrosodiphenylamine	62	NA	50 – 150	UJG or JTG
SW846 8270	B09B116-BS1	n-Nitrosodiphenylamine	NA	190	<40	None
SW846 8270	B09B116-BS1	Triethyl citrate	20	NA	50 – 150	None
SW846 8270	B09B116-BSD1	Triethyl citrate	11	NA	50 – 150	None
SW846 8270	B09B116-BSD1	Triethyl citrate	NA	61	<40	None
SW846 8270	B09B116-BSD1	4-Nonylphenol	24	NA	50 – 150	UJG or JTG

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	B09B116-BS1	4-Nonylphenol	71	NA	50 – 150	UJG or JTG
SW846 8270	B09B116-BSD1	4-Nonylphenol	NA	99	<40	None
SW846 8270	B09B116-BS1	Bisphenol A	0	NA	50 – 150	REJ
SW846 8270	B09B116-BSD1	Bisphenol A	9	NA	50 – 150	REJ
SW846 8270	B09B116-BSD1	Bisphenol A	NA	100	<40	None
SW846 8270	B09B116-BS1	di-n-Ocytlphthalate	358	NA	50 – 150	JL
SW846 8270	B09B116-BSD1	di-n-Ocytlphthalate	2980	NA	50 – 150	JL
SW846 8270	B09B116-BSD1	di-n-Ocytlphthalate	NA	157	<40	None
SW846 8270	B09B146-BS1	Benzyl alcohol	0	NA	50 – 150	None
SW846 8270	B09B146-BS1	Bis(2-chloroethoxy)methane	0	NA	50 – 150	REJ
SW846 8270	B09B146-BS1	4-Chloroaniline	0	NA	50 – 150	REJ
SW846 8270	B09B146-BS1	4-Nitrophenol	0	NA	50 – 150	None
SW846 8270	B09B146-BS1	4-Nitroaniline	0	NA	50 – 150	REJ
SW846 8270	B09B146-BS1	Bisphenol A	0	NA	50 – 150	REJ
SW846 8270	B09B146-BS1	4-Methylphenol	39	NA	50 – 150	JG
SW846 8270	B09B146-BS1	Benzoic acid	39	NA	50 – 150	None
SW846 8270	B09B146-BS1	2-Nitroaniline	8	NA	50 – 150	REJ
SW846 8270	B09B146-BS1	3-Nitroaniline	8	NA	50 – 150	REJ
SW846 8270	B09B146-BS1	Caffeine	5	NA	50 – 150	JTG
SW846 8270	B09B146-BS1	Triclosan	33	NA	50 – 150	None

Table 7 –Samples that were Reanalyzed

Sample ID	Reason for Reanalysis
Sumner	Sample was reanalyzed due to IS outliers.
Everett	Sample was reanalyzed due to IS outliers.
Bellingham	Sample was reanalyzed due to QC outliers.
Field blank	Sample was reanalyzed due to QC outliers.

Data Validation Qualifiers:

Code	Description
G	Value is likely greater than the reported result. Reported result may be biased low.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
K	Bias could not be determined.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 14, 2009	Completed by: Mark Woodke

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0907021	Gig Harbor	0907021-01	07/14/2009		
0907021	Bremerton	0907021-02	07/14/2009		
0907021	West Point	0907021-04	07/14/2009	MS/MSD	
0907021	Burlington	0907021-05	07/14/2009		
0907021	Tacoma	0907021-06	07/16/2009		
0907021	Chambers Creek	0907021-07	07/16/2009		
0907021	Sumner	0907021-08	07/17/2009		
0907021	Bellingham	0907021-09	07/16/2009		
0907021	Everett	0907021-10	07/16/2009		
0907021	Shelton	0907021-13	07/15/2009		
0907021	Rinsate	0907021-12	07/10/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
0907021	Water	EPA 8270	Semivolatile Organic Compounds by GC/MS	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes.
Did coolers arrive at lab less than 6^{0}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, assumed based on the data review memorandum by Dickey Huntamer.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes
Case narrative present and complete?	Yes.
Any holding time violations?	No.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blank Results (Table 3);
- Surrogates Outside Limits (Table 4);
- MS/MSD Outside Limits (Table 5);
- LCS Outside Limits (Table 6); and
- Re-analysis Results (Table 7)

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 14, 2009	Completed by: Mark Woodke

The semivolatile organic analyses (BNAs) data was originally reviewed by Dickey Huntamer, Manchester Environmental Laboratory (MEL) on September 22, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

Semivolatile Organics (including organotins) by GCMS	
Description	**Notes and Qualifiers**
Any compounds present in method, trip, and field blanks (see Table 2)?	Yes.
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data. Qualification also applies to TICs.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one method blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes
Surrogate recovery values for method blanks and LCS/LCSD samples within laboratory QC limits?	No
Surrogate recovery values for samples and MS/MSD within laboratory QC limits? All samples should be re-analyzed for VOCs? Samples should be re-analyzed if >1 BN and/or AP for SVOCs is out.	No
MS/MSD percent recovery values within laboratory QC criteria (see Table 4)?	No – Several compounds were outside QC limits. The analytes were qualified in the parent sample “JG” and “UJG” for low MS/MSD recovery. If MS/MSD percent recovery values were below 10%, then non-detect results were flagged as rejected “REJ”.
MS/MSD relative percent difference values within QC criteria (see Table 4) of <35%?	Yes.
LCS percent recovery values within Laboratory QC criteria (see Table 5)?	No – Several compounds were outside QC limits. All analytes were qualified in associated samples “JG” and “UJG” for low LCS/LCSD recovery. If LCS/LCSD percent recovery values were below 10%, then non-detect results were flagged as rejected “REJ”.
Do internal standards areas and retention time meet criteria? If not was sample re-analyzed to establish matrix (see Table 6)?	Yes.
Is initial calibration for target compounds <20 % RSD or curve fit?	No – several compounds were above the QC limit, all associated samples results were qualified “JK or UJK”.
Is continuing calibration for target compounds < 20%?	No – several compounds were above the QC limit, all associated samples results were qualified “JK or UJK”.
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	Yes.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 14, 2009	Completed by: Mark Woodke

Analytes were detected in the method blanks. The associated samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged UJ. Several MS/MSD compound percent recovery values were outside QC limits. The analytes were qualified in the parent sample "JG" and "UJG" for low MS/MSD recovery. If both MS/MSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ". Several LCS/LCSD compound percent recovery values were outside QC limits. All analytes were qualified in associated samples "JG" and "UJG" for low LCS/LCSD recovery. If both LCS/LCSD percent recovery values were below 10%, then non-detect results were flagged as rejected "REJ". Several compounds were above the initial and continuing calibrations QC limit, all associated samples results were qualified estimated, bias unknown (UJK, JTK, or JK). Sample results greater than MDL and less than PQL are flagged estimated (JT).

Table 3 – List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Units	PQL
SW846 8270	B09G117-BLK1	MBLK	Di-n-butylphthalate	0.18	J	µg/L	0.25
SW846 8270	B09G161-BLK1	MBLK	Di-n-butylphthalate	0.78	J	µg/L	0.25

Table 3A - List of Samples Qualified for Method Blank Contamination

Method	Sample ID	Analyte	Result	Qualifier
SW846 8270	Gig Harbor	Di-n-butylphthalate	0.32	UJ
SW846 8270	Bremerton	Di-n-butylphthalate	0.19	UJ
SW846 8270	West Point	Di-n-butylphthalate	0.21	UJ
SW846 8270	Burlington	Di-n-butylphthalate	0.39	UJ
SW846 8270	Tacoma	Di-n-butylphthalate	0.24	UJ
SW846 8270	Chambers Creek	Di-n-butylphthalate	0.33	UJ
SW846 8270	Sumner	Di-n-butylphthalate	0.24	UJ
SW846 8270	Bellingham	Di-n-butylphthalate	0.26	UJ
SW846 8270	Everett	Di-n-butylphthalate	0.25	UJ
SW846 8270	Shelton	Di-n-butylphthalate	0.22	UJ

Table 4 - List of Samples with Surrogates outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	QC Limit	Sample Qualification
SW846 8270	Sumner	2-Fluorobiphenyl	42	43 – 116	None
SW846 8270	B09G161-BSD1	2-Fluorophenol	139	43 – 116	None
SW846 8270	B09G161-BLK1	2-Fluorophenol	128	43 – 116	None
SW846 8270	B09G117-BLK1	2-Fluorophenol	135	43 – 116	None

Table 5 - List MS/MSD Percent Recovery Values and RPDs outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	West Point MS	Phenol	44	NA	50 – 150	JG/UJG
SW846 8270	West Point MSD	Phenol	46	NA	50 – 150	JG/UJG

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	West Point MS	Benzyl Alcohol	41	NA	50 – 150	JG/UJG
SW846 8270	West Point MSD	Benzyl Alcohol	41	NA	50 – 150	JG/UJG
SW846 8270	West Point MS	Hexachloroethane	48	NA	50 – 150	JG/UJG
SW846 8270	West Point MSD	Hexachloroethane	40	NA	50 – 150	JG/UJG
SW846 8270	West Point MS	4-Nitroaniline	12	NA	50 – 150	JG/UJG
SW846 8270	West Point MSD	4-Nitroaniline	12	NA	50 – 150	JG/UJG
SW846 8270	West Point MS	Hexachlorocyclopentadiene	39	NA	50 – 150	JG/UJG
SW846 8270	West Point MSD	Hexachlorocyclopentadiene	32	NA	50 – 150	JG/UJG
SW846 8270	West Point MS	Hexachlorobutadiene	44	NA	50 – 150	None
SW846 8270	West Point MS	N-Nitrosodiphenylamine	161	NA	50 – 150	J
SW846 8270	West Point MSD	N-Nitrosodiphenylamine	162	NA	50 – 150	J
SW846 8270	West Point MS	Cholesterol	204	NA	50 – 150	J
SW846 8270	West Point MSD	Cholesterol	217	NA	50 – 150	J
SW846 8270	West Point MS	Bisphenol A	156	NA	50 – 150	J
SW846 8270	West Point MSD	Bisphenol A	154	NA	50 – 150	J
SW846 8270	West Point MS	Coprostanol	151	NA	50 – 150	None
SW846 8270	West Point MS	4-Chloroaniline	0	NA	50 – 150	Rej
SW846 8270	West Point MSD	4-Chloroaniline	0	NA	50 – 150	Rej
SW846 8270	West Point MS	3,3'-Dichlorobenzidine	0	NA	50 – 150	Rej
SW846 8270	West Point MSD	3,3'-Dichlorobenzidine	0	NA	50 – 150	Rej

Table 6 - List LCS Percent Recovery Values outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	B09G117-BS1	Benzyl Alcohol	47	NA	50 – 150	JG/UJG
SW846 8270	B09G117-BS1	Benzoic Acid	35	NA	50 – 150	JG/UJG

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	B09G117-BS1	Hexachlorocyclopentadiene	20	NA	50 – 150	JG/UJG
SW846 8270	B09G117-BS1	4-Chloroaniline	0	NA	50 – 150	Rej
SW846 8270	B09G117-BS1	N-Nitrosodiphenylamine	199	NA	50 – 150	J
SW846 8270	B09G117-BS1	4-Nitroaniline	191	NA	50 – 150	J
SW846 8270	B09G117-BS1	N-Nonylphenol	152	NA	50 – 150	J
SW846 8270	B09G161-BS1/-BSD1	Hexachlorocyclopentadiene	20/44	NA	50 – 150	JG/UJG
SW846 8270	B09G161-BS1/-BSD1	Benzyl alcohol	42/48	NA	50 – 150	JG/UJG
SW846 8270	B09G161-BS1/-BSD1	Benzoic acid	25/33	NA	50 – 150	JG/UJG
SW846 8270	B09G161-BS1/-BSD1	Bisphenol A	140/41	NA	50 – 150	None
SW846 8270	B09G161-BS1/-BSD1	Hexachloroethane	49/68	NA	50 – 150	None
SW846 8270	B09G161-BS1/-BSD1	4-Chloroaniline	6/0	NA	50 – 150	Rej
SW846 8270	B09G161-BS1/-BSD1	N-Nitrosodiphenylamine	189/197	NA	50 – 150	J
SW846 8270	B09G161-BS1/-BSD1	4-Nitroaniline	183/150	NA	50 – 150	J
SW846 8270	B09G161-BS1/-BSD1	N-Nonylphenol	140/145	NA	50 – 150	J
SW846 8270	B09G161-BS1	Bisphenol A	NA	108	<40	J
SW846 8270	B09G161-BS1	Hexachlorocyclopentadiene	NA	75	<40	J

Table 7 –Samples that were Reanalyzed

Sample ID	Reason for Reanalysis
B09G117-BS1	Sample was reanalyzed due to overwriting file.
B09G161-BS1	Sample was reanalyzed due to overwriting file.

Data Validation Qualifiers:

Code	Description
G	Value is likely greater than the reported result. Reported result may be biased low.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
K	Bias could not be determined.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
T	The associated positive result is less than the quantitation limit.
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: March 31, 2008	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance level 1 review (QA1) (PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0902008	Water	Sumner	0902008-01	02/12/2009		None
0902008	Water	Gig Harbor	0902008-02	02/10/2009		None
0902008	Water	Shelton	0902008-03	02/10/2009		None
0902008	Water	Everett	0902008-04	02/12/2009		None
0902008	Water	Burlington	0902008-05	02/10/2009		None
0902008	Water	Bremerton	0902008-06	02/10/2009		None
0902008	Water	Tacoma	0902008-07	02/19/2009	MS/MSD	None
0902008	Water	Chambers Creek	0902008-08	02/19/2009		None
0902008	Water	Metro West Point	0902008-09	02/10/2009		None
0902008	Water	Bellingham	0902008-10	02/12/2009		None
0902008	Water	Field Blank	0902008-11	02/12/2009		None

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples
0902008	Water	SW846 8270	Acid Herbicides by Gas Chromatography/Mass Spectrometry	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes
Did coolers arrive at lab between 0 °C and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes
Frequency of Field QC Samples Correct? Field Duplicate – Not required. Field Blank – 1/20 samples. MS/MSD samples – 1/20 samples.	Yes
Case narrative present and complete?	Yes
Any holding time violations?	No - All samples were prepared and analyzed within holding times.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);
- Surrogates Outside Limits (Table 4);

- MS/MSD Outside Limits (Table 5);
- LCS Outside Limits (Table 6); and
- Re-analysis Results (Table 7).

The acid herbicides data was reviewed by Bob Carrell, Manchester Environmental Laboratory (MEL) on March 11, 2009. The laboratory provided the analytical summaries for samples, including QC samples. No raw data was provided by the laboratory.

Acid Herbicides by GC/MS	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks?	No.
For samples, if results are <5 times the blank then "U" flag data.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Surrogate standard recovery values for samples, MS/MSD, method blanks, and LCS/LCSD samples within laboratory QC limits?	No, please refer to Table 4. No action was taken for LCS surrogate outliers.
Internal standard recovery values for samples, MS/MSD, method blanks, and LCS/LCSD samples within laboratory QC limits?	Yes.
MS/MSD percent recovery values within laboratory QC criteria?	No, please refer to Table 5.
MS/MSD relative percent difference values within QC criteria (see Table 4) of <40%?	No, please refer to Table 5. No action was taken, since results were qualified due to MS/MSD recovery.
LCS percent recovery values within laboratory QC criteria (see Table 5)? If the value is high with no positive values in the associated data; then no data qualification is required.	No, please refer to Table 6.
Is initial calibration for target compounds <20 % RSD or curve fit?	Yes
Is initial calibration verification standard for target compounds <30 %?	No, 4-nitrophenol and dinoseb were outside QC limits. No action was taken since the anayltes were not detected in the associated samples.
Is continuing calibration for target compounds < 20%?	Yes
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	No

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Matrix spike (B09B138-MS1 and –MSD, parent sample Tacoma) percent recovery values were outside QC limits, the sample results were qualified (refer to Table 4). Laboratory control sample percent recovery values were outside QC limits, associated samples were qualified (refer to Table 5).

Table 3 - List of Positive Results for Blank Samples
None

Table 3A - List of Samples Qualified for Method Blank Contamination
None

Table 4 - List of Samples with Surrogates outside Control Limits

Method	Sample ID	Analyte	Recovery	QC Limit	Sample Qualification
SW846 8270	B09B102-BS1	2,4-Dichlorophenylacetic Acid	24	40 - 130	None

Table 5 - List MS/MSD Percent Recovery Values and RPDs outside Control Limits

Method	Sample ID	Analyte	Recovery	QC Limit	Sample Qualification
SW846 8270	B09B138-MS1	2,4-DB	0	40 - 130	R
SW846 8270	B09B138-MS1	4-Nitrophenol	23	40 - 130	UJL or JL
SW846 8270	B09B138-MS1	Acifluorfen (Blazer)	0	40 - 130	R
SW846 8270	B09B138-MS1	Clopyralid	38	40 - 130	UJL or JL
SW846 8270	B09B138-MS1	Dinoseb	0	40 - 130	R
SW846 8270	B09B138-MS1	Picloram	15	40 - 130	None
SW846 8270	B09B138-MSD1	2,4-DB	0	40 - 130	R
SW846 8270	B09B138-MSD1	4-Nitrophenol	19	40 - 130	UJL or JL
SW846 8270	B09B138-MS1	Clopyralid	34	40 - 130	UJL or JL
SW846 8270	B09B138-MS1	Dinoseb	34	40 - 130	R
SW846 8270	B09B138-MS1	Picloram	0	40 - 130	R
SW846 8270	B09B138-MS1	2,4-DB	RPD = NC	40	None
SW846 8270	B09B138-MS1	Acifluorfen (Blazer)	RPD = NC	40	None
SW846 8270	B09B138-MS1	Dinoseb	RPD = NC	40	None
SW846 8270	B09B138-MS1	Picloram	RPD = NC	40	None

Table 6 - List LCS Percent Recovery Values outside Control Limits

Method	Sample ID	Analyte	Recovery	QC Limit	Sample Qualification
SW846 8270	B09B102-BS1	2,3,4,5-Tetrachlorophenol	24	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	2,3,4,6-Tetrachlorophenol	39	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	2,4,5-T	36	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	2,4,5-Trichlorophenol	21	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	2,4,6-Trichlorophenol	26	40 - 130	UJL, JTL or JL
SW846 8270	B09B102-BS1	2,4-D	35	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	2,4-DB	23	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	4-Nitrophenol	22	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	Acifluorfen (Blazer)	34	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	Clopyralid	30	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	Dicamba l	39	40 - 130	UJL, NJTL, or JL
SW846 8270	B09B102-BS1	Diclofop-Methyl	38	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	Dinoseb	24	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	MCPA	38	40 - 130	UJL, NJTL, or JL
SW846 8270	B09B102-BS1	MCPP (Mecoprop)	38	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	Picloram	26	40 - 130	UJL or JL
SW846 8270	B09B102-BS1	Trichlopry	38	40 - 130	UJL, NJTL, or JL
SW846 8270	B09B138-BS1	Dinoseb	35	40 - 130	UJL or JL
SW846 8270	B09B148-BS1	Picloram	36	40 - 130	UJL or JL
SW846 8270	B09B148-BSD	Clopyralid	28	40 - 130	UJL or JL

Method	Sample ID	Analyte	Recovery	QC Limit	Sample Qualification
SW846 8270	B09B148-BSD	Picloram	36	40 - 130	UJL or JL

Table 7 –Samples that were Reanalyzed
None

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference

Data Validation Qualifiers:

Code	Description
B	Analyte detected in sample and method blank. Reported result is sample concentration without blank correction or associated quantitation limit.
JG	Analyte was positively identified. Value may be greater than the reported estimate.
JK	Analyte was positively identified. Reported result is an estimate with unknown bias.
JL	Analyte was positively identified. Value may be less than the reported estimate.
JT	Analyte was positively identified. Reported result is an estimate below the associated quantitation limit but above the MDL.
JTG	Analyte was positively identified. Value may be greater than the reported result, which is an estimate below the associated quantitation limit but above the MDL.
JTK	Analyte was positively identified. Reported result is an estimate with unknown bias, below the associated quantitation limit but above the MDL.
JTL	Analyte was positively identified. Value may be less than the reported result which is an estimate below associated quantitation limit but above MDL.
NJ	There is evidence that the analyte is present in the sample. Reported result for the tentatively identified analyte is an estimate.
NJT	There is evidence the analyte is present in the sample. Reported result for the tentatively identified analyte is an estimate below the associated quantitation limit but above the MDL.
NU	There is evidence the analyte is present in the sample. Tentatively identified analyte was not detected at or above the reported result.
NUJ	There is evidence the analyte is present in the sample. Tentatively identified analyte was not detected at or above the reported estimate.
NAF	Not analyzed for.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	Analyte was not detected at or above the reported result.
UJ	Analyte was not detected at or above the reported estimate
UJG	Analyte was not detected at or above the reported estimate with likely low bias.
UJK	Analyte was not detected at or above the reported estimate with unknown bias.
UJL	Analyte was not detected at or above the reported estimate with likely high bias.

Washington State Department of Ecology
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Final Analysis Report for
Chlorophenoxy Herbicides

Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Gig Harbor**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 995 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-02
Collected: 2/10/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B102
Prepared: 2/11/2009
Analyzed: 3/2/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.063	U JL	0.063	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.063	U JL	0.063	0.007
93-76-5	2,4,5-T	0.063	U JL	0.063	0.009
93-72-1	2,4,5-TP (Silvex)	0.063	U	0.063	0.010
95-95-4	2,4,5-Trichlorophenol	0.063	U JL	0.063	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.16**	JL	0.063	0.011
94-75-7	2,4-D	0.063	U JL	0.063	0.012
94-82-6	2,4-DB	0.063	U JL	0.063	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.063	U	0.063	0.007
100-02-7	4-Nitrophenol	0.063	U JL	0.063	0.022
62476-59-9	Acifluorfen (Blazer)	0.063	U JL	0.063	0.054
25057-89-0	Bentazon	0.063	U	0.063	0.007
1689-84-5	Bromoxynil	0.063	U JL	0.063	0.006
1702-17-6	Clopyralid	0.063	U	0.063	0.008
1861-32-1	Dacthal (DCPA)	0.063	U	0.063	0.005
1918-00-9	Dicamba I	0.063	U JL	0.063	0.007
120-36-5	Dichlorprop	0.063	U	0.063	0.009
51338-27-3	Diclofop-Methyl	0.063	U JL	0.063	0.017
88-85-7	Dinoseb	0.063	U JL	0.063	0.041
1689-83-4	Ioxynil	0.063	U	0.063	0.016
94-74-6	MCPA	0.063	U JL	0.063	0.008
93-65-2	MCPP (Mecoprop)	0.063	U JL	0.063	0.008
87-86-5	Pentachlorophenol	0.063	U	0.063	0.007
1918-02-1	Picloram	0.063	UJL	0.063	0.018
55335-06-3	Trichlopyr	0.063	U JL	0.063	0.007

1 10 APRIL 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	1.01	1.01	100	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.668	1.01	67	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
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Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Shelton**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 985 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-03
Collected: 2/10/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B102
Prepared: 2/11/2009
Analyzed: 3/2/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.063	U JL	0.063	0.004
58-90-2	**2,3,4,6-Tetrachlorophenol**	**0.15**	JL	0.063	0.007
93-76-5	2,4,5-T	0.063	U JL	0.063	0.009
93-72-1	2,4,5-TP (Silvex)	0.063	U	0.063	0.010
95-95-4	2,4,5-Trichlorophenol	0.063	U JL	0.063	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.30**	JL	0.063	0.011
94-75-7	2,4-D	0.063	U JL	0.063	0.012
94-82-6	2,4-DB	0.063	U JL	0.063	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.063	U	0.063	0.007
100-02-7	4-Nitrophenol	0.063	U JL	0.063	0.022
62476-59-9	Acifluorfen (Blazer)	0.063	U JL	0.063	0.054
25057-89-0	Bentazon	0.063	U	0.063	0.007
1689-84-5	Bromoxynil	0.063	U	0.063	0.006
1702-17-6	Clopyralid	0.063	U JL	0.063	0.009
1861-32-1	Dacthal (DCPA)	0.063	U	0.063	0.005
1918-00-9	Dicamba I	0.063	U JL	0.063	0.007
120-36-5	Dichlorprop	0.063	U	0.063	0.009
51338-27-3	Diclofop-Methyl	0.063	U JL	0.063	0.017
88-85-7	Dinoseb	0.063	U JL	0.063	0.041
1689-83-4	Ioxynil	0.063	U	0.063	0.016
94-74-6	MCPA	0.063	U JL	0.063	0.008
93-65-2	MCPP (Mecoprop)	0.063	U JL	0.063	0.008
87-86-5	Pentachlorophenol	0.063	U	0.063	0.007
1918-02-1	Picloram	0.063	UJ JL	0.063	0.018
55335-06-3	**Trichlopyr**	**0.054**	~~NJ JL~~ NJ JL	0.063	0.007

1 APRIL 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	0.904	1.02	89	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.670	1.02	66	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
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Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Burlington**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1020 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-05
Collected: 2/10/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B102
Prepared: 2/11/2009
Analyzed: 3/2/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.061	U JL	0.061	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.061	U JL	0.061	0.007
93-76-5	2,4,5-T	0.061	U JL	0.061	0.009
93-72-1	2,4,5-TP (Silvex)	0.061	U	0.061	0.010
95-95-4	2,4,5-Trichlorophenol	0.061	U JL	0.061	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.029**	JTL	0.061	0.011
94-75-7	2,4-D	0.061	U JL	0.061	0.012
94-82-6	2,4-DB	0.061	U JL	0.061	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.061	U	0.061	0.007
100-02-7	4-Nitrophenol	0.061	U JL	0.061	0.021
62476-59-9	Acifluorfen (Blazer)	0.061	U JL	0.061	0.053
25057-89-0	Bentazon	0.061	U	0.061	0.006
1689-84-5	Bromoxynil	0.061	U	0.061	0.006
1702-17-6	Clopyralid	0.061	U JL	0.061	0.008
1861-32-1	Dacthal (DCPA)	0.061	U	0.061	0.005
1918-00-9	Dicamba I	0.061	U JL	0.061	0.007
120-36-5	Dichlorprop	0.061	U	0.061	0.008
51338-27-3	Diclofop-Methyl	0.061	U JL	0.061	0.016
88-85-7	Dinoseb	0.061	U JL	0.061	0.040
1689-83-4	Ioxynil	0.061	U	0.061	0.016
94-74-6	MCPA	0.061	U JL	0.061	0.008
93-65-2	MCPP (Mecoprop)	0.061	U JL	0.061	0.008
87-86-5	**Pentachlorophenol**	**0.037**	NJT	0.061	0.007
1918-02-1	Picloram	0.061	UJ L	0.061	0.017
55335-06-3	Trichlopyr	0.061	U JL	0.061	0.007

1 10 April 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	0.917	0.98	94	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.745	0.98	76	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
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Chlorophenoxy Herbicides

Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Bremerton**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 995 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-06
Collected: 2/10/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B102
Prepared: 2/11/2009
Analyzed: 3/2/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.063	U J L	0.063	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.063	U J L	0.063	0.007
93-76-5	2,4,5-T	0.063	U J L	0.063	0.009
93-72-1	2,4,5-TP (Silvex)	0.063	U	0.063	0.010
95-95-4	2,4,5-Trichlorophenol	0.063	U J L	0.063	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.033**	J T L	0.063	0.011
94-75-7	2,4-D	0.063	U J L	0.063	0.012
94-82-6	2,4-DB	0.063	U J L	0.063	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.063	U	0.063	0.007
100-02-7	4-Nitrophenol	0.063	U J L	0.063	0.022
62476-59-9	Acifluorfen (Blazer)	0.063	U J L	0.063	0.054
25057-89-0	Bentazon	0.063	U	0.063	0.007
1689-84-5	Bromoxynil	0.063	U	0.063	0.006
1702-17-6	Clopyralid	0.063	U J L	0.063	0.008
1861-32-1	Dacthal (DCPA)	0.063	U	0.063	0.005
1918-00-9	Dicamba I	0.063	U J L	0.063	0.007
120-36-5	Dichlorprop	0.063	U	0.063	0.009
51338-27-3	Diclofop-Methyl	0.063	U J L	0.063	0.017
88-85-7	Dinoseb	0.063	U J L	0.063	0.041
1689-83-4	Ioxynil	0.063	U	0.063	0.016
94-74-6	MCPA	0.063	U J L	0.063	0.008
93-65-2	MCPP (Mecoprop)	0.063	U J L	0.063	0.008
87-86-5	**Pentachlorophenol**	**0.044**	NJT	0.063	0.007
1918-02-1	Picloram	0.063	UJL	0.063	0.018
55335-06-3	Trichlopyr	0.063	U J L	0.063	0.007

1 10 April 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	0.894	1.01	89	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.724	1.01	72	40-130

Authorized by: _____ Release Date: 3-16-09

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Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Metro West Point**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1015 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-09
Collected: 2/10/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B102
Prepared: 2/11/2009
Analyzed: 3/3/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.062	U J L	0.062	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.062	U J L	0.062	0.007
93-76-5	2,4,5-T	0.062	U J L	0.062	0.009
93-72-1	2,4,5-TP (Silvex)	0.062	U	0.062	0.010
95-95-4	2,4,5-Trichlorophenol	0.062	U J L	0.062	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.046**	J T L	0.062	0.011
94-75-7	2,4-D	0.062	U J L	0.062	0.012
94-82-6	2,4-DB	0.062	U J L	0.062	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.062	U	0.062	0.007
100-02-7	4-Nitrophenol	0.062	U J L	0.062	0.021
62476-59-9	Acifluorfen (Blazer)	0.062	U J L	0.062	0.053
25057-89-0	Bentazon	0.062	U	0.062	0.006
1689-84-5	Bromoxynil	0.062	U	0.062	0.006
1702-17-6	Clopyralid	0.062	U J L	0.062	0.008
1861-32-1	Dacthal (DCPA)	0.062	U	0.062	0.005
1918-00-9	**Dicamba I**	**0.031**	NJ T L	0.062	0.007
120-36-5	Dichlorprop	0.062	U	0.062	0.008
51338-27-3	Diclofop-Methyl	0.062	U J L	0.062	0.017
88-85-7	Dinoseb	0.062	U J L	0.062	0.040
1689-83-4	Ioxynil	0.062	U	0.062	0.016
94-74-6	**MCPA**	**0.16**	NJ T L	0.062	0.008
93-65-2	MCPP (Mecoprop)	0.062	U J L	0.062	0.008
87-86-5	Pentachlorophenol	0.062	U	0.062	0.007
1918-02-1	Picloram	0.062	U J L	0.062	0.017
55335-06-3	**Trichlopyr**	**0.051**	NJ T L	0.062	0.007

1 10 APRIL 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	0.901	0.985	92	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.724	0.985	74	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
Chlorophenoxy Herbicides

Project: Phase 3: Priority Pollutant Scans of Ten — Field ID: Tacoma

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1010 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-07
Collected: 2/19/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B138
Prepared: 2/20/2009
Analyzed: 3/3/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.062	U	0.062	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.062	U	0.062	0.007
93-76-5	2,4,5-T	0.062	U	0.062	0.009
93-72-1	2,4,5-TP (Silvex)	0.062	U	0.062	0.010
95-95-4	2,4,5-Trichlorophenol	0.062	U	0.062	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.12**		0.062	0.011
94-75-7	2,4-D	0.062	U	0.062	0.012
94-82-6	2,4-DB		~~REJ~~ R	0.062	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.062	U	0.062	0.007
100-02-7	4-Nitrophenol	0.062	UJ L	0.062	0.021
62476-59-9	Acifluorfen (Blazer)	0.062	~~UJ~~ R	0.062	0.053
25057-89-0	Bentazon	0.062	U	0.062	0.006
1689-84-5	Bromoxynil	0.062	U	0.062	0.006
1702-17-6	Clopyralid	0.062	UJ L	0.062	0.008
1861-32-1	Dacthal (DCPA)	0.062	U	0.062	0.005
1918-00-9	Dicamba I	0.062	U	0.062	0.007
120-36-5	Dichlorprop	0.062	U	0.062	0.008
51338-27-3	Diclofop-Methyl	0.062	U	0.062	0.017
88-85-7	Dinoseb	0.062	~~UJ~~ R	0.062	0.040
1689-83-4	Ioxynil	0.062	U	0.062	0.016
94-74-6	MCPA	0.062	U	0.062	0.008
93-65-2	MCPP (Mecoprop)	0.062	U	0.062	0.008
87-86-5	Pentachlorophenol	0.062	U	0.062	0.007
1918-02-1	Picloram	0.062	~~U~~ R	0.062	0.018
55335-06-3	Trichlopyr	0.062	U	0.062	0.007

10 April 20

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	1.04	0.99	106	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.688	0.99	70	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
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Result_Re ported_Va lue | Result_Va lue_UOM | Result_Re porting_Li mit | Result_Re porting_Li mit_Type | Result_De tection_Li mit | Result_De tection_Li mit_Type | Result_Da ta_Qualifie r | Result_La b_Name

Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Chambers Creek**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 980 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-08
Collected: 2/19/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B138
Prepared: 2/20/2009
Analyzed: 3/3/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.064	U	0.064	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.064	U	0.064	0.007
93-76-5	2,4,5-T	0.064	U	0.064	0.009
93-72-1	2,4,5-TP (Silvex)	0.064	U	0.064	0.010
95-95-4	2,4,5-Trichlorophenol	0.064	U	0.064	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.092**		0.064	0.011
94-75-7	2,4-D	0.064	U	0.064	0.013
94-82-6	2,4-DB	0.064	U	0.064	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.064	U	0.064	0.007
100-02-7	4-Nitrophenol	0.064	U	0.064	0.022
62476-59-9	Acifluorfen (Blazer)	0.064	U	0.064	0.055
25057-89-0	Bentazon	0.064	U	0.064	0.007
1689-84-5	Bromoxynil	0.064	U	0.064	0.006
1702-17-6	Clopyralid	0.064	U	0.064	0.009
1861-32-1	Dacthal (DCPA)	0.064	U	0.064	0.005
1918-00-9	Dicamba I	0.064	U	0.064	0.007
120-36-5	Dichlorprop	0.064	U	0.064	0.009
51338-27-3	Diclofop-Methyl	0.064	U	0.064	0.017
88-85-7	Dinoseb	0.064	U JL	0.064	0.042
1689-83-4	Ioxynil	0.064	U	0.064	0.016
94-74-6	MCPA	0.064	U	0.064	0.008
93-65-2	**MCPP (Mecoprop)**	**0.23**		0.064	0.008
87-86-5	Pentachlorophenol	0.064	U	0.064	0.007
1918-02-1	Picloram	0.064	UJ U	0.064	0.018
55335-06-3	Trichlopyr	0.064	U	0.064	0.007

10 APRIL 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	1.06	1.02	104	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.776	1.02	76	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
Manchester Environmental Laboratory
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Chlorophenoxy Herbicides

Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Sumner**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1010 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-01
Collected: 2/12/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B148
Prepared: 2/17/2009
Analyzed: 3/3/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.062	U	0.062	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.062	U	0.062	0.007
93-76-5	2,4,5-T	0.062	U	0.062	0.009
93-72-1	2,4,5-TP (Silvex)	0.062	U	0.062	0.010
95-95-4	2,4,5-Trichlorophenol	0.062	U	0.062	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.057**	**J T**	0.062	0.011
94-75-7	2,4-D	0.062	U	0.062	0.012
94-82-6	2,4-DB	0.062	U	0.062	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.062	U	0.062	0.007
100-02-7	4-Nitrophenol	0.062	U	0.062	0.021
62476-59-9	Acifluorfen (Blazer)	0.062	U	0.062	0.053
25057-89-0	Bentazon	0.062	U	0.062	0.006
1689-84-5	Bromoxynil	0.062	U	0.062	0.006
1702-17-6	Clopyralid	0.062	UJ L	0.062	0.008
1861-32-1	Dacthal (DCPA)	0.062	U	0.062	0.005
1918-00-9	Dicamba l	0.062	U	0.062	0.007
120-36-5	Dichlorprop	0.062	U	0.062	0.008
51338-27-3	Diclofop-Methyl	0.062	U	0.062	0.017
88-85-7	Dinoseb	0.062	U	0.062	0.040
1689-83-4	Ioxynil	0.062	U	0.062	0.016
94-74-6	**MCPA**	**0.11**	**NJ T**	0.062	0.008
93-65-2	MCPP (Mecoprop)	0.062	U	0.062	0.008
87-86-5	Pentachlorophenol	0.062	U	0.062	0.007
1918-02-1	Picloram	0.062	UJ L	0.062	0.018
55335-06-3	Trichlopyr	0.062	U	0.062	0.007

10 April 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	0.965	0.99	98	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.827	0.99	84	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
Chlorophenoxy Herbicides

Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Everett**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1015 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-04
Collected: 2/12/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B148
Prepared: 2/17/2009
Analyzed: 3/3/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.062	U	0.062	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.062	U	0.062	0.007
93-76-5	2,4,5-T	0.062	U	0.062	0.009
93-72-1	2,4,5-TP (Silvex)	0.062	U	0.062	0.010
95-95-4	2,4,5-Trichlorophenol	0.062	U	0.062	0.008
88-06-2	2,4,6-Trichlorophenol	0.062	U	0.062	0.011
94-75-7	2,4-D	0.062	U	0.062	0.012
94-82-6	2,4-DB	0.062	U	0.062	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.062	U	0.062	0.007
100-02-7	4-Nitrophenol	0.062	U	0.062	0.021
62476-59-9	Acifluorfen (Blazer)	0.062	U	0.062	0.053
25057-89-0	Bentazon	0.062	U	0.062	0.006
1689-84-5	Bromoxynil	0.062	U	0.062	0.006
1702-17-6	Clopyralid	0.062	UJ	0.062	0.008
1861-32-1	Dacthal (DCPA)	0.062	U	0.062	0.005
1918-00-9	Dicamba I	0.062	U	0.062	0.007
120-36-5	Dichlorprop	0.062	U	0.062	0.008
51338-27-3	Diclofop-Methyl	0.062	U	0.062	0.017
88-85-7	Dinoseb	0.062	U	0.062	0.040
1689-83-4	Ioxynil	0.062	U	0.062	0.016
94-74-6	MCPA	0.062	U	0.062	0.008
93-65-2	MCPP (Mecoprop)	0.062	U	0.062	0.008
87-86-5	Pentachlorophenol	0.062	U	0.062	0.007
1918-02-1	Picloram	0.062	UJ	0.062	0.017
55335-06-3	Trichlopyr	0.062	U	0.062	0.007

ID APR 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	1.08	0.985	110	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.788	0.985	80	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
Chlorophenoxy Herbicides

Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Bellingham**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 1010 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-10
Collected: 2/12/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B148
Prepared: 2/17/2009
Analyzed: 3/3/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.062	U	0.062	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.062	U	0.062	0.007
93-76-5	2,4,5-T	0.062	U	0.062	0.009
93-72-1	2,4,5-TP (Silvex)	0.062	U	0.062	0.010
95-95-4	2,4,5-Trichlorophenol	0.062	U	0.062	0.008
88-06-2	**2,4,6-Trichlorophenol**	**0.049**	JT	0.062	0.011
94-75-7	2,4-D	0.062	U	0.062	0.012
94-82-6	2,4-DB	0.062	U	0.062	0.008
51-36-5	3,5-Dichlorobenzoic Acid	0.062	U	0.062	0.007
100-02-7	4-Nitrophenol	0.062	U	0.062	0.021
62476-59-9	Acifluorfen (Blazer)	0.062	U	0.062	0.053
25057-89-0	Bentazon	0.062	U	0.062	0.006
1689-84-5	Bromoxynil	0.062	U	0.062	0.006
1702-17-6	Clopyralid	0.062	UJL	0.062	0.008
1861-32-1	Dacthal (DCPA)	0.062	U	0.062	0.005
1918-00-9	Dicamba I	0.062	U	0.062	0.007
120-36-5	Dichlorprop	0.062	U	0.062	0.008
51338-27-3	Diclofop-Methyl	0.062	U	0.062	0.017
88-85-7	Dinoseb	0.062	U	0.062	0.040
1689-83-4	Ioxynil	0.062	U	0.062	0.016
94-74-6	MCPA	0.062	U	0.062	0.008
93-65-2	MCPP (Mecoprop)	0.062	U	0.062	0.008
87-86-5	**Pentachlorophenol**	**0.076**	NJT	0.062	0.007
1918-02-1	Picloram	0.062	UJL	0.062	0.018
55335-06-3	Trichlopyr	0.062	U	0.062	0.007

10 APRIL 2009

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	0.985	0.99	100	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.718	0.99	72	40-130

Authorized by: _____ Release Date: 3-16-09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
Chlorophenoxy Herbicides

Project: Phase 3: Priority Pollutant Scans of Ten **Field ID: Field Blank**

Work Order: 0902008
Project Officer: Maroncelli, Jim
Initial Vol: 970 mL
Final Vol: 0.5 mL

Lab ID #: 0902008-11
Collected: 2/12/2009
Prep Method: SW3535
Analysis Method: SW 8270

Batch ID: B09B148
Prepared: 2/17/2009
Analyzed: 3/3/2009
Matrix: Water
Units: ug/L

CAS#	Analyte	Result	Qualifier	RL	MDL
4901-51-3	2,3,4,5-Tetrachlorophenol	0.064	U	0.064	0.004
58-90-2	2,3,4,6-Tetrachlorophenol	0.064	U	0.064	0.007
93-76-5	2,4,5-T	0.064	U	0.064	0.009
93-72-1	2,4,5-TP (Silvex)	0.064	U	0.064	0.010
95-95-4	2,4,5-Trichlorophenol	0.064	U	0.064	0.009
88-06-2	2,4,6-Trichlorophenol	0.064	U	0.064	0.011
94-75-7	2,4-D	0.064	U	0.064	0.013
94-82-6	2,4-DB	0.064	U	0.064	0.009
51-36-5	3,5-Dichlorobenzoic Acid	0.064	U	0.064	0.007
100-02-7	4-Nitrophenol	0.064	U	0.064	0.022
62476-59-9	Acifluorfen (Blazer)	0.064	U	0.064	0.055
25057-89-0	Bentazon	0.064	U	0.064	0.007
1689-84-5	Bromoxynil	0.064	U	0.064	0.006
1702-17-6	Clopyralid	0.064	UJ	0.064	0.009
1861-32-1	Dacthal (DCPA)	0.064	U	0.064	0.006
1918-00-9	Dicamba I	0.064	U	0.064	0.007
120-36-5	Dichlorprop	0.064	U	0.064	0.009
51338-27-3	Diclofop-Methyl	0.064	U	0.064	0.017
88-85-7	Dinoseb	0.064	U	0.064	0.042
1689-83-4	Ioxynil	0.064	U	0.064	0.016
94-74-6	MCPA	0.064	U	0.064	0.008
93-65-2	MCPP (Mecoprop)	0.064	U	0.064	0.008
87-86-5	Pentachlorophenol	0.064	U	0.064	0.007
1918-02-1	Picloram	0.064	UJ	0.064	0.018
55335-06-3	Trichlopyr	0.064	U	0.064	0.007

Surrogate Recovery:

CAS#	Analyte	Result	Spike Level	% Recovery	%Rec.Limits
118-79-6	2,4,6-Tribromophenol	0.938	1.03	91	40-130
19719-28-9	2,4-Dichlorophenylacetic acid	0.732	1.03	71	40-130

Authorized by: _____ Release Date: 3-16-09

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: August 26, 2009	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0907021	Gig Harbor	0907021-01	07/14/2009		
0907021	Bremerton	0907021-02	07/14/2009		
0907021	West Point	0907021-04	07/14/2009	MS/MSD	
0907021	Burlington	0907021-05	07/14/2009		
0907021	Tacoma	0907021-06	07/16/2009		
0907021	Chambers Creek	0907021-07	07/16/2009		
0907021	Sumner	0907021-08	07/17/2009		
0907021	Bellingham	0907021-09	07/16/2009		
0907021	Everett	0907021-10	07/20/2009		
0907021	Rinsate	0907021-12	07/10/2009		
0907021	Shelton	0907021-13	07/20/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
0907021	Water	EPA 535/8270	Chlorinated Herbicides by solid phase extraction and GC/MS	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes, implied in the data review memoranda by Bob Carrell.
Did coolers arrive at lab less than 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, implied in the data review memoranda by Bob Carrell.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes
Case narrative present and complete?	Yes.
Any holding time violations?	No.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);
- Internal Standards Outside Limits (Table 4);
- Surrogates Outside Limits (Table 5);
- LCS Outside Limits (Table 6);
- MS/MSD Outside Limits (Table 7); and
- Re-analysis Results (Table 8).

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: August 26, 2009	Completed by: David Ikeda

The chlorinated herbicides analyses data was originally reviewed by Bob Carrell, Manchester Environmental Laboratory (MEL) on July 29, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

Chlorinated Pesticides by GC/ECD	
Description	**Notes and Qualifiers**
Any compounds present in method, trip, and field blanks (see Table 3)?	No.
For samples, if results are <10 times the blank then "UJ" flag data.	Not applicable.
Laboratory QC frequency of one method blank and LCS with each batch per 20 samples?	Yes
Internal standards and clean-up standards percent recovery values for method blanks and LCS/LCSD samples within laboratory QC limits?	Yes.
Internal standards and clean-up standards recovery values for samples and MS/MSD within laboratory QC limits (see Table 4)?	Yes.
Surrogate recovery values for method blanks and LCS/LCSD samples within laboratory QC limits?	Yes.
Surrogate recovery values for samples and MS/MSD within laboratory QC limits (see Table 5)?	Yes.
LCS percent recovery values within Laboratory QC criteria (see Table 6)?	No, picloram was outside QC limits, associated sample results were qualified as estimated (UJG).
MS/MSD percent recovery values within laboratory QC criteria (see Table 7)?	No, several compounds were outside Laboratory QC limits, West Point results were qualified as estimated (UJG or JG), except for picloram. The Picloram quantitation limit was qualified as rejected (REJ).
MS/MSD relative percent difference values within laboratory QC criteria (see Table 7)?	Yes.
Is initial calibration for target compounds <20 % RSD or curve fit?	Yes.
Is continuing calibration for target compounds < 20%?	No, 2,4,6-trichlorophenol and 3,5-dichlorobenzoic acid were outside calibration QC limits. Associated sample results were qualified as estimated (UJK, JTK, or JK).
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	Yes.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: August 26, 2009	Completed by: David Ikeda

The picloram was outside LCS QC limits, associated sample results were qualified as estimated (UJG). Several compounds were outside Laboratory MS/MSD QC limits, West Point results were qualified as estimated (UJG or JG), except for picloram. The Picloram quantitation limit was qualified as rejected (REJ). 2,4,6-Trichlorophenol and 3,5-dichlorobenzoic acid were outside calibration QC limits. Associated sample results were qualified as estimated (UJK, JTK, or JK). Sample results greater than MDL and less than PQL are flagged estimated (JT). Sample results that are outside laboratory QC criteria, the results are flagged tentative identification (NK or NJK).

Table 3 – List of Positive Results for Blank Samples
None.

Table 3A - List of Samples Qualified for Method Blank Contamination
None.

Table 4 - List Internal Standard Recovery Values outside Control Limits
None.

Table 5 – Surrogate Precent Recovery Values outside Control Limits
None.

Table 6 – LCS Precent Recovery Values outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
EPA 8270	B09G181-BS1	Picloram	38	NA	40 – 130	None
EPA 8270	B09G181-BSD1	Picloram	NA	50	40	None

Table 7 – MS/MSD Precent Recovery Values outside Control Limits

Method	Sample ID	Analyte	MS Recovery	MSD Recovery	QC Limit	Sample Qualification
EPA 8270	West Point	2,4,5-T	33	39	40 – 130	UJG
EPA 8270	West Point	2,4-D	28	34	40 – 130	JG
EPA 8270	West Point	4-Nitrophenol	15	19	40 – 130	UJG
EPA 8270	West Point	Bentazon	30	38	40 – 130	UJG
EPA 8270	West Point	Clopyralid	30	34	40 – 130	UJG
EPA 8270	West Point	Picloram	6	7	40 – 130	REJ

Table 8 - Samples that were Reanalyzed
None.

Data Validation Qualifiers:

Code	Description
G	Value is likely greater than the reported result. Reported result may be biased low.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
K	Bias could not be determined.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.

REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
T	Sample results are greater than MDL and less than PQL
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: June 19, 2009	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0902008	Sumner	0902008-01	02/12/2009		
0902008	Gig Harbor	0902008-02	02/10/2009		
0902008	Shelton	0902008-03	02/10/2009		
0902008	Everett	0902008-04	02/12/2009		
0902008	Burlington	0902008-05	02/10/2009		
0902008	Bremerton	0902008-06	02/10/2009		
0902008	Tacoma	0902008-07	02/19/2009	MS/MSD	
0902008	Chambers Creek	0902008-08	02/19/2009		
0902008	Metro West Point	0902008-09	02/10/2009		
0902008	Bellingham	0902008-10	02/12/2009		
0902008	Field Blank	0902008-11	02/12/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
0902008	Water	EPA 8081	Chlorinated Pesticide Compounds by GC/ECD	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes.
Did coolers arrive at lab less than 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, according to the data review memoranda by M. Mandjikov.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes
Case narrative present and complete?	Yes.
Any holding time violations?	No.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);
- Surrogates Outside Limits (Table 4);
- MS/MSD Outside Limits (Table 5);
- LCS Outside Limits (Table 6); and
- Re-analysis Results (Table 7)

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: June 19, 2009	Completed by: David Ikeda

The Chlorinated pesticides analyses (BNAs) data was originally reviewed by M. Mandjikov, Manchester Environmental Laboratory (MEL) on May 21, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

Chlorinated Pesticides by GC/ECD	
Description	**Notes and Qualifiers**
Any compounds present in method, trip, and field blanks (see Table 2)?	Yes.
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data. Qualification also applies to TICs.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one method blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes
Surrogate recovery values for method blanks and LCS/LCSD samples within laboratory QC limits?	No. No action was taken for the outliers.
Surrogate recovery values for samples and MS/MSD within laboratory QC limits (see Table 4)?	No.
MS/MSD percent recovery values within laboratory QC criteria (see Table 4)?	No – Several compounds were outside QC limits. The analytes were not qualified in the parent sample.
MS/MSD relative percent difference values within QC criteria (see Table 5) of <35%?	No – Several compounds were outside QC limits. No action was taken.
LCS percent recovery values within Laboratory QC criteria (see Table 6)?	No – Several compounds were outside QC limits in B09B101-BSD1, according to the memoranda by M. Madjikov, the laboratory lost part of the sample extract. No action was taken for this LCSD, since the associated LCS was within QC limits.
Confirmation column quantitation results are with QC limits of less than 40 percent?	Several compounds were quantitatively confirmed on the confirmation sample. Sample results that exceeded a relative percent difference of 40% were qualified as estimated bias unknown (JK or JTK).
Is initial calibration for target compounds <20 % RSD or curve fit?	Yes.
Is continuing calibration for target compounds < 20%?	Yes
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	No

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Analytes were detected in the method blanks. The associated samples results were not changed and flagged U. Several MS/MSD compound percent recovery values were outside QC limits. Sample results greater than MDL and less than PQL are flagged estimated (JT).

Table 3 – List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Units	PQL
SW846 8081	B09B101-BLK1	MBLK	Lindane	0.004	J	µg/L	0.25
SW846 8081	B09B117-BLK1	MBLK	Lindane	0.003	J	µg/L	0.25
SW846 8081	B09B135-BLK1	MBLK	Lindane	0.004	J	µg/L	0.25

Table 3A - List of Samples Qualified for Method Blank Contamination

Method	Sample ID	Analyte	Result	Qual
SW846 8081	Sumner	Lindane	0.0045	U
SW846 8081	Gig Harbor	Lindane	0.0049	U
SW846 8081	Shelton	Lindane	0.0043	U
SW846 8081	Everett	Lindane	0.0025	U
SW846 8081	Burlington	Lindane	0.0049	U
SW846 8081	Bremerton	Lindane	0.0037	U
SW846 8081	Tacoma	Lindane	0.0039	U
SW846 8081	Chambers Creek	Lindane	0.0048	U
SW846 8081	Metro West Point	Lindane	0.0029	U
SW846 8081	Bellingham	Lindane	0.0040	U

Table 4 - List of Samples with Surrogates outside Control Limits

Method	Sample ID	TMX Recovery	DBOB Recovery	DBC Recovery	DCB Recovery	QC Limit	Sample Qualification
SW846 8081	Sumner	52	63	55	74	50 – 150	None
SW846 8081	Gig Harbor	54	56	29	50	50 – 150	UJG or JG
SW846 8081	Shelton	62	73	53	76	50 – 150	None
SW846 8081	Everett	47	56	28	55	50 – 150	UJG
SW846 8081	Burlington	60	72	51	81	50 – 150	None
SW846 8081	Bremerton	60	71	51	73	50 – 150	None
SW846 8081	Tacoma	58	65	39	68	50 – 150	UJG
SW846 8081	Chambers Creek	54	65	38	71	50 – 150	UJG
SW846 8081	Metro West Point	49	56	33	48	50 – 150	UJG
SW846 8081	Bellingham	40	56	38	56	50 – 150	UJG

TMX = Tetrachloro-m-xylene.
DBOB = Dibromooctafluorobiphenyl.
DBC = Dibutylchlrendate.
DCB = Decachlorobiphenyl.

Table 5 - List MS/MSD Percent Recovery Values and RPDs outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	Tacoma MS	Aldrin	49	NA	50 – 150	None
SW846 8270	Tacoma MSD	Aldrin	48	NA	50 – 150	None
SW846 8270	Tacoma MS	4,4'-DDE	41	NA	50 – 150	None
SW846 8270	Tacoma MSD	4,4'-DDE	39	NA	50 – 150	None
SW846 8270	Tacoma MS	4,4'-DDT	46	NA	50 – 150	None
SW846 8270	Tacoma MSD	4,4'-DDT	42	NA	50 – 150	None
SW846 8270	Tacoma MSD	cis-Nonachlor	49	NA	50 – 150	None

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8270	Tacoma MSD	trans-Nonachlor	49	NA	50 – 150	None

Table 6 - List LCS Percent Recovery Values outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8081	B09B117-BS1	Endrin aldehyde	49	NA	50 – 150	None

Table 7 –Samples that were Reanalyzed
None

Data Validation Qualifiers:

Code	Description
G	Value is likely greater than the reported result. Reported result may be biased low.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: September 9, 2009	Completed by: Mark Woodke

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0907021	Gig Harbor	0907021-01	07/14/2009		
0907021	Bremerton	0907021-02	07/14/2009		
0907021	West Point	0907021-04	07/14/2009	MS/MSD	
0907021	Burlington	0907021-05	07/14/2009		
0907021	Tacoma	0907021-06	07/16/2009		
0907021	Chambers Creek	0907021-07	07/16/2009		
0907021	Sumner	0907021-08	07/17/2009		
0907021	Bellingham	0907021-09	07/16/2009		
0907021	Everett	0907021-10	07/16/2009		
0907021	Rinsate	0907021-12	07/10/2009		
0907021	Shelton	0907021-13	07/15/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
0907021	Water	EPA 8081	Chlorinated Pesticides Compounds by GC/ECD	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes, implied in the data review memorandum by M. Mandjikov.
Did coolers arrive at lab less than 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, implied in the data review memorandum by M. Mandjikov.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes.
Case narrative present and complete?	Yes.
Any holding time violations?	No.

The following tables are presented at the end of this QA1 Review Memorandum and provide summaries of results outside QC criteria.

- Method Blank Results (Table 3);
- Surrogates Outside Limits (Table 4);
- MS/MSD Outside Limits (Table 5);
- LCS Outside Limits (Table 6); and
- Re-analysis Results (Table 7).

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: September 9, 2009	Completed by: Mark Woodke

The chlorinated pesticides analyses data was originally reviewed by M. Mandjikov, Manchester Environmental Laboratory (MEL) on August 19, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

Chlorinated Pesticides by GC/ECD	
Description	**Notes and Qualifiers**
Any compounds present in method, trip, and field blanks (see Table 3)?	Yes.
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data. Qualification also applies to TICs.	Sample results below the PQL are reported at the PQL and flagged U. Sample results greater than the PQL are not changed and flagged U.
Laboratory QC frequency of one method blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
Surrogate recovery values for method blanks and LCS/LCSD samples within laboratory QC limits?	No. No action was taken for the outliers.
Surrogate recovery values for samples and MS/MSD within laboratory QC limits (see Table 4)?	No.
LCS percent recovery values within Laboratory QC criteria (see Table 6)?	Yes.
MS/MSD percent recovery values within laboratory QC criteria (see Table 5)?	No, several compounds were outside Laboratory QC limits. The analytes were not qualified in the parent sample.
MS/MSD relative percent difference values within laboratory QC criteria of < 35% (see Table 5)?	Yes.
Confirmation column quantitation results are within QC limits of less than 40 percent?	Several compounds were quantitatively confirmed on the confirmation sample. Sample results that exceeded a relative percent difference of 40 % were qualified as estimated with an unknown bias (JK or JTK).
Is initial calibration for target compounds <20 % RSD or curve fit?	Yes.
Is continuing calibration for target compounds < 20%?	Yes.
Were any samples re-analyzed or diluted (see Table 7)? For any sample re-analysis and dilutions is only one reportable result by flagged?	No.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Analytes were detected in the method blanks. The associated sample results were not changed and were flagged U. Several MS/MSD compound percent recovery values were outside QC limits. Sample results greater than the MDL and less than the PQL are flagged as estimated quantities (JT).

Table 3 – List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Units	PQL
SW846 8081	B09G116-BLK1	MBLK	Lindane	0.005	J	µg/L	0.0025
SW846 8081	B09G178-BLK1	MBLK	Lindane	0.002	J	µg/L	0.0025

Table 3A - List of Samples Qualified for Method Blank Contamination

Method	Sample ID	Analyte	Result	Qual
SW846 8081	Sumner	Lindane	0.0027	UJ
SW846 8081	Gig Harbor	Lindane	0.010	UJ
SW846 8081	Shelton	Lindane	0.0027	UJ
SW846 8081	Everett	Lindane	0.0051	UJ
SW846 8081	Burlington	Lindane	0.0066	UJ
SW846 8081	Bremerton	Lindane	0.0036	UJ
SW846 8081	Tacoma	Lindane	0.0032	UJ
SW846 8081	Metro West Point	Lindane	0.0047	UJ
SW846 8081	Bellingham	Lindane	0.0053	UJ

Table 4 - List of Samples with Surrogates Outside Control Limits

Method	Sample ID	TMX Recovery	DBOB Recovery	DBC Recovery	DCB Recovery	QC Limit	Sample Qualification
SW846 8081	Gig Harbor	64	57	49	59	50 - 150	JG or UJG
SW846 8081	Everett	33	37	40	69	50 - 150	JG or UJG
SW846 8081	Metro West Point	56	57	48	64	50 - 150	JG or UJG

TMX = Tetrachloro-m-xylene.
DBOB = Dibromooctafluorobiphenyl.
DBC = Dibutylchlorendate.
DCB = Decachlorobiphenyl.

Table 5 – List of MS/MSD Percent Recovery Values and RPDs outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
SW846 8081	Metro West Point MS	2,4'-DDT	39	NA	50 – 150	None
SW846 8081	Metro West Point MS	4,4'-DDE	37	NA	50 – 150	None
SW846 8081	Metro West Point MS	4,4'-DDT	42	NA	50 – 150	None
SW846 8081	Metro West Point MS	Aldrin	45	NA	50 – 150	None
SW846 8081	Metro West Point MS	Cis-Nonachlor	39	NA	50 – 150	None
SW846 8081	Metro West Point MS	Mirex	29	NA	50 – 150	None
SW846 8081	Metro West Point MS	Trans-Nonachlor	46	NA	50 – 150	None
SW846 8081	Metro West Point MSD	2,4'-DDT	38	NA	50 – 150	None
SW846 8081	Metro West Point MSD	4,4'-DDE	38	NA	50 – 150	None
SW846 8081	Metro West Point MSD	4,4'-DDT	42	NA	50 – 150	None
SW846 8081	Metro West Point MSD	Aldrin	47	NA	50 – 150	None
SW846 8081	Metro West Point MSD	Cis-Nonachlor	42	NA	50 – 150	None
SW846 8081	Metro West Point MSD	Mirex	28	NA	50 – 150	None

Table 6 – List of LCS Percent Recovery Values Outside Control Limits
None.

Table 7 - Samples that were Reanalyzed

None.

Data Validation Qualifiers:

Code	Description
G	Value is likely greater than the reported result. Reported result may be biased low.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
K	Bias could not be determined.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
T	Sample results are greater than MDL and less than PQL
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: May 29, 2009	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
PR90268	Summer	PR90276	02/12/2009		Sumner
PR90268	Gig Harbor	PR90277	02/10/2009		
PR90268	Shelton	PR90278	02/10/2009		
PR90268	Everett	PR90269	02/12/2009		
PR90268	Burlington	PR90280	02/10/2009		
PR90268	Bremerton	PR90270	02/10/2009		
PR90268	Tacoma	PR90271	02/19/2009		
PR90268	Chambers Creek	PR90273	02/19/2009		
PR90268	Metro West Point	PR90274	02/10/2009	Dup	
PR90268	Bellingham	PR90286	02/12/2009		
PR90268	Herrera	PR90287	02/12/2009		Field Blank

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
PR90268	Water	EPA 1614	Brominated Diphenyl Ethers in Water, Soil, Sediment, and Tissue by HRGC/HRMS	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes, according to the data review memoranda by Karin Feddersen.
Did coolers arrive at lab less than 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, according to the data review memoranda by Karin Feddersen.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes
Case narrative present and complete?	Yes.
Any holding time violations?	No, according to the data review memoranda by Karin Feddersen.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);
- OPR outside QC limits (Table 4);
- Sample Reanalysis (Table 5).

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: May 29, 2009	Completed by: David Ikeda

The Polybrominated Diphenyl Ethers (PBDEs) data were originally reviewed by Karin Feddersen, Manchester Environmental Laboratory (MEL) on May 11, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

PFOAs by LCMS-MS	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks?	Yes, according to the data review memoranda by Karin Feddersen.
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one method blank and ongoing precision and recovery (OPR) with each batch?	Yes, according to the data review memoranda by Feddersen.
Initial precision and recovery (IPR) values are within QC limits?	Yes, according to the data review memoranda by Karin Feddersen.
OPR recovery values are within laboratory QC limits?	Yes, according to the data review memoranda by Karin Feddersen.
C-13 labeled isotope dilution internal standard recovery values for samples within QC limits?	Yes, according to the data review memoranda by Karin Feddersen.
Is initial calibration within Method QC limits?	Yes, according to the data review memoranda by Karin Feddersen.
Is continuing calibration within Method QC limits?	Yes, according to the data review memoranda by Karin Feddersen.
Were any samples re-analyzed or diluted? For any sample re-analysis and dilutions is only one reportable result by flagged?	No.
Did compound ion abundances meet method QC requirements for compound identification?	No, according to the data review memoranda by Karin Feddersen. Data was qualified as estimated tentatively identified, bias unknown (NJK or NK).
Laboratory Duplicate Sample analyzed?	Yes, all relative percent difference values were within QC limits.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Several compound ion abundances did not meet method QC requirements for compound identification. Data was qualified as estimated tentatively identified (NJK or NK). No Form Is were received by the secondary reviewer. Several qualifiers were changed by the secondary reviewer, and the spreadsheet that accompanied the data review was updated.

Table 3 – List of Positive Results for Blank Samples
None

Table 4 - OPR outside QC limits
None

Table 5 - List of Reanalyzed Samples
None

Data Validation Qualifiers:

Code	Description
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
K	Bias could not be determined.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 14, 2009	Completed by: Mark Woodke

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
PR90775	Gig Harbor	PR90775	07/16/2009		
PR90775	Bremerton	PR90776	07/16/2009		
PR90775	West Point	PR90777	07/16/2009		
PR90775	Burlington	PR90778	07/16/2009		
PR90775	Tacoma	PR90802	07/24/2009		
PR90775	Chambers Creek	PR90803	07/24/2009		
PR90775	Sumner	PR90804	07/24/2009		
PR90775	Bellingham	PR90805	07/24/2009		
PR90775	Everett	PR90806	07/24/2009	Dup	
PR90775	Shelton	PR90808	07/24/2009		
PR90775	X	PR90779	07/16/2009		Rinsate Blank

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
PR90775	Water	EPA 1614	Brominated Diphenyl Ethers in Water, Soil, Sediment, and Tissue by HRGC/HRMS	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes, implied in the data review memoranda by Karin Feddersen.
Did coolers arrive at lab less than 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, according to the data review memoranda by Karin Feddersen.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes.
Case narrative present and complete?	Yes.
Any holding time violations?	No, according to the data review memoranda by Karin Feddersen.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blank Results (Table 3);
- OPR outside QC limits (Table 4);
- Sample Reanalysis (Table 5).

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 14, 2009	Completed by: Mark Woodke

The Polybrominated Diphenyl Ethers (PBDEs) data were originally reviewed by Karin Feddersen, Manchester Environmental Laboratory (MEL) on October 9, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

PBDEs by HRGC/HRMS	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks?	Yes, according to the data review memoranda by Karin Feddersen.
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged UJ.
Laboratory QC frequency of one method blank and ongoing precision and recovery (OPR) with each batch?	Yes, according to the data review memoranda by Karin Feddersen.
Initial precision and recovery (IPR) values are within QC limits?	Not discussed in the data review memorandum.
OPR recovery values are within laboratory QC limits?	Yes, according to the data review memoranda by Karin Feddersen.
C-13 labeled isotope dilution internal standard recovery values for samples within QC limits?	No, associated results were qualified UJ.
Is initial calibration within Method QC limits?	No, associated results were qualified JH.
Is continuing calibration within Method QC limits?	No, no qualifiers were applied based on these outliers.
Were any samples re-analyzed or diluted? For any sample re-analysis and dilutions is only one reportable result by flagged?	Yes.
Did compound ion abundances meet method QC requirements for compound identification?	No, according to the data review memoranda by Karin Feddersen. Data was qualified as estimated tentatively identified, bias unknown (NJK or NK).
Laboratory Duplicate Sample analyzed?	Yes, but was not discussed in the data review memorandum.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Several compound ion abundances did not meet method QC requirements for compound identification. Data was qualified as estimated tentatively identified (NJK). Sample results less than 10 times the associated method blank results were qualified UJ. Positive calibration outliers were qualified as estimated quantities (JH). Internal standard quantitation limit outliers were qualified as estimated (UJG). No Form Is were received by the secondary reviewer. Several qualifiers were changed by the secondary reviewer, and the spreadsheet that accompanied the data review was updated.

Table 3 – List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Units	PQL
1614	BDE09323B	MBLK	BDE-047	26		pg/L	25
1614	BDE09323B	MBLK	BDE-099	15	J	pg/L	25

Table 3A - List of Samples Qualified for Method Blank Contamination

Method	Sample ID	Analyte	Result	Qualifier
1614	Rinsate	BDE-047	151	UJ

Table 4 - OPR outside QC limits
None

Table 5 - List of Reanalyzed Samples

Sample ID	Reason for Reanalysis
BDE09323B	Sample was reanalyzed to get appropriate detection limits.

Data Validation Qualifiers:

Code	Description
G	Value is likely greater than the reported result. Reported result may be biased low.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
K	Bias could not be determined.
L	The result is low biased.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
T	The associated positive result is less than the quantitation limit.
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: August 10, 2009	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0902008	Shelton	0902008-03	02/10/2009		
0902008	Everett	0902008-04	02/12/2009		
0902008	Bremerton	0902008-06	02/10/2009		
0902008	Tacoma	0902008-07	02/19/2009	MS/MSD	
0902008	Chambers Creek	0902008-08	02/19/2009		
0902008	Metro West Point	0902008-09	02/10/2009		
0902008	Field Blank	0902008-11	02/12/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
0902008	Water	EPA 1668	Chlorinated Biphenyl Congeners by HRGC/HRMS	7

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes.
Did coolers arrive at lab less than 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, according to the data review memoranda by Karin Feddersen.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes
Case narrative present and complete?	Yes.
Any holding time violations?	No.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);
- Internal and Clean-up Standards Outside Limits (Table 4);
- LCS Outside Limits (Table 5); and
- Re-analysis Results (Table 6)

The chlorinated biphenyl congeners analyses data was originally reviewed by Karin Feddersen, Manchester Environmental Laboratory (MEL) on August 9, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

Chlorinated Pesticides by GC/ECD	
Description	**Notes and Qualifiers**

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: August 10, 2009	Completed by: David Ikeda

Chlorinated Pesticides by GC/ECD	
Description	**Notes and Qualifiers**
Any compounds present in method, trip, and field blanks (see Table 2)?	Yes.
For samples, if results are <10 times the blank then "UJ" flag data. Qualification also applies to Total Homolog data.	Samples results are flagged UJ. Associated Total Homolog results are not changed and flagged J.
Laboratory QC frequency of one method blank and LCS (OPR) with each batch per 20 samples?	Yes
Internal standards and clean-up standards percent recovery values for method blanks and LCS/LCSD samples within laboratory QC limits?	Yes.
Internal standards and clean-up standards recovery values for samples and MS/MSD within laboratory QC limits (see Table 4)?	No. No action was taken.
MS/MSD percent recovery values within laboratory QC criteria?	Not required.
MS/MSD relative percent difference values within QC criteria of <35%?	Not required.
LCS percent recovery values within Laboratory QC criteria (see Table 5)?	Yes
Is initial calibration for target compounds <20 % RSD or curve fit?	Yes.
Is continuing calibration for target compounds < 20%?	Yes
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	Yes.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
Analytes were detected in the method blanks. The associated samples results were not changed and flagged UJ. Associated total homolog results were not corrected and were qualified as estimated (J). For sample results with peak ratios outside of acceptable criteria, the results are flagged tentative identification (N or NJ).

Table 3 – List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Units	PQL
EPA 1668	PC09100B	MBLK	PCB-005/008	10.5		pg/L	10
EPA 1668	PC09100B	MBLK	PCB-011	43.3		pg/L	10
EPA 1668	PC09100B	MBLK	PCB-052/069	11.6		pg/L	10
EPA 1668	PC09100B	MBLK	PCB-101	11		pg/L	10
EPA 1668	PC09100B	MBLK	Dichlorobiphenyls	53.8		pg/L	10
EPA 1668	PC09100B	MBLK	Tetrachlorobiphenyls	11.6		pg/L	10
EPA 1668	PC09100B	MBLK	Pentachlorobiphenyls	11		pg/L	10
EPA 1668	PC09100B	MBLK	Total PCB	76.4		pg/L	10

Table 3A - List of Samples Qualified for Method Blank Contamination

Method	Sample ID	Analyte	Result	Qual

Method	Sample ID	Analyte	Result	Qual
EPA 1668	Everett	PCB-005/008	77	UJ
EPA 1668	Everett	PCB-011	283	UJ
EPA 1668	Bremerton	PCB-005/008	12.1	UJ
EPA 1668	Bremerton	PCB-011	42.9	UJ
EPA 1668	Bremerton	PCB-052/069	19.8	UJ
EPA 1668	Chambers Creek	PCB-005/008	37.5	UJ
EPA 1668	Chambers Creek	PCB-011	94	UJ
EPA 1668	Chambers Creek	PCB-052/069	43.6	UJ
EPA 1668	Metro West Point	PCB-005/008	64.9	UJ
EPA 1668	Metro West Point	PCB-011	68.5	UJ
EPA 1668	Metro West Point	PCB-052/069	89.9	UJ
EPA 1668	Shelton	PCB-011	28.5	UJ
EPA 1668	Shelton	PCB-052/069	27.7	UJ
EPA 1668	Tacoma	PCB-011	95.1	UJ
EPA 1668	Herrera	PCB-011	42.1	UJ
EPA 1668	Herrera	PCB-052/069	32	UJ

Table 4 - List Internal Standard Percent Recovery Values outside Control Limits

Method	Sample ID	Analyte	Percent Recovery	RPD	QC Limit	Sample Qualification
EPA 1668	Shelton	PCB-178L	173	NA	60 – 130	None
EPA 1668	Everett	PCB-178L	160	NA	60 – 130	None
EPA 1668	Bremerton	PCB-178L	190	NA	60 – 130	None

Table 5 – LCS Precent Recovery Values outside Control Limits
None.

Table 6 - Samples that were Reanalyzed

Method	Sample	Reason
EPA 1668	Bremerton	Retention time shifting and peak area suppression. Report original sample.

Data Validation Qualifiers:

Code	Description
G	Value is likely greater than the reported result. Reported result may be biased low.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	Analyte was not detected at or above the reported result.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: May 12, 2009	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
L12354	Field Blank	L12354-01	02/12/2009		
L12354	Summer	L12354-02	02/12/2009		Sumner
L12354	Gig Harbor	L12354-03	02/10/2009		
L12354	Shelton	L12354-04	02/10/2009		
L12354	Everett	L12354-05	02/12/2009		
L12354	Burlington	L12354-06	02/10/2009		
L12354	Bremerton	L12354-07	02/10/2009		
L12354	Tacoma	L12354-08	02/19/2009		
L12354	Chambers Creek	L12354-09	02/19/2009		
L12354	Metro West Point	L12354-10	02/10/2009	Dup	
L12354	Bellingham	L12354-12	02/12/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
L12354	Water	MLA-060	Analytical Procedure for the Analysis of Perfluorinated Organic Compounds in Aquaeous Samples by LC-MS/MS	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes, according to the data review memoranda by Jim Maroncelli.
Did coolers arrive at lab less than 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, according to the data review memoranda by Jim Maroncelli.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes
Case narrative present and complete?	Yes.
Any holding time violations?	No, according to the data review memoranda by Jim Maroncelli.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);
- OPR outside QC limits (Table 4);
- Sample Reanalysis (Table 5).

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: May 12, 2009	Completed by: David Ikeda

The perfluorinated organic analyses (PFOAs) data was originally reviewed by Jim Maroncelli, Manchester Environmental Laboratory (MEL) on May 5, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

PFOAs by LCMS-MS	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks?	No.
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one method blank and ongoing precision and recovery (OPR) with each batch?	Yes.
Initial precision and recovery (IPR) values are within QC limits?	Yes.
OPR recovery values are within laboratory QC limits?	Yes.
C-13 labeled isotope dilution internal standard recovery values for samples within QC limits?	Yes.
Is initial calibration within Method QC limits?	Yes, according to the data review memoranda by Jim Maroncelli.
Is continuing calibration within Method QC limits?	Yes, according to the data review memoranda by Jim Maroncelli.
Were any samples re-analyzed or diluted? For any sample re-analysis and dilutions is only one reportable result by flagged?	No.
Laboratory Duplicate Sample analyzed?	Yes, all relative percent difference values were within QC limits.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
None

Table 3 – List of Positive Results for Blank Samples
None

Table 4 - OPR outside QC limits
None

Table 5 - List of Reanalyzed Samples
None

Data Validation Qualifiers:

Code	Description
U	Analyte was not detected at or above the reported result.

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
Field Blank
Sample Collection:
N/A

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-1
Matrix:	AQUEOUS	**Sample Size:**	0.504 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 01:12:50	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 13**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		0.993	
PFPeA	U		0.993	
PFHxA	U		0.993	
PFHpA	U		0.993	
PFOA	U		0.993	
PFNA	U		0.993	
PFDA	U		0.993	
PFUnA	U		0.993	
PFDoA	U		0.993	
PFBS	U		1.99	
PFHxS	U		1.99	
PFOS	U		1.99	
PFOSA	U		0.993	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: Matthew Ou QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L12354-1_Form1A_FC9G_069S13_SJ990254.html; Workgroup: WG28032; Design ID: 1058]

12 Mar 2009

AXYS METHOD MLA-060 Rev 07

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.
~~Summer~~ Sumner
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

		Project No.	PRIORITY POLLUTANTS IN 10 POTWS
Contract No.:	4499	**Lab Sample I.D.:**	L12354-2
Matrix:	AQUEOUS	**Sample Size:**	0.510 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 01:31:33	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 14**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		2.95	0.981	5:23
PFPeA		13.3	0.981	6:05
PFHxA		52.1	0.981	6:28
PFHpA		4.29	0.981	6:51
PFOA		69.8	0.981	7:17
PFNA		6.27	0.981	7:41
PFDA		7.85	0.981	8:11
PFUnA	U		0.981	
PFDoA	U		0.981	
PFBS	U		1.96	
PFHxS	U		1.96	
PFOS		2.57	1.96	8:31
PFOSA		1.08	0.981	10:08

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: Matthew Ou QA/QC Chemist

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AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
Gig Harbor
Sample Collection:
N/A

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-3
Matrix:	AQUEOUS	**Sample Size:**	0.505 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 01:50:14	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 15**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		0.991	
PFPeA		15.9	1.05	6:05
PFHxA		34.1	0.991	6:29
PFHpA		4.65	0.991	6:51
PFOA		48.6	0.991	7:17
PFNA		12.3	0.991	7:41
PFDA		5.66	0.991	8:15
PFUnA	U		0.991	
PFDoA	U		0.991	
PFBS	U		1.98	
PFHxS	U		1.98	
PFOS		5.60	1.98	8:31
PFOSA	U		0.991	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Matthew Ou_____ QA/QC Chemist

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AXYS METHOD MLA-060 Rev 07

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.
Shelton
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-4
Matrix:	AQUEOUS	**Sample Size:**	0.504 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 02:08:05	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 16**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		0.991	
PFPeA		8.47	1.65	6:05
PFHxA		25.5	1.03	6:28
PFHpA		2.80	1.10	6:51
PFOA		33.1	1.05	7:14
PFNA		1.39	0.991	7:41
PFDA		5.78	0.991	8:11
PFUnA	U		0.991	
PFDoA	U		0.991	
PFBS	U		1.98	
PFHxS	U		1.98	
PFOS	U		1.98	
PFOSA	U		0.991	

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12 MAY 2009

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
Everett
Sample Collection:
N/A

Form 1A
PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-5
Matrix:	AQUEOUS	**Sample Size:**	0.480 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 02:26:47	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 17**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		1.04	
PFPeA	U		1.50	
PFHxA		11.9	1.04	6:28
PFHpA		10.3	1.04	6:51
PFOA		24.3	1.04	7:14
PFNA		134	1.04	7:41
PFDA		1.91	1.04	8:11
PFUnA		1.18	1.04	8:49
PFDoA	U		1.04	
PFBS	U		2.08	
PFHxS		2.57	2.08	7:26
PFOS		7.57	2.08	8:15
PFOSA	U		1.04	

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Approved by: Matthew Ou QA/QC Chemist

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12 May 2009

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
Burlington
Sample Collection:
N/A

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-6
Matrix:	AQUEOUS	**Sample Size:**	0.505 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 02:45:31	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 18**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		0.991	
PFPeA		5.80	1.58	6:05
PFHxA		24.9	1.24	6:29
PFHpA		4.06	1.31	6:51
PFOA		30.5	0.991	7:17
PFNA		13.1	0.991	7:41
PFDA		4.27	0.991	8:11
PFUnA	U		0.991	
PFDoA	U		0.991	
PFBS	U		1.98	
PFHxS		3.17	1.98	7:26
PFOS		5.89	1.98	8:31
PFOSA		1.95	0.991	10:07

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Matthew Ou_____ QA/QC Chemist

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12 MAR 2009

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
Bremerton
Sample Collection:
N/A

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-7
Matrix:	AQUEOUS	**Sample Size:**	0.516 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 03:04:13	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 19**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		1.40	1.36	5:23
PFPeA		1.16	0.968	6:05
PFHxA		10.8	0.968	6:28
PFHpA		2.08	0.968	6:51
PFOA		11.3	0.968	7:14
PFNA		2.36	0.968	7:41
PFDA		1.74	0.968	8:02
PFUnA	U		0.968	
PFDoA	U		0.968	
PFBS	U		1.94	
PFHxS	U		1.94	
PFOS		4.50	1.94	8:31
PFOSA	U		0.968	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Matthew Ou_____ QA/QC Chemist

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12 May 2009

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
Tacoma
Sample Collection:
N/A

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-8
Matrix:	AQUEOUS	**Sample Size:**	0.509 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 03:22:55	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 20**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		1.38	0.982	5:22
PFPeA		3.77	2.25	6:05
PFHxA		10.9	1.83	6:27
PFHpA		5.64	0.982	6:51
PFOA		27.0	0.982	7:14
PFNA		4.47	0.982	7:41
PFDA		2.62	0.982	8:11
PFUnA	U		0.982	
PFDoA	U		0.982	
PFBS	U		1.96	
PFHxS		4.42	2.75	7:26
PFOS		9.71	1.96	8:27
PFOSA	U		0.982	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: Matthew Ou QA/QC Chemist

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12 May 2009

AXYS METHOD MLA-060 Rev 07

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.
Chambers Creek
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-9
Matrix:	AQUEOUS	**Sample Size:**	0.509 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 03:41:37	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 21**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		3.60	0.983	5:23
PFPeA		2.02	1.11	6:02
PFHxA		12.1	1.17	6:28
PFHpA		3.98	1.09	6:51
PFOA		10.9	0.983	7:14
PFNA		2.76	0.983	7:41
PFDA		5.54	0.983	7:59
PFUnA	U		0.983	
PFDoA	U		0.983	
PFBS	U		1.97	
PFHxS		6.87	1.97	7:26
PFOS		6.56	1.97	8:27
PFOSA	U		0.983	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Matthew Ou_____ QA/QC Chemist

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AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
Metro West Point (GP)
Sample Collection:
N/A

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-10
Matrix:	AQUEOUS	**Sample Size:**	0.501 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 04:00:19	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 22**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		1.31	0.997	5:20
PFPeA		1.84	1.46	6:03
PFHxA		13.2	0.997	6:28
PFHpA		2.75	0.997	6:51
PFOA		12.5	0.997	7:14
PFNA		3.73	0.997	7:41
PFDA		2.82	0.997	8:11
PFUnA	U		0.997	
PFDoA	U		0.997	
PFBS	U		1.99	
PFHxS		3.12	1.99	7:26
PFOS		19.5	1.99	8:31
PFOSA	U		0.997	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: Matthew Ou QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L12354-10_Form1A_FC9G_069S22_SJ990263.html; Workgroup: WG28032; Design ID: 1058]

12 March 2009

AXYS METHOD MLA-060 Rev 07

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.
Bellingham
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L12354-12
Matrix:	AQUEOUS	**Sample Size:**	0.499 L
Sample Receipt Date:	24-Feb-2009	**Initial Calibration Date:**	25-Feb-2009
Extraction Date:	26-Feb-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	27-Feb-2009 **Time:** 04:37:43	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_069 S: 24**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_069 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_069 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		1.86	1.00	5:22
PFPeA		1.90	1.00	6:05
PFHxA		15.4	1.00	6:28
PFHpA		3.53	1.00	6:51
PFOA		11.6	1.00	7:17
PFNA		3.52	1.00	7:41
PFDA		1.37	1.00	8:11
PFUnA	U		1.00	
PFDoA	U		1.00	
PFBS	U		2.00	
PFHxS		3.31	2.00	7:26
PFOS		6.02	2.28	8:27
PFOSA	U		1.00	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: Matthew Ou QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L12354-12_Form1A_FC9G_069S24_SJ990265.html; Workgroup: WG28032; Design ID: 1058]

12 MAY 2009

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 7, 2009	Completed by: Mark Woodke

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
L13114	Field Blank	L12114-1	07/14/2009		
L13114	0907021-01	L12114-2	07/14/2009		
L13114	0907021-02	L12114-3	07/14/2009		
L13114	0907021-03	L12114-4	07/14/2009		
L13114	0907021-04	L12114-5(A)	07/14/2009	DUP	
L13114	0907021-05	L12114-7	07/14/2009		
L13114	0907021-06	L12114-8	07/16/2009		
L13114	0907021-07	L12114-9	07/16/2009		
L13114	0907021-08	L12114-10	07/16/2009		
L13114	0907021-09	L12114-11	07/16/2009		
L13114	0907021-10	L12114-12	07/16/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
L13114	Water	MLA-060	Analytical Procedure for the Analysis of Perfluorinated Organic Compounds in Aqueous Samples by LC-MS/MS	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes, implied in the data review memorandum by Karin Feddersen.
Did coolers arrive at lab at less than 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, implied in the data review memorandum by Karin Feddersen.
Frequency of Field QC Samples Correct? Field Duplicate – Not required.	Yes.
Case narrative present and complete?	Yes.
Any holding time violations?	No, according to the data review memorandum by Karin Feddersen.

The following tables are presented at the end of this QA1 Review Memorandum and provide summaries of results outside QC criteria.

- Method Blank Results (Table 3);
- OPR Outside Limits (Table 4); and
- Sample Reanalysis (Table 5).

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: October 7, 2009	Completed by: Mark Woodke

The Perfluorinated organic analyses (PFOAs) data was originally reviewed by Karin Feddersen, Manchester Environmental Laboratory, on October 5, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided with the deliverable.

Metals by GC/ECD	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks?	No.
For samples, if results are <5 times the blank or <10 times the blank for common laboratory contaminants then "U" flag data.	Not applicable.
Laboratory QC frequency of one method blank and ongoing precision and recovery (OPR) with each batch?	Yes.
Initial precision and recovery (IPR) values are within QC limits?	Not provided.
OPR recovery values are within laboratory QC limits?	Yes.
C-13 labeled isotope dilution internal standard recovery values for samples within QC limits?	Yes.
Is initial calibration within method QC limits?	Yes according to the data review memorandum by Karin Feddersen.
Is continuing calibration within method QC limits?	Yes according to the data review memorandum by Karin Feddersen.
Were any samples re-analyzed or diluted? For any sample re-analysis and dilutions, is only one reportable result flagged?	No.
Laboratory duplicate sample analyzed?	Yes, all relative percent difference values were within QC limits.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
None.

Table 3 – List of Positive Results for Blank Samples
None

Table 4 – OPR outside QC Limits
None

Table 5 – List of Reanalyzed Samples
None.

Data Validation Qualifiers:

Code	Description
U	Analyte was not detected at or above the reported result.

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
Field Blank
Sample Collection:
N/A

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L13114-1
Matrix:	AQUEOUS	**Sample Size:**	0.496 L
Sample Receipt Date:	22-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Extraction Date:	23-Jul-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	08-Aug-2009 **Time:** 14:55:09	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_347 S: 13**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_347 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_347 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		1.01	
PFPeA	U		1.01	
PFHxA	U		1.01	
PFHpA	U		1.01	
PFOA	U		1.01	
PFNA	U		1.01	
PFDA	U		1.01	
PFUnA	U		1.01	
PFDoA	U		1.01	
PFBS	U		2.01	
PFHxS	U		2.01	
PFOS	U		2.01	
PFOSA	U		2.52	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Bryan Alonzo_____ QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L13114-1_Form1A_FC9G_347S13_SJ1043102.html; Workgroup: WG29556; Design ID: 1058]

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MW
10-7-09

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
0907021-01
Sample Collection:
14-Jul-2009 12:15

Form 1A
PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L13114-2
Matrix:	AQUEOUS	**Sample Size:**	0.492 L
Sample Receipt Date:	22-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Extraction Date:	23-Jul-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	08-Aug-2009 **Time:** 15:14:36	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_347 S: 14**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_347 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_347 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		1.38	1.02	5:23
PFPeA		12.6	1.02	6:06
PFHxA		41.3	1.02	6:28
PFHpA		5.27	1.02	6:51
PFOA		52.5	1.02	7:17
PFNA		23.2	1.02	7:41
PFDA		7.31	1.02	8:15
PFUnA	U		1.02	
PFDoA	U		1.02	
PFBS	U		2.03	
PFHxS	U		2.03	
PFOS		2.24	2.03	8:21
PFOSA	U		2.54	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Bryan Alonzo_____ QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L13114-2_Form1A_FC9G_347S14_SJ1043103.html; Workgroup: WG29556; Design ID: 1058]

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MW 10-7-09

AXYS METHOD MLA-060 Rev 07

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.
0907021-02
Sample Collection:
14-Jul-2009 09:45

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4499	**Project No.**	PRIORITY POLLUTANTS IN 10 POTWS
Matrix:	AQUEOUS	**Lab Sample I.D.:**	L13114-3
Sample Receipt Date:	22-Jul-2009	**Sample Size:**	0.499 L
Extraction Date:	23-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Analysis Date:	08-Aug-2009 **Time:** 15:34:03	**Instrument ID:**	LC MS/MS
Extract Volume (uL):	4000	**Column ID:**	C18
Injection Volume (uL):	15	**Sample Data Filename:**	**FC9G_347 S: 15**
Dilution Factor:	N/A	**Blank Data Filename:**	FC9G_347 S: 11
Concentration Units:	ng/L	**Cal. Ver. Data Filename:**	FC9G_347 S: 4

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		1.83	1.00	5:20
PFPeA	U		1.00	
PFHxA		14.3	1.00	6:29
PFHpA		3.44	1.00	6:51
PFOA		11.1	1.00	7:17
PFNA		10.8	1.00	7:41
PFDA		2.77	1.00	8:15
PFUnA	U		1.00	
PFDoA	U		1.00	
PFBS		17.7	2.01	6:26
PFHxS		7.79	2.01	7:30
PFOS		55.0	2.01	8:31
PFOSA	U		2.51	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Bryan Alonzo_____ QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L13114-3_Form1A_FC9G_347S15_SJ1043104.html; Workgroup: WG29556; Design ID: 1058]

10-7-09

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
0907021-03
Sample Collection:
14-Jul-2009 07:30

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L13114-4
Matrix:	AQUEOUS	**Sample Size:**	0.489 L
Sample Receipt Date:	22-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Extraction Date:	23-Jul-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	08-Aug-2009 **Time:** 15:52:42	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_347 S: 16**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_347 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_347 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		2.99	1.02	5:20
PFPeA		16.5	1.02	6:05
PFHxA		44.3	1.02	6:28
PFHpA		3.74	1.02	6:47
PFOA		38.9	1.02	7:14
PFNA		3.29	1.02	7:41
PFDA		6.30	1.02	8:15
PFUnA	U		1.02	
PFDoA	U		1.02	
PFBS	U		2.04	
PFHxS	U		2.04	
PFOS		4.37	2.04	8:31
PFOSA	U		2.56	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: Bryan Alonzo QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L13114-4_Form1A_FC9G_347S16_SJ1043105.html; Workgroup: WG29556; Design ID: 1058]

MW 10-7-09

AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
0907021-04
Sample Collection:
14-Jul-2009 07:17

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L13114-5 (A)
Matrix:	AQUEOUS	**Sample Size:**	0.506 L
Sample Receipt Date:	22-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Extraction Date:	23-Jul-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	08-Aug-2009 **Time:** 16:11:20	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_347 S: 17**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_347 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_347 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		2.47	1.52	5:20
PFPeA	U		1.38	
PFHxA		16.1	0.987	6:27
PFHpA		6.00	1.04	6:51
PFOA		22.6	0.987	7:14
PFNA		5.83	0.987	7:38
PFDA		4.28	0.987	8:11
PFUnA	U		0.987	
PFDoA	U		0.987	
PFBS		13.8	1.97	6:28
PFHxS		2.65	1.97	7:26
PFOS		21.2	1.97	8:27
PFOSA	U		2.47	

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Approved by: _____Bryan Alonzo_____ QA/QC Chemist

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AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
0907021-05
Sample Collection:
14-Jul-2009 17:00

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L13114-7
Matrix:	AQUEOUS	**Sample Size:**	0.508 L
Sample Receipt Date:	22-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Extraction Date:	23-Jul-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	08-Aug-2009 **Time:** 16:48:37	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_347 S: 19**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_347 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_347 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		1.27	
PFPeA		1.94	0.984	6:03
PFHxA		9.62	0.984	6:28
PFHpA		4.73	0.984	6:51
PFOA		16.5	0.984	7:14
PFNA		4.11	0.984	7:41
PFDA		3.57	0.984	8:11
PFUnA	U		0.984	
PFDoA	U		0.984	
PFBS	U		1.97	
PFHxS		2.34	1.97	7:26
PFOS		3.51	1.97	8:31
PFOSA	U		2.46	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: Bryan Alonzo QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L13114-7_Form1A_FC9G_347S19_SJ1043108.html; Workgroup: WG29556; Design ID: 1058]

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AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
0907021-06
Sample Collection:
16-Jul-2009 14:40

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L13114-8
Matrix:	AQUEOUS	**Sample Size:**	0.506 L
Sample Receipt Date:	22-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Extraction Date:	23-Jul-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	08-Aug-2009 **Time:** 17:08:12	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_347 S: 20**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_347 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_347 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		1.53	
PFPeA		6.79	0.988	6:05
PFHxA		22.8	0.988	6:28
PFHpA		9.69	0.988	6:51
PFOA		30.2	0.988	7:14
PFNA		7.02	0.988	7:41
PFDA		1.54	0.988	8:08
PFUnA	U		0.988	
PFDoA	U		0.988	
PFBS	U		1.98	
PFHxS		7.01	1.98	7:26
PFOS		4.23	1.98	8:21
PFOSA	U		2.47	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Bryan Alonzo_____ QA/QC Chemist

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Report Filename: PFC_FC_LC_PFOA_L13114-8_Form1A_FC9G_347S20_SJ1043109.html; Workgroup: WG29556; Design ID: 1058]

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AXYS METHOD MLA-060 Rev 07

CLIENT SAMPLE NO.
0907021-07
Sample Collection:
16-Jul-2009 16:14

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L13114-9
Matrix:	AQUEOUS	**Sample Size:**	0.504 L
Sample Receipt Date:	22-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Extraction Date:	23-Jul-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	08-Aug-2009 **Time:** 17:27:39	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	**FC9G_347 S: 21**
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_347 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_347 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		4.87	1.46	5:22
PFPeA		1.98	0.993	6:03
PFHxA		18.5	0.993	6:28
PFHpA		6.49	0.993	6:51
PFOA		13.2	0.993	7:14
PFNA		5.76	1.02	7:41
PFDA		3.66	0.993	8:05
PFUnA	U		0.993	
PFDoA	U		0.993	
PFBS		14.7	1.99	6:32
PFHxS		8.27	1.99	7:26
PFOS		8.78	1.99	8:27
PFOSA	U		2.48	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: Bryan Alonzo QA/QC Chemist

For Axys Internal Use Only [XSL Template: FC-Form1A.xsl; Created: 01-Sep-2009 10:13:54; Application: XMLTransformer-1.10.4;
Report Filename: PFC_FC_LC_PFOA_L13114-9_Form1A_FC9G_347S21_SJ1043110.html; Workgroup: WG29556; Design ID: 1058]

These pages are part of a larger report that may contain information necessary for full data evaluation.
Results reported relate only to the sample tested.
Results are compliant with NELAP where specific accreditation is held.

MW 10709

AXYS METHOD MLA-060 Rev 07

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.
0907021-08
Sample Collection:
16-Jul-2009 11:05

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4499	**Project No.**	PRIORITY POLLUTANTS IN 10 POTWS
Matrix:	AQUEOUS	**Lab Sample I.D.:**	L13114-10
Sample Receipt Date:	22-Jul-2009	**Sample Size:**	0.508 L
Extraction Date:	23-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Analysis Date:	08-Aug-2009 **Time:** 17:47:06	**Instrument ID:**	LC MS/MS
Extract Volume (uL):	4000	**Column ID:**	C18
Injection Volume (uL):	15	**Sample Data Filename:**	FC9G_347 S: 22
Dilution Factor:	N/A	**Blank Data Filename:**	FC9G_347 S: 11
Concentration Units:	ng/L	**Cal. Ver. Data Filename:**	FC9G_347 S: 4

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		0.985	
PFPeA		18.2	0.985	6:06
PFHxA		30.9	0.985	6:29
PFHpA		6.96	0.985	6:51
PFOA		46.5	0.985	7:17
PFNA		9.16	0.985	7:41
PFDA		10.4	0.985	8:15
PFUnA	U		0.985	
PFDoA	U		0.985	
PFBS	U		1.97	
PFHxS	U		1.97	
PFOS		10.7	1.97	8:31
PFOSA	U		2.46	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Bryan Alonzo_____ QA/QC Chemist

For Axys Internal Use Only [XSL Template: FC-Form1A.xsl; Created: 01-Sep-2009 10:13:54; Application: XMLTransformer-1.10.4;
Report Filename: PFC_FC_LC_PFOA_L13114-10_Form1A_FC9G_347S22_SJ1043111.html; Workgroup: WG29556; Design ID: 1058]

These pages are part of a larger report that may contain information necessary for full data evaluation.
Results reported relate only to the sample tested.
Results are compliant with NELAP where specific accreditation is held.

MW
10-7-09

AXYS METHOD MLA-060 Rev 07

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.
0907021-09
Sample Collection:
16-Jul-2009 09:24

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.	PRIORITY POLLUTANTS IN 10 POTWS		
Contract No.:	4499	**Lab Sample I.D.:**	L13114-11
Matrix:	AQUEOUS	**Sample Size:**	0.505 L
Sample Receipt Date:	22-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Extraction Date:	23-Jul-2009	**Instrument ID:**	LC MS/MS
Analysis Date:	08-Aug-2009 **Time:** 18:05:44	**Column ID:**	C18
Extract Volume (uL):	4000	**Sample Data Filename:**	FC9G_347 S: 23
Injection Volume (uL):	15	**Blank Data Filename:**	FC9G_347 S: 11
Dilution Factor:	N/A	**Cal. Ver. Data Filename:**	FC9G_347 S: 4
Concentration Units:	ng/L		

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA	U		1.46	
PFPeA		2.05	0.991	6:03
PFHxA		17.2	0.991	6:28
PFHpA		5.10	0.991	6:51
PFOA		17.4	0.991	7:14
PFNA		22.0	0.991	7:38
PFDA		2.82	0.991	8:08
PFUnA	U		0.991	
PFDoA	U		0.991	
PFBS	U		1.98	
PFHxS		2.41	1.98	7:26
PFOS	U		1.98	
PFOSA	U		2.48	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Bryan Alonzo_____ QA/QC Chemist

For Axys Internal Use Only [XSL Template: FC-Form1A.xsl; Created: 01-Sep-2009 10:13:54; Application: XMLTransformer-1.10.4;
Report Filename: PFC_FC_LC_PFOA_L13114-11_Form1A_FC9G_347S23_SJ1043112.html; Workgroup: WG29556; Design ID: 1058]

These pages are part of a larger report that may contain information necessary for full data evaluation.
Results reported relate only to the sample tested.
Results are compliant with NELAP where specific accreditation is held.

MW 10-7-09

AXYS METHOD MLA-060 Rev 07

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.
0907021-10
Sample Collection:
16-Jul-2009 12:37

AXYS ANALYTICAL SERVICES
2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4499	**Project No.**	PRIORITY POLLUTANTS IN 10 POTWS
Matrix:	AQUEOUS	**Lab Sample I.D.:**	L13114-12
Sample Receipt Date:	22-Jul-2009	**Sample Size:**	0.500 L
Extraction Date:	23-Jul-2009	**Initial Calibration Date:**	06-Aug-2009
Analysis Date:	08-Aug-2009 **Time:** 18:24:23	**Instrument ID:**	LC MS/MS
Extract Volume (uL):	4000	**Column ID:**	C18
Injection Volume (uL):	15	**Sample Data Filename:**	**FC9G_347 S: 24**
Dilution Factor:	N/A	**Blank Data Filename:**	FC9G_347 S: 11
Concentration Units:	ng/L	**Cal. Ver. Data Filename:**	FC9G_347 S: 4

COMPOUND	LAB FLAG [1]	CONC. FOUND	DETECTION LIMIT	RETENTION TIME
PFBA		3.24	1.00	5:24
PFPeA		3.18	1.41	6:03
PFHxA		16.1	1.04	6:27
PFHpA		7.83	1.33	6:51
PFOA		16.8	1.00	7:14
PFNA		28.7	1.47	7:41
PFDA		2.55	1.00	8:11
PFUnA	U		1.00	
PFDoA	U		1.00	
PFBS	U		2.00	
PFHxS		3.36	2.00	7:23
PFOS		10.0	2.00	8:31
PFOSA	U		2.50	

(1) Where applicable, custom lab flags have been used on this report; U = not detected.

Approved by: _____Bryan Alonzo_____ QA/QC Chemist

For Axys Internal Use Only [XSL Template: FC-Form1A.xsl; Created: 01-Sep-2009 10:13:54; Application: XMLTransformer-1.10.4;
Report Filename: PFC_FC_LC_PFOA_L13114-12_Form1A_FC9G_347S24_SJ1043113.html; Workgroup: WG29556; Design ID: 1058]

These pages are part of a larger report that may contain information necessary for full data evaluation.
Results reported relate only to the sample tested.
Results are compliant with NELAP where specific accreditation is held.

MW 10-7-09

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: March 31, 2008	Completed by: David Ikeda

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance level 1 review (QA1) (PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Matrix	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0902008	Water	Sumner	0902008-01	02/12/2009		None
0902008	Water	Gig Harbor	0902008-02	02/10/2009	MS/MSD	None
0902008	Water	Shelton	0902008-03	02/10/2009		None
0902008	Water	Everett	0902008-04	02/12/2009		None
0902008	Water	Burlington	0902008-05	02/10/2009		None
0902008	Water	Bremerton	0902008-06	02/10/2009		None
0902008	Water	Tacoma	0902008-07	02/19/2009		None
0902008	Water	Chambers Creek	0902008-08	02/19/2009		None
0902008	Water	Metro West Point	0902008-09	02/10/2009	Duplicate	None
0902008	Water	Bellingham	0902008-10	02/12/2009		None
0902008	Water	Field Blank	0902008-11	02/12/2009		None

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Orders	Matrix	Test Method	Method Name	Number of Samples
0902008	Water	EPA 200.8	Inductively Coupled Plasma - Mass Spectrometry	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes
Did coolers arrive at lab between 0 °C and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes
Frequency of Field QC Samples Correct? Field Duplicate – Not required. Field Blank – 1/20 samples. MS/MSD samples – 1/20 samples.	Yes
Case narrative present and complete?	Yes
Any holding time violations?	No - All samples were prepared and analyzed within holding times.

The following tables are presented at the end of this QA1 Review Memorandum and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 3);

- Surrogates Outside Limits (Table 4);
- MS/MSD Outside Limits (Table 5);
- LCS Outside Limits (Table 6); and
- Re-analysis Results (Table 7).

The inorganic data was originally reviewed Dean Momohara, Manchester Environmental Laboratory (MEL) on March 4, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided by the laboratory.

Metals by ICPMS	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks as noted on Table 2?	Yes – Copper was detected in the Field Blank.
For samples, if results are <3 times the blank then "U" flag data.	Samples results below the PQL are reported at the PQL and flagged U. Sample results greater than PQL are not changed and flagged U.
Laboratory QC frequency of one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes
MS/MSD percent recovery values within QC criteria (see Table 4) of 75-125%? QC limits are not applicable to sample results greater than 4 times spike amount.	Yes
Sample and duplicate relative percent difference values within QC criteria (see Table 4) of <20%? Apply criteria only when both results are >PQL.	Yes
LCS percent recovery values within QC criteria (see Table 5) of 85-115%? If the value is high with no positive values in the associated data; then no data qualification is required.	Yes
Is there one serial dilution per 20 samples? Are percent difference values within laboratory QC criteria?	Information not provided by the laboratory.
Spot check ICS recoveries 80-120%. Contact lab.	Information not provided by the laboratory.
Correlation Coefficient > 0.995.	Yes
ICV and CCV recovery between 90-110%. Contact lab.	Yes
Internal Standard recovery values for samples and MS/MSD within laboratory QC limits?	Yes.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
None

Table 3 - List of Positive Results for Blank Samples

Method	Sample ID	Samp Type	Analyte	Result	Qual	Anal Type	Units	PQL	MDL
EPA 200.8	0902008-11	FBLK	Copper	0.71		A	µg/L	0.10	0.02

Table 3A - List of Samples Qualified for Method Blank Contamination
None

Table 4 - List of Samples with Surrogates outside Control Limits
None

Table 5 - List MS/MSD Percent Recovery Values and RPDs outside Control Limits
None

Table 6 - List LCS Percent Recovery Values outside Control Limits
None

Table 7 –Samples that were Reanalyzed
None

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference

Data Validation Qualifiers:

Code	Description
B	Analyte detected in sample and method blank. Reported result is sample concentration without blank correction or associated quantitation limit.
JG	Analyte was positively identified. Value may be greater than the reported estimate.
JK	Analyte was positively identified. Reported result is an estimate with unknown bias.
JL	Analyte was positively identified. Value may be less than the reported estimate.
JT	Analyte was positively identified. Reported result is an estimate below the associated quantitation limit but above the MDL.
JTG	Analyte was positively identified. Value may be greater than the reported result, which is an estimate below the associated quantitation limit but above the MDL.
JTK	Analyte was positively identified. Reported result is an estimate with unknown bias, below the associated quantitation limit but above the MDL.
JTL	Analyte was positively identified. Value may be less than the reported result which is an estimate below associated quantitation limit but above MDL.
NJ	There is evidence that the analyte is present in the sample. Reported result for the tentatively identified analyte is an estimate.
NJT	There is evidence the analyte is present in the sample. Reported result for the tentatively identified analyte is an estimate below the associated quantitation limit but above the MDL.
NU	There is evidence the analyte is present in the sample. Tentatively identified analyte was not detected at or above the reported result.
NUJ	There is evidence the analyte is present in the sample. Tentatively identified analyte was not detected at or above the reported estimate.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	Analyte was not detected at or above the reported result.
UJG	Analyte was not detected at or above the reported estimate with likely low bias.
UJK	Analyte was not detected at or above the reported estimate with unknown bias.
UJL	Analyte was not detected at or above the reported estimate with likely high bias.

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
Copper

Project Name: Phase 3: Priority Pollutant Scans of Ten
Work Order: 0902008
Project Officer: Maroncelli, Jim

Analyte: Copper
Method: EPA200.8
Matrix: Water
Units: ug/L

Sample #	Sample ID	Result	Qualifier	RL	MDL	Collected	Analyzed	Batch ID
0902008-01	Sumner	13.2		0.10	0.02	02/12/09	03/02/09	B09B136
0902008-02	Gig Harbor	9.28		0.10	0.02	02/10/09	03/02/09	B09B136
0902008-03	Shelton	7.31		0.10	0.02	02/10/09	03/02/09	B09B136
0902008-04	Everett	11.8		0.10	0.02	02/12/09	03/02/09	B09B136
0902008-05	Burlington	2.56		0.10	0.02	02/10/09	03/02/09	B09B136
0902008-06	Bremerton	3.52		0.10	0.02	02/10/09	03/02/09	B09B136
0902008-07	Tacoma	9.65		0.10	0.02	02/19/09	03/02/09	B09B136
0902008-08	Chambers Creek	11.9		0.10	0.02	02/19/09	03/02/09	B09B136
0902008-09	Metro West Point	11.7		0.10	0.02	02/10/09	03/02/09	B09B136
0902008-10	Bellingham	6.21		0.10	0.02	02/12/09	03/02/09	B09B136
0902008-11	Field Blank	0.71		0.10	0.02	02/12/09	03/02/09	B09B136

QC Results for Batch ID: B09B136

Method Blank	Sample ID	Result	Qualifer	RL	Analyzed
B09B136-BLK1	Blank	0.10	U	0.10	03/02/09

Sample #	QC Sample	Result	Spike Level	Source Sample	Source Result	%Rec	%Rec Limits	RPD	RPD Limit
B09B136-BS1	LCS	20.8	20			104	85-115		
B09B136-DUP1	Duplicate	11.6		0902008-09	11.7			0.4	20
B09B136-MS1	Matrix Spike	28.8	20	0902008-02	9.28	98	75-125		
B09B136-MSD1	Matrix Spike Dup	28.8	20	0902008-02	9.28	97	75-125	0.07	20

Authorized by: DM

Release Date: 3/4/09

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for
Lead

Project Name: Phase 3: Priority Pollutant Scans of Ten
Work Order: 0902008
Project Officer: Maroncelli, Jim

Analyte: Lead
Method: EPA200.8
Matrix: Water
Units: ug/L

Sample #	Sample ID	Result	Qualifier	RL	MDL	Collected	Analyzed	Batch ID
0902008-01	Sumner	0.18		0.10	0.007	02/12/09	03/02/09	B09B136
0902008-02	Gig Harbor	0.68		0.10	0.007	02/10/09	03/02/09	B09B136
0902008-03	Shelton	0.40		0.10	0.007	02/10/09	03/02/09	B09B136
0902008-04	Everett	1.17		0.10	0.007	02/12/09	03/02/09	B09B136
0902008-05	Burlington	0.31		0.10	0.007	02/10/09	03/02/09	B09B136
0902008-06	Bremerton	0.28		0.10	0.007	02/10/09	03/02/09	B09B136
0902008-07	Tacoma	0.72		0.10	0.007	02/19/09	03/02/09	B09B136
0902008-08	Chambers Creek	0.29		0.10	0.007	02/19/09	03/02/09	B09B136
0902008-09	Metro West Point	0.38		0.10	0.007	02/10/09	03/02/09	B09B136
0902008-10	Bellingham	0.44		0.10	0.007	02/12/09	03/02/09	B09B136
0902008-11	Field Blank	0.10	U	0.10	0.007	02/12/09	03/02/09	B09B136

QC Results for Batch ID: B09B136

Method Blank	Sample ID	Result	Qualifer	RL	Analyzed
B09B136-BLK1	Blank	0.10	U	0.10	03/02/09

Sample #	QC Sample	Result	Spike Level	Source Sample	Source Result	%Rec	%Rec Limits	RPD	RPD Limit
B09B136-BS1	LCS	20.9	20			105	85-115		
B09B136-DUP1	Duplicate	0.376		0902008-09	0.38			2	20
B09B136-MS1	Matrix Spike	20.3	20	0902008-02	0.680	98	75-125		
B09B136-MSD1	Matrix Spike Dup	20.3	20	0902008-02	0.680	98	75-125	0.1	20

Authorized by: DH

Release Date: 3/4/9

Washington State Department of Ecology
Manchester Environmental Laboratory
Final Analysis Report for:
Zinc

Project Name: Phase 3: Priority Pollutant Scans of Ten
Work Order: 0902008
Project Officer: Maroncelli, Jim

Analyte: Zinc
Method: EPA200.8
Matrix: Water
Units: ug/L

Sample #	Sample ID	Result	Qualifier	RL	MDL	Collected	Analyzed	Batch ID
0902008-01	Sumner	49.9		5.0	0.5	02/12/09	03/02/09	B09B136
0902008-02	Gig Harbor	76.2		5.0	0.5	02/10/09	03/02/09	B09B136
0902008-03	Shelton	44.5		5.0	0.5	02/10/09	03/02/09	B09B136
0902008-04	Everett	29.6		5.0	0.5	02/12/09	03/02/09	B09B136
0902008-05	Burlington	41.1		5.0	0.5	02/10/09	03/02/09	B09B136
0902008-06	Bremerton	21.7		5.0	0.5	02/10/09	03/02/09	B09B136
0902008-07	Tacoma	44.5		5.0	0.5	02/19/09	03/02/09	B09B136
0902008-08	Chambers Creek	34.5		5.0	0.5	02/19/09	03/02/09	B09B136
0902008-09	Metro West Point	33.0		5.0	0.5	02/10/09	03/02/09	B09B136
0902008-10	Bellingham	39.7		5.0	0.5	02/12/09	03/02/09	B09B136
0902008-11	Field Blank	5.0	U	5.0	0.5	02/12/09	03/02/09	B09B136

QC Results for Batch ID: B09B136

Method Blank	Sample ID	Result	Qualifer	RL	Analyzed
B09B136-BLK1	Blank	5.0	U	5.0	03/02/09

Sample #	QC Sample	Result	Spike Level	Source Sample	Source Result	%Rec	%Rec Limits	RPD	RPD Limit
B09B136-BS1	LCS	21.9	20			109	85-115		
B09B136-DUP1	Duplicate	33.0		0902008-09	33.0			0.06	20
B09B136-MS1	Matrix Spike	95.1	20	0902008-02	76.2	94	75-125		
B09B136-MSD1	Matrix Spike Dup	95.4	20	0902008-02	76.2	96	75-125	0.3	20

Authorized by: DM Release Date: 3/4/09

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: September 15, 2009	Completed by: Mark Woodke

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per Washington Department of Ecology (Ecology) Quality Assurance Review Guidance for the quality assurance review level 1 review (QA1, PTI, 1989). Specific criteria for QC limits were obtained from the project QAPP. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concern affecting data usability is summarized below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

Table 1 Sample Summary Tables from Electronic Data Deliverable

Work Order	Sample ID	Lab ID	Sample Date	Lab QC	ID Corrections
0907021	Gig Harbor	0907021-01	07/14/2009		
0907021	Bremerton	0907021-02	07/14/2009	MS/MSD	
0907021	Shelton	0907021-03	07/14/2009		
0907021	West Point	0907021-04	07/14/2009		
0907021	Burlington	0907021-05	07/16/2009		
0907021	Tacoma	0907021-06	07/16/2009		
0907021	Chambers Creek	0907021-07	07/16/2009		
0907021	Sumner	0907021-08	07/17/2009		
0907021	Bellingham	0907021-09	07/16/2009		
0907021	Everett	0907021-10	07/16/2009		
0907021	Rinsate	0907021-11	07/14/2009		

Table 2 Work Orders, Tests and Number of Samples included in this DUSR

Work Order	Matrix	Test Method	Method Name	Number of Samples
0907021	Water	EPA 200.8	Inductively Coupled Plasma – Mass Spectrometry	11

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes, implied in the data review memorandum by Dean Momohara.
Did coolers arrive at lab between 0^{o}C and 6^{o}C and in good condition as indicated on COC and Cooler Receipt Form?	Yes, implied in the data review memorandum by Dean Momohara.
Frequency of Field QC Samples Correct? Field Duplicate – Not required. Field Blank – Not required. MS/MSD samples – 1/20 samples.	Yes.
Case narrative present and complete?	Yes.
Any holding time violations?	No.

The following tables are presented at the end of this QA1 Review Memorandum and provide summaries of results outside QC criteria.

- Method Blank Results (Table 3);
- MS/MSD Outside Limits (Table 4);
- LCS Outside Limits (Table 5); and
- Re-analysis Results (Table 6).

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: September 15, 2009	Completed by: Mark Woodke

The inorganic data was originally reviewed by Dean Momohara, Manchester Environmental Laboratory (MEL) on August 3, 2009. The laboratory provided analytical summaries for samples, including QC samples. No raw data was provided by the laboratory.

Metals by GC/ECD	
Description	**Notes and Qualifiers**
Any compounds present in method and field blanks as noted on Table 3?	No.
For samples, if results are <3 times the blank then "U" flag data.	Not applicable.
Laboratory QC frequency of one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes.
MS/MSD percent recovery values within QC criteria (see Table 4) of 75 – 125%? QC limits are not applicable to sample results greater than 4 times spike amount.	Yes.
Sample and duplicate relative percent difference values within QC criteria (see Table 4) of < 20%? Apply criteria only when both results are >PQL.	Yes.
LCS percent recovery values within QC criteria (see Table 5) of 85-115%? If the value is high with no positive values in the associated data, then no qualification is required.	Yes.
Is there one serial dilution per 20 samples? Are percent difference values within laboratory QC criteria?	Information not provided by the laboratory.
Spot check ICS recoveries 80-120. Contact lab.	Information not provided by the laboratory.
Correlation coefficient > 0.995?	Yes.
ICV and CCV recovery between 90-110%. Contact lab.	Yes.
Internal standard recovery values for samples and MS/MSD within laboratory QC limits?	Yes.

Summary of Potential Impacts on Data Usability
Major Concerns
None
Minor Concerns
None

Table 3 – List of Positive Results for Blank Samples
None

Table 3A - List of Samples Qualified for Method Blank Contamination
None

Table 4 – List of MS/MSD Percent Recovery Values and RPDs outside Control Limits
None

Table 5 – List of LCS Percent Recovery Values Outside Control Limits
None.

Table 6 - Samples that were Reanalyzed
None.

Quality Assurance Review Level 1 Report	Project: Ecology – POTW Pollution Scans
Date Completed: September 15, 2009	Completed by: Mark Woodke

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference

Data Validation Qualifiers:

Code	Description
B	Analyte detected in sample and method blank. Reported result is sample concentration without blank correction or associated quantitation limit.
JG	Analyte was positively identified. Value may be greater than the reported estimate.
JK	Analyte was positively identified. Reported result is an estimate with an unknown bias.
JL	Analyte was positively identified. Value may be less than the reported estimate.
JT	Analyte was positively identified. Reported result is an estimate below the associated quantitation limit but above the MDL.
JTG	Analyte was positively identified. Value may be greater than the reported result, which is an estimate below the associated quantitation limit but above the MDL.
JTK	Analyte was positively identified. Reported result is an estimate with unknown bias, below the associated quantitation limit but above the MDL.
JTL	Analyte was positively identified. Value may be less than the reported result which is an estimate below associated quantitation limit but above the MDL.
NJ	There is evidence that the analyte is present in the sample. Reported result for the tentatively identified analyte is an estimate.
NJT	There is evidence that the analyte is present in the sample. Reported result for the tentatively identified analyte is an estimate below the associated quantitation limit but above the MDL.
NU	There is evidence that the analyte is present in the sample. Tentatively identified analyte was not detected at or above the reported result.
NUJ	There is evidence that the analyte is present in the sample. Tentatively identified analyte was not detected at or above the reported estimate.
REJ	Data are unusable for all purposes. Sample results rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
U	Analyte was not detected at or above the reported result.
UJG	Analyte was not detected at or above the reported estimate with likely low bias.
UJK	Analyte was not detected at or above the reported estimate with unknown bias.
UJL	Analyte was not detected at or above the reported estimate with likely high bias.

Appendix C.

Summary of Analytical Results

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (PAHs)																							
Low Molecular Weight PAHs (LPAHs)																							
Acenaphthene		83-32-9	ug/L	6.10E-03	U	5.70E-03	UJG	6.50E-03	U	8.20E-02	JG	6.00E-03	U	6.30E-03	UJG	1.10E-02		5.80E-03	UJG	6.60E-03	U	6.00E-03	UJG
Acenaphthylene		208-96-8	ug/L	6.10E-03	U	5.70E-03	UJG	6.50E-03	U	5.20E-02		6.00E-03	U	6.30E-03	UJG	5.80E-03	JT	5.80E-03	UJG	6.60E-03	U	6.00E-03	UJG
Anthracene		120-12-7	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	8.20E-03		6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	6.00E-03	U
Fluorene		86-73-7	ug/L	1.10E-02		5.70E-03	U	6.90E-03		1.70E-01		1.10E-02		6.30E-03	UJG	2.20E-02		5.80E-03	U	6.60E-03	U	6.00E-03	U
Naphthalene		91-20-3	ug/L	3.70E-02	UFB	5.70E-03	UJG	4.00E-02	UFB	3.40E-01	JG	2.70E-02	UFB	6.30E-03	JTG	3.60E-02	UFB	1.20E-02	UJG	1.80E-02	UFB	1.20E-02	UJG
Phenanthrene		85-01-8	ug/L	1.10E-02		3.90E-03	JT	5.40E-03	JT	6.60E-02		6.00E-03	U	6.30E-03	UJG	8.00E-03		5.80E-03	U	6.60E-03	U	6.00E-03	U
Number of Detects =				2		1		2		6		1		1		4		0		0		0	
Sum of Detects =			ug/L	2.20E-02		3.90E-03	J	1.23E-02	J	7.18E-01	J	1.10E-02		6.30E-03	J	4.68E-02	J	1.20E-02	U	1.80E-02	U	1.20E-02	U
High Molecular Weight PAHs (HPAHs)																							
Benzo(a)anthracene		56-55-3	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	5.50E-03	JT
Benzo(a)pyrene		50-32-8	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	1.20E-02	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	1.20E-02	U
Benzo(b)fluoranthene		205-99-2	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	2.10E-02	JL
Benzo(g,h,i)perylene		191-24-2	ug/L	6.10E-03	U	5.70E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	UJG	5.90E-03	JT	1.20E-02	UJG
Benzo(k)fluoranthene		207-08-9	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	6.00E-03	U
Chrysene		218-01-9	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	8.20E-03	
Dibenzo(a,h)anthracene		53-70-3	ug/L	6.10E-03	U	5.70E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	UJG	6.60E-03	U	1.20E-02	UJG
Fluoranthene		206-44-0	ug/L	8.40E-03		4.00E-03	JT	3.70E-03	JT	4.80E-03	JT	3.70E-03	JT	2.00E-03	JTG	1.50E-02		5.80E-03	U	8.70E-03		9.80E-03	
Indeno(1,2,3-cd)pyrene		193-39-5	ug/L	6.10E-03	U	5.70E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	UJG	1.60E-02		1.20E-02	UJG
Pyrene		129-00-0	ug/L	7.80E-03		6.60E-03		6.00E-03	JT	5.60E-03	JT	4.50E-03	JT	5.00E-03	JTG	1.80E-02		5.20E-03	JT	1.60E-02		3.10E-02	
Number of Detects =				2		2		2		2		2		2		2		1		4		5	
Sum of Detects =			ug/L	1.62E-02		1.06E-02	J	9.70E-03	J	1.04E-02	J	8.20E-03	J	7.00E-03	J	3.30E-02		5.20E-03	J	4.66E-02	J	7.55E-02	J
Carcinogenic PAHs (cPAHs)																							
Benzo(a)anthracene		56-55-3	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	5.50E-03	JT
Benzo(a)pyrene		50-32-8	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	1.20E-02	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	1.20E-02	U
Benzo(b)fluoranthene		205-99-2	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	2.10E-02	JL
Benzo(k)fluoranthene		207-08-9	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	6.00E-03	U
Chrysene		218-01-9	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	8.20E-03	
Dibenzo(a,h)anthracene		53-70-3	ug/L	6.10E-03	U	5.70E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	UJG	6.60E-03	U	1.20E-02	UJG
Indeno(1,2,3-cd)pyrene		193-39-5	ug/L	6.10E-03	U	5.70E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	UJG	1.60E-02		1.20E-02	UJG
Number of Detects =				0		0		0		0		0		0		0		0		1		3	
Sum of Detects =			ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	1.20E-02	U	6.00E-03	U	6.30E-03	U	7.40E-03	U	5.80E-03	U	1.60E-02		3.47E-02	J
Total PAHs (LPAHs+HPAHs)																							
Number of Detects =				4		3		4		8		3		3		6		1		4		5	
Sum of Detects =			ug/L	3.82E-02		1.45E-02	J	2.20E-02	J	7.28E-01	J	1.92E-02	J	1.33E-02	J	7.98E-02	J	5.20E-03	J	4.66E-02	J	7.55E-02	J
Phthalates																							
bis(2-Ethylhexyl) phthalate		117-81-7	ug/L	5.90E-01	UJL	4.70E-01		2.40E+00		4.30E-01		5.30E-01		8.40E-01		2.80E+00		2.30E+00		3.40E+00		5.30E+00	
Butylbenzyl phthalate		85-68-7	ug/L	6.00E-01	U	6.00E-01	U	1.00E-01	JT	5.90E-01	U	4.60E-01		6.40E-01	U	1.90E-01	JT	5.90E-01	U	6.50E-01	UJK	6.00E-01	U
Di-N-butyl phthalate		84-74-2	ug/L	4.90E-01		2.60E-01	UJL	3.60E-01	UJL	1.90E-01	UJL	2.40E-01	UJL	3.90E-01	UJL	2.80E-01	UJG	2.40E-01	UJL	1.60E-01	U	2.50E-01	UJL
Di-N-octyl phthalate		117-84-0	ug/L	3.00E-01	UJG	3.00E-01	U	2.90E-01	U	3.00E-01	U	2.80E-01	U	3.20E-01	U	3.60E-01	U	2.90E-01	U	3.20E-01	UJG	3.00E-01	U
Diethyl phthalate		84-66-2	ug/L	3.00E-01	U	2.70E-01	UFB	2.90E-01	U	3.00E-01	U	3.40E-01		3.20E-01	U	1.40E-01	JT	2.90E-01	U	3.20E-01	UJK	3.00E-01	U
Dimethyl phthalate		131-11-3	ug/L	3.00E-01	UFB	3.00E-01	U	2.90E-01	U	3.00E-01	U	2.80E-01	U	3.20E-01	U	3.60E-01	U	2.90E-01	U	3.20E-01	UJK	3.00E-01	U
Number of Detects =				1		1		2		1		3		1		3		1		1		1	
Sum of Detects =			ug/L	4.90E-01		4.70E-01		2.50E+00		4.30E-01		1.33E+00		8.40E-01		3.13E+00	J	2.30E+00		3.40E+00		5.30E+00	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (PAHs)																							
Low Molecular Weight PAHs (LPAHs)																							
Acenaphthene		83-32-9	ug/L	6.70E-03	U	8.90E-02	JG	1.20E-02		6.00E-03	UJG	1.40E-02		6.10E-03	UJG	6.30E-03	U	6.20E-03	UJG	5.50E-03	JT	1.50E-02	JG
Acenaphthylene		208-96-8	ug/L	6.70E-03	U	5.50E-02	JG	5.10E-03	JT	6.00E-03	UJK	6.50E-03	U	6.10E-03	UJG	6.30E-03	U	6.20E-03	UJG	3.20E-03	JT	2.30E-02	JG
Anthracene		120-12-7	ug/L	6.70E-03	U	8.40E-03	JG	3.90E-03	JT	6.00E-03	UJK	6.50E-03	U	6.61E-02	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	7.00E-03	
Fluorene		86-73-7	ug/L	6.70E-03	U	2.00E-01	JG	2.50E-02		6.00E-03	UJK	1.80E-02		1.10E-02		5.70E-03	JT	6.20E-03	U	9.00E-03		1.20E-01	
Naphthalene		91-20-3	ug/L	1.30E-01		3.70E-01	JG	4.40E-02	UFB	6.00E-03	UJG	6.30E-02		1.20E-02	UJG	2.50E-02	UFB	1.20E-02	UJG	3.00E-02	UFB	2.20E-02	JG
Phenanthrene		85-01-8	ug/L	6.10E-03	JT	7.10E-02	JG	1.60E-02		4.50E-03	JTK	1.60E-02		1.40E-02		5.10E-03	JT	6.20E-03	U	6.00E-03	JT	5.40E-02	
Number of Detects =				2		6		5		1		4		2		2		0		4		6	
Sum of Detects =			ug/L	1.36E-01		7.93E-01	J	6.20E-02	J	4.50E-03	J	1.11E-01		2.50E-02		1.08E-02	J	1.20E-02	U	2.37E-02	J	2.41E-01	J
High Molecular Weight PAHs (HPAHs)																							
Benzo(a)anthracene		56-55-3	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.61E-02	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Benzo(a)pyrene		50-32-8	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	1.20E-02	U	6.30E-03	U	1.20E-02	U	6.20E-03	U	1.20E-02	U
Benzo(b)fluoranthene		205-99-2	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.10E-03	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Benzo(g,h,i)perylene		191-24-2	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.30E-03	U	1.20E-02	UJG	6.20E-03	U	1.20E-02	UJG
Benzo(k)fluoranthene		207-08-9	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.10E-03	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Chrysene		218-01-9	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.10E-03	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Dibenzo(a,h)anthracene		53-70-3	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.30E-03	U	1.20E-02	UJG	6.20E-03	U	1.20E-02	UJG
Fluoranthene		206-44-0	ug/L	6.70E-03	U	4.70E-03	JTG	7.50E-03		4.40E-03	JT	8.50E-03		9.50E-03		6.30E-03	U	6.20E-03	U	4.90E-03	JT	4.80E-03	JT
Indeno(1,2,3-cd)pyrene		193-39-5	ug/L	6.70E-03	U	1.30E-02	UJG	4.70E-03	JT	6.00E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.30E-03	U	1.20E-02	UJG	6.20E-03	U	1.20E-02	UJG
Pyrene		129-00-0	ug/L	4.30E-03	JT	1.10E-02	JG	1.40E-02		7.70E-03		6.80E-03		6.30E-03		6.30E-03	U	6.20E-03	U	4.30E-03	JT	3.20E-03	JT
Number of Detects =				1		2		3		2		2		2		0		0		2		2	
Sum of Detects =			ug/L	4.30E-03	J	1.57E-02	J	2.62E-02	J	1.21E-02	J	1.53E-02		1.58E-02		6.30E-03	U	1.20E-02	U	9.20E-03	J	8.00E-03	J
Carcinogenic PAHs (cPAHs)																							
Benzo(a)anthracene		56-55-3	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.61E-02	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Benzo(a)pyrene		50-32-8	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	1.20E-02	U	6.30E-03	U	1.20E-02	U	6.20E-03	U	1.20E-02	U
Benzo(b)fluoranthene		205-99-2	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.10E-03	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Benzo(k)fluoranthene		207-08-9	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.10E-03	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Chrysene		218-01-9	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.10E-03	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Dibenzo(a,h)anthracene		53-70-3	ug/L	6.70E-03	U	1.30E-02	UJG	5.90E-03	U	6.00E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.30E-03	U	1.20E-02	UJG	6.20E-03	U	1.20E-02	UJG
Indeno(1,2,3-cd)pyrene		193-39-5	ug/L	6.70E-03	U	1.30E-02	UJG	4.70E-03	JT	6.00E-03	UJG	6.50E-03	U	1.20E-02	UJG	6.30E-03	U	1.20E-02	UJG	6.20E-03	U	1.20E-02	UJG
Number of Detects =				0		0		1		0		0		0		0		0		0		0	
Sum of Detects =			ug/L	6.70E-03	U	1.30E-02	U	4.70E-03	J	6.00E-03	U	6.50E-03	U	1.20E-02	U	6.30E-03	U	1.20E-02	U	6.20E-03	U	1.20E-02	U
Total PAHs (LPAHs+HPAHs)																							
Number of Detects =				3		8		8		3		6		4		2		0		6		8	
Sum of Detects =			ug/L	1.40E-01		8.09E-01	J	8.82E-02	J	1.66E-02	J	1.26E-01		4.08E-02		1.08E-02	J	1.20E-02	U	3.29E-02	J	2.49E-01	J
Phthalates																							
bis(2-Ethylhexyl) phthalate		117-81-7	ug/L	1.40E+00		1.80E+00		1.40E+00		8.70E-01		1.20E+00		4.10E-01		1.00E+00		2.40E-01	JT	1.10E+00	UJL	1.90E-01	JT
Butylbenzyl phthalate		85-68-7	ug/L	8.00E-02	JT	6.30E-01	U	1.90E-01	JT	5.70E-01	U	6.80E-01	U	5.90E-01	U	6.30E-01	U	5.90E-01	U	6.20E-01	UJK	6.00E-01	U
Di-N-butyl phthalate		84-74-2	ug/L	2.20E-01	UJL	3.20E-01	UJL	3.80E-01	UJL	2.10E-01	UJL	1.50E-01	JT	3.30E-01	UJL	4.30E-01	UJL	2.20E-01	UJL	1.50E-01	U	2.40E-01	UJL
Di-N-octyl phthalate		117-84-0	ug/L	3.20E-01	U	3.20E-01	U	2.90E-01	U	2.90E-01	U	3.40E-01	U	2.90E-01	U	3.20E-01	U	2.90E-01	U	3.10E-01	UJK	3.00E-01	U
Diethyl phthalate		84-66-2	ug/L	3.30E-01		5.40E-01	UFB	2.90E-01	U	2.90E-01	U	3.40E-01	U	2.90E-01	U	3.20E-01	U	2.90E-01	U	3.10E-01	JT	3.00E-01	U
Dimethyl phthalate		131-11-3	ug/L	3.20E-01	U	3.20E-01	U	2.90E-01	U	2.90E-01	U	3.40E-01	U	2.90E-01	U	3.20E-01	U	2.90E-01	U	3.10E-01	UJK	3.00E-01	U
Number of Detects =				3		1		2		1		2		1		1		1		1		1	
Sum of Detects =			ug/L	1.81E+00		1.80E+00		1.59E+00	J	8.70E-01		1.35E+00	J	4.10E-01		1.00E+00		2.40E-01	J	3.10E-01	J	1.90E-01	J

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Other Base/Neutral/Acid Extractables																							
1,2,4-Trichlorobenzene		120-82-1	ug/L	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.40E-01	U	1.60E-01	U	1.80E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U
1,2-Dichlorobenzene		95-50-1	ug/L	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.40E-01	U	1.60E-01	U	1.80E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U
1,3-Dichlorobenzene		541-73-1	ug/L	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.40E-01	U	1.60E-01	U	1.80E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U
1,4-Dichlorobenzene		106-46-7	ug/L	2.40E-01		2.10E-01		1.60E-01		2.00E-01		8.60E-01		4.70E-01		5.10E-01		6.30E-01		9.00E-02	JT	1.50E-01	U
1-Methylnaphthalene		90-12-0	ug/L	9.90E-03	UJL	5.70E-03	UJG	1.20E-02	UJL	1.10E-01	JG	9.70E-03	UJL	6.30E-03	UJG	1.50E-02	UJL	1.20E-02	UJG	6.60E-03	U	1.20E-02	UJG
2,3,4,5-Tetrachlorophenol		4901-51-3	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
2,3,4,6-Tetrachlorophenol		58-90-2	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	UJL	6.40E-02	U	6.10E-02	UJL	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
2,4,5-Trichlorophenol		95-95-4	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
2,4,6-Trichlorophenol		88-06-2	ug/L	4.90E-02	JT	5.90E-02	JTG	3.30E-02	JT	1.50E-01	JG	2.90E-02	JT	9.80E-02	JG	1.20E-01		1.00E-01	JG	6.20E-02	U	6.60E-02	NJG
2,4-Dichlorophenol		120-83-2	ug/L	2.10E-01	JT	1.50E+00	U	2.50E-01	JT	1.50E+00	U	1.80E-01	JT	1.60E+00	U	2.90E-01	JT	1.50E+00	U	1.40E-01	JT	1.50E+00	U
2,4-Dimethylphenol		105-67-9	ug/L	1.50E+00	UJK	1.00E-01	JT		REJ	1.50E+00	U	2.20E-01	JTK	1.60E+00	U	1.80E+00	UJK	1.50E+00	U	1.60E+00	UJG	1.50E+00	U
2,4-Dinitrophenol		51-28-5	ug/L	1.50E+00	U	1.50E+00	U	1.50E+00	UJK	1.50E+00	U	2.20E-01	JTK	1.60E+00	U	1.80E+00	UJK	1.50E+00	UJG	1.60E+00	UJK	1.50E+00	UJG
2,4-Dinitrotoluene		121-14-2	ug/L	6.00E-01	U	6.00E-01	U	5.80E-01	U	5.90E-01	U	5.60E-01	U	6.40E-01	U	7.20E-01	U	5.90E-01	U	6.50E-01	UJK	6.00E-01	U
2,6-Dinitrotoluene		606-20-2	ug/L	6.00E-01	U	6.00E-01	U	5.80E-01	U	5.90E-01	U	5.60E-01	U	6.40E-01	U	7.20E-01	U	5.90E-01	U	6.50E-01	UJK	6.00E-01	U
2-Chloroethanol phosphate (3:1)		115-96-8	ug/L	na		7.00E-02	JT	na		2.70E-01		na		1.50E-01	JT	na		3.10E-01		na		4.30E-01	
2-Chloronaphthalene		91-58-7	ug/L	8.60E-03		5.70E-03	UJG	6.50E-03	U	6.20E-03	UJG	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	UJG	6.60E-03	U	6.00E-03	UJG
2-Chlorophenol		95-57-8	ug/L	6.00E-01	U	6.00E-01	U	5.80E-01	U	5.90E-01	U	5.60E-01	U	6.40E-01	U	7.20E-01	U	5.90E-01	U	6.50E-01	U	6.00E-01	U
2-Methylnaphthalene		91-57-6	ug/L	1.00E-02	UJL	5.70E-03	UJG	1.10E-02	UJL	1.70E-01	JG	8.20E-03	UJL	6.30E-03	UJG	8.20E-03	UJL	1.20E-02	UJG	6.60E-03	U	1.20E-02	UJG
2-Methylphenol	o-Cresol	95-48-7	ug/L	1.50E+00	U	1.50E+00	U	1.50E+00	U	1.50E+00	U	1.40E+00	U	1.20E-01	JT	1.80E+00	U	7.00E-02	JT	1.60E+00	U	1.50E+00	U
2-Nitroaniline	o-Nitroaniline	88-74-4	ug/L		REJ	3.00E+00	U	2.90E+00	UJK	3.00E+00	U	2.80E+00	UJK	3.20E+00	U		REJ	2.90E+00	U		REJ	3.00E+00	U
2-Nitrophenol		88-75-5	ug/L	3.00E-01	U	3.00E-01	U	1.70E-01	JT	3.00E-01	U	2.80E-01	U	3.20E-01	U	2.30E-01	JT	2.90E-01	U	3.20E-01	U	3.00E-01	U
3,3'-Dichlorobenzidine		91-94-1	ug/L		REJ	3.00E-01	UJK		REJ	3.00E-01	UJK		REJ	3.20E-01	UJK		REJ	2.90E-01	UJG		REJ	3.00E-01	UJG
3B-Coprostanol		360-68-9	ug/L	na		9.40E+00	JG	na		1.50E+00	UJG	na		1.50E+01	JG	na		1.40E+01	JG	na		1.50E+01	JG
3-Nitroaniline	m-Nitroaniline	99-09-2	ug/L		REJ	6.00E-01	U	5.80E-01	UJK	5.90E-01	U	5.60E-01	UJK	6.40E-01	U		REJ	5.90E-01	U		REJ	6.00E-01	U
4,6-Dinitro-2-methylphenol		534-52-1	ug/L	6.00E-01	U	6.00E-01	UJG	5.80E-01	U	5.90E-01	UJG	5.60E-01	U	6.40E-01	UJG	7.20E-01	U	5.90E-01	UJG	6.50E-01	U	6.00E-01	UJG
4-Bromophenylphenyl ether		101-55-3	ug/L	3.00E-01	U	3.00E-01	U	2.90E-01	U	3.00E-01	U	2.80E-01	U	3.20E-01	U	3.60E-01	U	2.90E-01	U	6.30E-01	U	3.00E-01	U
4-Chloro-3-methylphenol	p-Chloro-m-cresol	59-50-7	ug/L	1.50E+00	UJK	1.50E+00	U	1.50E+00	UJK	1.50E+00	U	1.40E+00	UJK	1.60E+00	U	1.80E+00	UJG	1.50E+00	U	1.60E+00	UJG	1.50E+00	U
4-Chloroaniline		106-47-8	ug/L		REJ		REJ		REJ		REJ		REJ		REJ		REJ		REJ		REJ		REJ
4-Chlorophenylphenyl ether		7005-72-3	ug/L	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.40E-01	U	1.60E-01	U	1.80E-01	U	1.50E-01	U	1.60E-01	UJK	1.50E-01	U
4-Methylphenol	p-Cresol	106-44-5	ug/L	4.90E-01	JTK	2.80E+00		2.60E-01	JTK	1.00E+00	JT	1.40E+00	UJK	1.60E+00	U	2.60E-01	JTG	1.50E+00	U	1.60E+00	UJG	1.50E+00	U
4-Nitroaniline	p-Nitroaniline	100-01-6	ug/L		REJ	6.00E-01	UJK		REJ	5.90E-01	UJK		REJ	6.40E-01	UJK		REJ	5.90E-01	U		REJ	6.00E-01	UJL
4-Nitrophenol		100-02-7	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	UJL	6.40E-02	U	6.10E-02	UJL	6.40E-02	U	6.20E-02	UJL	6.10E-02	U	6.20E-02	U	6.30E-02	U
4-Nonylphenol		104-40-5	ug/L	6.00E-01	UJG	6.00E-01	U		REJ	5.90E-01	U	5.60E-01	U	6.40E-01	U	1.00E+00	JG	5.90E-01	U	6.50E-01	UFB	6.00E-01	U
Benzoic acid		65-85-0	ug/L	na		1.80E+00	UFB	na		1.50E+00	UFB	na		1.60E+00	UJG	na		1.50E+00	UJG	na		1.50E+00	UJG
Benzyl alcohol		100-51-6	ug/L	na		1.40E+00	JG	na		1.50E+00	UJG	na		1.60E+00	UJG	na		1.50E+00	UJG	na		1.50E+00	UJG
bis(2-Chloroethoxy) methane		111-91-1	ug/L		REJ	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.40E-01	U	1.60E-01	U		REJ	1.50E-01	U		REJ	1.50E-01	U
bis(2-Chloroethyl) ether		111-44-4	ug/L	3.00E-01	U	3.00E-01	U	2.90E-01	U	3.00E-01	U	2.80E-01	U	3.20E-01	U	3.60E-01	U	2.90E-01	U	3.20E-01	U	3.00E-01	U
Bisphenol A		80-05-7	ug/L		REJ	6.70E-01	JK	5.80E-01	UJK	8.40E-01		2.00E-01	JT	6.40E-01	U		REJ	1.20E+00	JK		REJ	6.00E-01	U
Caffeine		58-08-2	ug/L		REJ	3.00E-01	U	2.80E+00		1.00E-01	JT	1.20E+01		3.20E-01	U	5.30E-01	JTG	2.90E-01	U		REJ	3.00E-01	U
Carbazole		86-74-8	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	6.00E-03	U
Cholesterol		57-88-5	ug/L	na		1.30E+01	JG	na		8.40E+00	JG	na		1.70E+01	JG	na		2.30E+01	JG	na		1.70E+01	JG
Dibenzofuran		132-64-9	ug/L	1.10E-02		5.70E-03	UJG	6.20E-03	JT	1.90E-01		6.10E-03		6.30E-03	UJG	1.90E-02		5.80E-03	UJG	6.60E-03	U	6.90E-03	JG
Hexachlorobutadiene		87-68-3	ug/L	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.40E-01	UJG	1.60E-01	U	1.80E-01	UJG	1.50E-01	U	1.60E-01	U	1.50E-01	U
Hexachlorocyclopentadiene		77-47-4	ug/L	6.00E-01	U	6.00E-01	UJG	5.80E-01	UJG	5.90E-01	UJG	5.60E-01	U	6.40E-01	UJG	7.20E-01	U	5.90E-01	UJG	6.50E-01	UJK	6.00E-01	UJG
Hexachloroethane		67-72-1	ug/L	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.40E-01	U	1.60E-01	U	1.80E-01	UJG	1.50E-01	U	1.60E-01	U	1.50E-01	U
Isophorone		78-59-1	ug/L	3.00E-01	U	6.00E-02	JT	2.90E-01	U	3.00E-01	U	2.80E-01	U	3.20E-01	U	3.60E-01	U	1.40E-01	JT	3.20E-01	U	3.00E-01	U
Nitrobenzene		98-95-3	ug/L	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U	1.40E-01	U	1.60E-01	U	1.80E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U
N-Nitrosodimethylamine		62-75-9	ug/L	6.00E-01	U	na		5.80E-01	U	na		5.60E-01	U	na		6.50E-01	JTG	na		6.50E-01	U	na	
N-Nitrosodi-n-propylamine		621-64-7	ug/L	1.80E-01	U	1.80E-01	U	1.70E-01	U	1.80E-01	U	1.70E-01	U	1.90E-01	U	2.20E-01	U	1.80E-01	U	1.90E-01	U	1.80E-01	U
N-Nitrosodiphenylamine		86-30-6	ug/L	3.00E-01	UJG	3.00E-01	U	2.90E-01	UJK	3.00E-01	U	2.80E-01	UJK	3.20E-01	U	3.60E-01	UJK	2.90E-01	U	3.20E-01	UJG	3.00E-01	U

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Other Base/Neutral/Acid Extractables																							
1,2,4-Trichlorobenzene		120-82-1	ug/L	1.60E-01	U	1.60E-01	U	1.50E-01	U	1.40E-01	U	1.70E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U
1,2-Dichlorobenzene		95-50-1	ug/L	1.60E-01	UFB	1.60E-01	U	1.50E-01	U	1.40E-01	U	1.70E-01	U	7.00E-02	JTG	1.60E-01	UFB	1.50E-01	U	1.50E-01	UFB	1.50E-01	U
1,3-Dichlorobenzene		541-73-1	ug/L	1.60E-01	UFB	1.60E-01	U	1.50E-01	U	1.40E-01	U	1.70E-01	U	1.50E-01	U	1.60E-01	UFB	1.50E-01	U	1.50E-01	U	1.50E-01	U
1,4-Dichlorobenzene		106-46-7	ug/L	2.90E-01		1.10E-01	JTG	2.20E+00		7.60E-01		2.20E-01		2.80E-01		7.00E-02	JT	7.00E-02	JT	1.40E-01	JT	1.90E-01	
1-Methylnaphthalene		90-12-0	ug/L	1.20E-02	UJL	1.20E-01	JG	2.00E-02		6.00E-03	UJG	2.50E-02		1.20E-02	UJG	8.40E-03	UJL	1.20E-02	UJK	1.20E-02	UJL	8.00E-03	JG
2,3,4,5-Tetrachlorophenol		4901-51-3	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
2,3,4,6-Tetrachlorophenol		58-90-2	ug/L	6.30E-02	UJL	6.40E-02	U	6.20E-02	UJL	6.60E-02	U	6.40E-02	U	6.30E-02	U	1.50E-01	JL	6.20E-02	U	6.20E-02	U	6.40E-02	U
2,4,5-Trichlorophenol		95-95-4	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
2,4,6-Trichlorophenol		88-06-2	ug/L	1.60E-01		1.70E-01	JG	4.60E-02	JT	2.30E-01	JG	9.20E-02		1.20E-01	JG	3.00E-01		2.70E-01	JG	5.70E-02	JT	2.20E-02	JTG
2,4-Dichlorophenol		120-83-2	ug/L	2.70E-01	JT	1.60E+00	U	2.10E-01	JT	1.40E+00	U	2.70E-01	JT	1.50E+00	U	1.60E+00	U	1.50E+00	U	1.50E-01	JTK	1.50E+00	U
2,4-Dimethylphenol		105-67-9	ug/L	3.40E-01	JTK	5.00E-02	JT	2.40E-01	JTK	1.40E+00	U	3.10E-01	JTK	3.50E-01	JT		REJ	1.50E+00	U	1.50E+00	U	1.50E+00	U
2,4-Dinitrophenol		51-28-5	ug/L	3.40E-01	JTK	1.60E+00	UJG	2.40E-01	JTK	1.40E+00	U	1.70E+00	UJK	1.50E+00	U	1.60E+00	UJK	1.50E+00	UJG	1.20E-01	JT	1.50E+00	U
2,4-Dinitrotoluene		121-14-2	ug/L	6.30E-01	U	6.30E-01	U	5.90E-01	U	5.70E-01	U	6.80E-01	U	5.90E-01	U	6.30E-01	UJK	5.90E-01	U	6.20E-01	UJK	6.00E-01	U
2,6-Dinitrotoluene		606-20-2	ug/L	6.30E-01	U	6.30E-01	U	5.90E-01	U	5.70E-01	U	6.80E-01	U	5.90E-01	U	6.30E-01	U	5.90E-01	U	6.20E-01	UJK	6.00E-01	U
2-Chloroethanol phosphate (3:1)		115-96-8	ug/L	na		9.00E-02	JT	na		2.90E-01		na		4.10E-01		na		1.90E-01		na		1.90E-01	
2-Chloronaphthalene		91-58-7	ug/L	6.70E-03	U	6.60E-03	UJG	5.90E-03	U	6.00E-03	UJG	6.50E-03	U	6.10E-03	UJG	4.70E-03	JT	6.20E-03	UJG	6.20E-03	U	6.20E-03	UJG
2-Chlorophenol		95-57-8	ug/L	6.30E-01	U	6.30E-01	U	5.90E-01	U	5.70E-01	U	6.80E-01	U	5.90E-01	U	6.30E-01	U	5.90E-01	U	6.20E-01	U	6.00E-01	U
2-Methylnaphthalene		91-57-6	ug/L	9.40E-03	UJL	1.80E-01	JG	2.20E-02		6.00E-03	UJG	1.40E-02	UJL	1.20E-02	UJG	9.00E-03	UJL	1.20E-02	UJK	9.00E-03	UJL	1.30E-02	JG
2-Methylphenol	o-Cresol	95-48-7	ug/L	2.00E-01	JT	1.60E+00	U	1.90E-01	JT	1.40E+00	U	1.70E+00	U	1.50E+00	U	1.50E-01	JT	1.50E+00	U	1.90E-01	JT	1.50E+00	U
2-Nitroaniline	o-Nitroaniline	88-74-4	ug/L	3.20E+00	UJK	3.20E+00	U	2.90E+00	UJK	2.90E+00	U		REJ	2.90E+00	U	3.20E+00	UJK	2.90E+00	U		REJ	3.00E+00	U
2-Nitrophenol		88-75-5	ug/L	1.50E-01	JT	3.20E-01	U	2.90E-01	U	2.90E-01	U	3.40E-01	U	2.90E-01	U	3.20E-01	U	2.90E-01	U	3.10E-01	U	3.00E-01	U
3,3'-Dichlorobenzidine		91-94-1	ug/L		REJ	3.20E-01	UJG		REJ		REJ		REJ	2.90E-01	UJK		REJ	2.90E-01	UJG		REJ	3.00E-01	UJK
3B-Coprostanol		360-68-9	ug/L	na		2.00E+01	JG	na		8.70E+00	JG	na		7.70E+00	JG	na		6.10E+00	JG	na		4.30E+00	JG
3-Nitroaniline	m-Nitroaniline	99-09-2	ug/L	6.30E-01	UJK	6.30E-01	U	5.90E-01	UJK	5.70E-01	U		REJ	5.90E-01	U	6.30E-01	UJK	5.90E-01	U		REJ	6.00E-01	U
4,6-Dinitro-2-methylphenol		534-52-1	ug/L	6.30E-01	U	6.30E-01	UJG	5.90E-01	U	5.70E-01	UJG	6.80E-01	U	5.90E-01	UJG	6.30E-01	U	5.90E-01	UJG	6.20E-01	U	6.00E-01	UJG
4-Bromophenylphenyl ether		101-55-3	ug/L	3.20E-01	U	3.20E-01	U	2.90E-01	U	2.90E-01	U	3.40E-01	U	2.90E-01	U	3.20E-01	U	2.90E-01	U	3.10E-01	UJK	3.00E-01	U
4-Chloro-3-methylphenol	p-Chloro-m-cresol	59-50-7	ug/L	1.60E+00	UJK	1.60E+00	U	1.50E+00	UJK	1.40E+00	U	1.70E+00	UJK	1.50E+00	U	1.60E+00	UJK	1.50E+00	U	1.50E+00	UJK	1.50E+00	U
4-Chloroaniline		106-47-8	ug/L		REJ		REJ		REJ		REJ		REJ		REJ		REJ		REJ		REJ		REJ
4-Chlorophenylphenyl ether		7005-72-3	ug/L	1.60E-01	U	1.60E-01	U	1.50E-01	U	1.40E-01	U	1.70E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U	1.50E-01	UJK	1.50E-01	U
4-Methylphenol	p-Cresol	106-44-5	ug/L	1.70E+00	UJK	8.10E+00		4.60E-01	JTK	4.80E-01	JT	2.30E-01	JTK	1.10E-01	JT	2.10E-01	JTK	1.20E-01	JT	2.10E-01	JT	1.50E+00	U
4-Nitroaniline	p-Nitroaniline	100-01-6	ug/L		REJ	6.30E-01	UJK		REJ	5.70E-01	UJG		REJ	5.90E-01	UJK		REJ	5.90E-01	U		REJ	6.00E-01	UJK
4-Nitrophenol		100-02-7	ug/L	6.30E-02	UJL	6.40E-02	U	6.20E-02	UJL	6.60E-02	UJG	6.40E-02	U	6.30E-02	U	6.30E-02	UJL	6.20E-02	U	6.20E-02	U	6.40E-02	U
4-Nonylphenol		104-40-5	ug/L		REJ	6.30E-01	U		REJ	5.70E-01	U	6.80E-01	UFB	5.90E-01	U		REJ	5.90E-01	U	8.40E-01	UFB	6.00E-01	U
Benzoic acid		65-85-0	ug/L	na		1.70E+00	UFB	na		1.40E+00	UFB	na		1.50E+00	UFB	na		1.50E+00	UJG	na		1.50E+00	UJG
Benzyl alcohol		100-51-6	ug/L	na		1.50E-01	JG	na		1.40E+00	UJG	na		9.00E-02	JG	na		1.50E+00	UJG	na		1.50E+00	UJG
bis(2-Chloroethoxy) methane		111-91-1	ug/L	1.60E-01	U	1.60E-01	U	1.50E-01	U	5.00E-02	JT		REJ	1.50E-01	U	1.60E-01	U	1.50E-01	U		REJ	1.50E-01	U
bis(2-Chloroethyl) ether		111-44-4	ug/L	3.20E-01	U	3.20E-01	U	2.90E-01	U	2.90E-01	U	3.40E-01	U	2.90E-01	U	3.20E-01	U	2.90E-01	U	3.10E-01	U	3.00E-01	U
Bisphenol A		80-05-7	ug/L	2.60E-01	JTK	6.30E-01	U	5.90E-01	UJK	1.10E+00	JL		REJ	1.60E+00	JK	2.80E-01	JTK	5.90E-01	U		REJ	6.00E-01	U
Caffeine		58-08-2	ug/L	4.20E+01		4.00E-01		7.00E-01		2.90E-01	U	5.90E-01	JTG	8.60E-01		8.00E-02	JT	2.90E-01	U		REJ	3.00E-01	U
Carbazole		86-74-8	ug/L	6.70E-03	U	3.60E-02	UJG	5.90E-03	U	6.00E-03	U	6.50E-03	U	6.10E-03	U	6.30E-03	U	6.20E-03	U	6.20E-03	U	6.20E-03	U
Cholesterol		57-88-5	ug/L	na		3.20E+01	JG	na		1.20E+01	JG	na		7.90E+00	JG	na		8.50E+00	JG	na		4.90E+00	JG
Dibenzofuran		132-64-9	ug/L	6.70E-03	U	1.90E-01	JG	2.10E-02		6.00E-03	UJK	1.60E-02		6.10E-03	UJG	5.60E-03	JT	6.20E-03	UJG	8.10E-03		9.50E-02	JG
Hexachlorobutadiene		87-68-3	ug/L	1.60E-01	U	1.60E-01	U	1.50E-01	U	1.40E-01	U	1.70E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U
Hexachlorocyclopentadiene		77-47-4	ug/L	6.30E-01	UJG	6.30E-01	UJG	5.90E-01	UJG	5.70E-01	UJG	6.80E-01	U	5.90E-01	UJG	6.30E-01	UJG	5.90E-01	UJG	6.20E-01	UJK	6.00E-01	UJG
Hexachloroethane		67-72-1	ug/L	1.60E-01	U	1.60E-01	U	1.50E-01	U	1.40E-01	UJG	1.70E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U
Isophorone		78-59-1	ug/L	3.20E-01	U	3.20E-01	U	2.90E-01	U	4.00E-02	JT	3.40E-01	U	2.90E-01	U	3.20E-01	U	2.00E-02	JT	3.10E-01	U	3.00E-01	U
Nitrobenzene		98-95-3	ug/L	1.60E-01	U	1.60E-01	U	1.50E-01	U	1.40E-01	U	1.70E-01	U	1.50E-01	U	1.60E-01	U	1.50E-01	U	1.50E-01	U	1.50E-01	U
N-Nitrosodimethylamine		62-75-9	ug/L	6.30E-01	U	na		5.90E-01	U	na		6.80E-01	U	na		6.30E-01	U	na		6.20E-01	U	na	
N-Nitrosodi-n-propylamine		621-64-7	ug/L	1.90E-01	U	1.90E-01	U	1.80E-01	U	1.70E-01	U	2.10E-01	U	1.80E-01	U	1.90E-01	U	1.80E-01	U	1.90E-01	U	1.80E-01	U
N-Nitrosodiphenylamine		86-30-6	ug/L	3.20E-01	UJK	3.20E-01	U	2.90E-01	UJK	2.90E-01	U	3.40E-01	UJK	2.90E-01	U	3.20E-01	UJK	2.90E-01	U	1.20E-01	JTG	3.00E-01	U

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Pentachlorophenol		87-86-5	ug/L	7.60E-02	NJT	5.60E-02	JT	4.40E-02	NJT	6.40E-02	U	3.70E-02	NJT	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Phenol		108-95-2	ug/L	9.60E-01	JT	1.10E+00		8.60E-01	JG	1.40E+00		5.60E-01	UFB	1.10E-01	UFB	7.20E-01	UFB	5.90E-01	UFB	7.80E-01		6.00E-01	UFB
Retene		483-65-8	ug/L	6.10E-03	U	5.70E-03	U	6.50E-03	U	6.20E-03	U	6.00E-03	U	6.30E-03	UJG	7.40E-03	U	5.80E-03	U	6.60E-03	U	6.00E-03	U
Triclosan		3380-34-5	ug/L	2.90E-01		7.30E-01		5.50E-01		5.30E-01		1.80E-01	NJG	5.70E-01		8.80E-01	JG	1.30E+00		1.60E-01	UJG	8.50E-01	
Triethyl citrate		77-93-0	ug/L	5.10E-01	JT	1.40E+00		9.10E-01		7.10E-01		8.30E-01		3.50E+00		1.10E+00		1.20E+00		9.00E-02	JK	5.80E-01	JT
Number of Detects =				10		14		11		13		11		8		11		10		4		7	
Sum of Detects =			ug/L	2.84E+00	J	3.11E+01	J	6.04E+00	J	1.41E+01	J	1.48E+01		3.69E+01	J	5.59E+00	J	4.20E+01	J	1.10E+00	J	3.39E+01	J
Pesticides																							
2,4'-DDD		53-19-0	ug/L	na		2.60E-03	U	na		2.80E-03	U	na		2.60E-03	U	na		2.50E-03	U	na		2.60E-03	UJG
2,4'-DDE		3424-82-6	ug/L	na		2.60E-03	U	na		2.80E-03	U	na		2.60E-03	U	na		2.50E-03	U	na		2.60E-03	UJG
2,4'-DDT		789-02-6	ug/L	na		2.60E-03	U	na		2.80E-03	U	na		2.60E-03	U	na		2.50E-03	U	na		2.60E-03	UJG
4,4'-DDD		72-54-8	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
4,4'-DDE		72-55-9	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
4,4'-DDT		50-29-3	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Aldrin		309-00-2	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
alpha-BHC		319-84-6	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
beta-BHC		319-85-7	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.60E-03	UJK	2.50E-03	UJG	2.60E-03	UJG
delta-BHC		319-86-8	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	3.00E-03	UJK	2.50E-03	UJG	2.60E-03	UJG
gamma-BHC	Lindane	58-89-9	ug/L	4.00E-03	UJK	5.30E-03	UJL	3.70E-03	UJL	3.60E-03	UJL	4.90E-03	UJL	6.60E-03	UJL	3.90E-03	UJK	3.20E-03	UJL	2.50E-03	UJG	5.10E-03	UJK
cis-Chlordane		5103-71-9	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
trans-Chlordane		5103-74-2	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Chlordane, technical		12789-03-6	ug/L	na		2.60E-02	U	na		2.80E-02	U	na		2.60E-02	U	na		2.50E-02	U	na		2.60E-02	UJG
Chlorpyriphos		2921-88-2	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	1.20E-02	JG
Dacthal	DCPA	1861-32-1	ug/L	6.20E-02	U	2.60E-03	U	6.30E-02	U	2.80E-03	U	6.10E-02	U	2.60E-03	U	6.20E-02	U	2.50E-03	U	6.20E-02	U	2.60E-03	UJG
DDMU		1022-22-6	ug/L	na		2.60E-03	U	na		4.80E-03	UJK	na		2.60E-03	U	na		2.50E-03	U	na		2.60E-03	UJG
Dieldrin		60-57-1	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	6.80E-03	UJK	2.50E-03	UJG	2.60E-03	UJG
Endosulfan I		959-98-8	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.60E-03		2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Endosulfan II		33213-65-9	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Endosulfan sulfate		1031-07-8	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Endrin		72-20-8	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Endrin aldehyde		7421-93-4	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Endrin ketone		53494-70-5	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Heptachlor		76-44-8	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Heptachlor epoxide		1024-57-3	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Hexachlorobenzene		118-74-1	ug/L	2.50E-03	UJG	2.60E-03	U	3.10E-03	JK	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Methoxychlor		72-43-5	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Mirex		2385-85-5	ug/L	na		2.60E-03	U	na		2.80E-03	U	na		2.60E-03	U	na		2.50E-03	U	na		2.60E-03	UJG
cis-Nonachlor		5103-73-1	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
trans-Nonachlor		39765-80-5	ug/L	2.50E-03	UJG	2.60E-03	U	2.40E-03	U	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Oxychlordane		27304-13-8	ug/L	2.50E-03	UJG	2.60E-03	U	2.50E-03	UJK	2.80E-03	U	2.50E-03	U	2.60E-03	U	2.50E-03	UJG	2.50E-03	U	2.50E-03	UJG	2.60E-03	UJG
Pentachloroanisole		1825-21-4	ug/L	na		2.60E-03	U	na		2.80E-03	U	na		4.30E-03		na		2.50E-03	U	na		2.50E-03	JGT
Toxaphene		8001-35-2	ug/L	2.50E-02	UJG	1.00E-01	UJK	2.40E-02	U	1.50E-01	UJK	2.50E-02	U	1.10E-01	UJK	2.50E-02	UJG	1.60E-01	JK	2.50E-02	UJG	1.00E-01	UJG
Number of Detects =				0		0		1		0		1		1		0		1		0		2	
Sum of Detects =			ug/L	6.20E-02	U	1.00E-01	U	3.10E-03	J	1.50E-01	U	2.60E-03		4.30E-03		6.20E-02	U	1.60E-01	J	6.20E-02	U	1.45E-02	J

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Pentachlorophenol		87-86-5	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
Phenol		108-95-2	ug/L	1.00E+00	JT	1.10E+00		9.40E-01		2.80E+00	JG	6.80E-01	UFB	6.90E-01		6.30E-01	UFB	1.50E+00		6.20E-01	UFB	6.00E-01	UFB
Retene		483-65-8	ug/L	6.70E-03	U	6.60E-03	UJG	5.90E-03	U	6.00E-03	UJK	6.50E-03	U	6.10E-03	U	6.30E-03	U	1.60E-03	JT	6.20E-03	U	6.20E-03	U
Triclosan		3380-34-5	ug/L	5.50E-01	JG	9.30E-01		4.60E-01	JG	8.60E-01		4.70E-01	JG	1.00E+00		1.80E-01		3.60E-01		8.40E-01	UJG	3.00E-01	
Triethyl citrate		77-93-0	ug/L	1.10E+00		1.00E+00		6.00E-01		8.20E-01		1.10E+00		1.20E+00		3.70E-01	JT	1.90E-01	JT	1.30E-01	JK	4.60E-01	JT
Number of Detects =				12		15		14		12		10		14		11		11		9		10	
Sum of Detects =			ug/L	4.67E+01		6.46E+01	J	6.35E+00	J	2.81E+01	J	3.32E+00	J	2.24E+01	J	1.80E+00	J	1.73E+01	J	1.13E+00	J	1.05E+01	J
Pesticides																							
2,4'-DDD		53-19-0	ug/L	na		2.50E-03	UJG	na		2.70E-03	UJG	na		3.40E-03	UJK	na		2.50E-03	U	na		4.50E-03	UJK
2,4'-DDE		3424-82-6	ug/L	na		2.50E-03	UJG	na		2.70E-03	UJG	na		2.50E-03	U	na		2.50E-03	U	na		2.50E-03	U
2,4'-DDT		789-02-6	ug/L	na		2.50E-03	UJG	na		2.70E-03	UJG	na		2.50E-03	U	na		2.50E-03	U	na		2.50E-03	U
4,4'-DDD		72-54-8	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
4,4'-DDE		72-55-9	ug/L	2.50E-03	U	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
4,4'-DDT		50-29-3	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Aldrin		309-00-2	ug/L	2.50E-03	U	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
alpha-BHC		319-84-6	ug/L	3.50E-03	JG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
beta-BHC		319-85-7	ug/L	2.50E-03	UJG	4.20E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	3.60E-03	UJK	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
delta-BHC		319-86-8	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.60E-03	UJK	2.50E-03	U	2.50E-03	U
gamma-BHC	Lindane	58-89-9	ug/L	4.90E-03	UJK	1.00E-02	UJK	2.90E-03	UJK	4.70E-03	UJK	4.80E-03	UJK	2.50E-03	U	4.30E-03	UJL	2.70E-03	UJL	4.50E-03	UJL	2.70E-03	UJL
cis-Chlordane		5103-71-9	ug/L	2.50E-03	U	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
trans-Chlordane		5103-74-2	ug/L	5.10E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	4.00E-03	UJK	2.50E-03	U	2.50E-03	U	2.50E-03	U
Chlordane, technical		12789-03-6	ug/L	na		5.10E-02	UJG	na		5.30E-02	UJG	na		2.50E-02	U	na		2.50E-02	U	na		2.50E-02	U
Chlorpyriphos		2921-88-2	ug/L	2.50E-03	UJG	7.20E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	3.30E-03	UJK	2.50E-03	U	3.50E-03	UJK	2.50E-03	U	2.50E-03	U
Dacthal	DCPA	1861-32-1	ug/L	6.30E-02	U	2.50E-03	UJG	6.20E-02	U	2.70E-03	UJG	6.40E-02	U	2.50E-03	U	6.30E-02	U	2.50E-03	U	6.20E-02	U	2.50E-03	U
DDMU		1022-22-6	ug/L	na		8.20E-03	UJG	na		2.70E-03	UJG	na		2.50E-03	U	na		2.50E-03	U	na		2.50E-03	U
Dieldrin		60-57-1	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	5.30E-03	UJK	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Endosulfan I		959-98-8	ug/L	7.70E-03	JG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	1.20E-02		2.50E-03	U	5.30E-03		2.50E-03	U
Endosulfan II		33213-65-9	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Endosulfan sulfate		1031-07-8	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Endrin		72-20-8	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Endrin aldehyde		7421-93-4	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Endrin ketone		53494-70-5	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Heptachlor		76-44-8	ug/L	2.50E-03	U	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Heptachlor epoxide		1024-57-3	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Hexachlorobenzene		118-74-1	ug/L	2.50E-03	U	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	3.70E-03	JK	2.50E-03	U	2.50E-03	U
Methoxychlor		72-43-5	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Mirex		2385-85-5	ug/L	na		2.50E-03	UJG	na		2.70E-03	UJG	na		2.50E-03	U	na		2.50E-03	U	na		2.50E-03	U
cis-Nonachlor		5103-73-1	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
trans-Nonachlor		39765-80-5	ug/L	2.50E-03	U	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Oxychlordane		27304-13-8	ug/L	2.50E-03	UJG	2.50E-03	UJG	2.50E-03	UJG	2.70E-03	UJG	2.50E-03	UJG	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U	2.50E-03	U
Pentachloroanisole		1825-21-4	ug/L	na		2.50E-03	UJG	na		2.70E-03	UJG	na		2.50E-03	U	na		2.50E-03	U	na		3.00E-03	
Toxaphene		8001-35-2	ug/L	2.50E-02	UJG	1.00E-01	JG	2.50E-02	UJG	1.50E-01	UJG	2.50E-02	UJG	5.10E-02	UJK	2.50E-02	U	5.10E-02	UJK	2.50E-02	U	1.00E-01	UJK
Number of Detects =				2		1		0		0		0		0		1		1		1		1	
Sum of Detects =			ug/L	1.12E-02	J	1.00E-01	J	6.20E-02	U	1.50E-01	U	6.40E-02	U	5.10E-02	U	1.20E-02		3.70E-03	J	5.30E-03		3.00E-03	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Herbicides																							
2,4,5-T		93-76-5	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
2,4,5-TP	Silvex	93-72-1	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
2,4-D		94-75-7	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	1.80E-01		6.10E-02	U	6.70E-02	NJK	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
2,4-DB	2,4-D butyric acid	94-82-6	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U		REJ	6.10E-02	U	6.20E-02	U	6.30E-02	U
3,5-Dichlorobenzoic acid		51-36-5	ug/L	6.20E-02	U	6.40E-02	UJK	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	UJK	6.20E-02	U	6.30E-02	UJK
Acifluorfen	Blazer	62476-59-9	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U		REJ	6.10E-02	U	6.20E-02	U	6.30E-02	U
Bentazon		25057-89-0	ug/L	6.10E-03	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Bromoxynil		1689-84-5	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Clopyralid		1702-17-6	ug/L	6.20E-02	UJG	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	UJG	6.10E-02	U	6.20E-02	UJG	6.30E-02	U
Dicamba I		1918-00-9	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	2.90E-02	NJTK	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Dichlorprop		120-36-5	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Diclofop-Methyl		51338-27-3	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Dinoseb		88-85-7	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U		REJ	6.10E-02	U	6.20E-02	U	6.30E-02	U
Ioxynil		1689-83-4	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
MCPA		94-74-6	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
MCPP	Mecoprop	93-65-2	ug/L	6.20E-02	U	5.90E-02	NJTK	6.30E-02	U	7.10E-02	NJK	6.10E-02	U	6.40E-02	U	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Picloram		1918-02-01	ug/L	6.20E-02	UJG	6.40E-02	UJG	6.30E-02	UJG	6.40E-02	U	6.10E-02	UJG	6.40E-02	U		REJ	6.10E-02	UJG	6.20E-02	UJG	6.30E-02	UJG
Triclopyr		55335-06-3	ug/L	6.20E-02	U	6.40E-02	U	6.30E-02	U	6.40E-02	U	6.10E-02	U	6.30E-02	NJTK	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Number of Detects =				0		1		0		3		0		2		0		0		0		0	
Sum of Detects =			ug/L	6.20E-02	U	5.90E-02	NJ	6.30E-02	U	2.80E-01	NJ	6.10E-02	U	1.30E-01	NJ	6.20E-02	U	6.10E-02	U	6.20E-02	U	6.30E-02	U
Polybrominated Diphenyl Ethers (Congeners)																							
2,4-DiBDE	BDE-007		pg/L	5.00E+00	U	5.00E+00	UJK	6.80E+00	JT	1.13E+01	JT	9.70E+00	JT	5.00E+00	UJK	5.00E+00	U	5.00E+00	UJK	1.45E+01	JT	2.30E+01	JT
2,6-DiBDE	BDE-010		pg/L	5.00E+00	U	5.00E+00	UJK	5.00E+00	U	2.50E+01	UJK	5.00E+00	U	5.00E+00	UJK	5.00E+00	U	5.00E+00	UJK	5.00E+00	U	5.00E+00	UJK
4,4'-DiBDE	BDE-015	2050-47-7	pg/L	6.70E+00	JT	9.40E+00	JT	8.20E+00	JT	2.50E+01	UJK	4.33E+01		5.64E+01		1.62E+01	JT	1.26E+01	JT	1.30E+02		4.53E+02	
2,2',4-TrBDE	BDE-017	147217-75-2	pg/L	3.63E+01		2.66E+01		4.70E+01		2.50E+01	UJK	1.59E+02		4.96E+02		7.76E+01		7.87E+01		3.13E+02		4.59E+02	
2,4,4'-TrBDE	BDE-028	41318-75-6	pg/L	9.58E+01		7.51E+01		9.67E+01		5.13E+01	JT	4.18E+02		1.19E+03		2.29E+02		2.14E+02		5.86E+02		1.06E+03	
2,4,6-TrBDE	BDE-030		pg/L	1.24E+01	JT	5.00E+00	UJK	1.08E+01	NJK	2.50E+01	UJK	5.00E+00	U	5.00E+00	UJK	3.12E+01	NJK	5.00E+00	UJK	2.84E+01	NJK	1.26E+01	JT
2,2',4,4'-TeBDE	BDE-047	5436-43-1	pg/L	5.26E+03		3.91E+03		5.35E+03		5.38E+03		2.97E+03		7.11E+03		1.41E+04		1.53E+04		3.19E+04		4.10E+04	
2,2',4,5'-TeBDE	BDE-049	243982-82-3	pg/L	co-elute		1.79E+01	JT	co-elute		5.00E+01	UJK	co-elute		1.00E+01	UJK	co-elute		3.52E+02		co-elute		1.26E+03	
2,2',4,5'/2,3',4',6-TeBDE	BDE-049/071		pg/L	1.93E+02		co-elute		1.88E+02		co-elute		3.95E+02		co-elute		5.15E+02		co-elute		1.38E+03		co-elute	
2,3',4,4'-TeBDE	BDE-066	189084-61-5	pg/L	1.00E+01	U	1.55E+02		1.00E+01	U	4.77E+02		2.00E+02		5.00E+01	NJK	5.45E+02		1.00E+01	UJK	9.87E+02		2.53E+03	
2,3',4',6-TeBDE	BDE-071	189084-62-6	pg/L	co-elute		1.00E+01	UJK	co-elute		7.97E+01	JT	co-elute		5.37E+02		co-elute		5.14E+01		co-elute		1.55E+02	
3,3',4,4'-TeBDE	BDE-077	93703-48-1	pg/L	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK
2,2',3,4,4'-PeBDE	BDE-085	182346-21-0	pg/L	1.47E+02		1.13E+02		1.88E+02		3.80E+02		1.00E+01	U	2.02E+02		3.74E+02		2.68E+02		1.23E+03		1.31E+03	
2,2',4,4',5-PeBDE	BDE-099	60348-60-9	pg/L	4.54E+03		2.99E+03		5.05E+03		4.58E+03		2.25E+03		6.30E+03		1.37E+04		1.48E+04		3.24E+04		3.77E+04	
2,2',4,4',6-PeBDE	BDE-100	189084-64-8	pg/L	9.52E+02		6.09E+02		1.09E+03		1.07E+03		5.52E+02		1.41E+03		2.88E+03		2.78E+03		6.65E+03		6.91E+03	
2,3',4,4',6-PeBDE	BDE-119	189084-66-0	pg/L	7.27E+01		1.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	5.83E+01		7.89E+01		1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK
3,3',4,4',5-PeBDE	BDE-126	366791-32-4	pg/L	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK
2,2',3,4,4',5'-HxBDE	BDE-138	182677-30-1	pg/L	1.00E+01	U	4.56E+01	JT	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.74E+02		2.91E+02		5.18E+02	
2,2',3,4,4',6-HxBDE	BDE-139		pg/L	1.00E+01	U	2.99E+01	JG	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	7.96E+01		2.27E+02	JG	2.93E+02		3.86E+02	
2,2',3,4,4',6'-HxBDE	BDE-140	243982-83-4	pg/L	1.00E+01	U	2.37E+01	JT	1.00E+01	U	4.42E+01	JT	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	8.65E+01		9.08E+01		1.74E+02	
2,2',4,4',5,5'-HxBDE	BDE-153	68631-49-2	pg/L	3.62E+02		2.97E+02		4.45E+02		8.26E+02		2.08E+02		5.13E+02		1.32E+03		1.23E+03		3.27E+03		4.79E+03	
2,2',4,4',5,6'-HxBDE	BDE-154	207122-15-4	pg/L	2.92E+02		1.55E+02		4.02E+02		3.77E+02		1.44E+02		4.06E+02		9.48E+02		8.23E+02		2.32E+03		2.31E+03	
2,3,3',4,4',5/3,3',4,4',5,5'-HxBDE	BDE-156/169		pg/L	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	7.46E+01	JT
2,2',3,3',4,4',6-HpBDE	BDE-171		pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	5.54E+01	JT
2,2',3,4,4',5,5'-HpBDE	BDE-180		pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	9.26E+01	JT
2,2',3,4,4',5',6-HpBDE	BDE-183	207122-16-5	pg/L	4.41E+01	JT	1.20E+01	NJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	1.37E+02		1.31E+02		4.91E+02		5.98E+02	
2,2',3,4,4',6,6'-HpBDE	BDE-184		pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	6.22E+01	JT
2,3,3',4,4',5',6-HpBDE	BDE-191		pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.81E+01	JT

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Herbicides																							
2,4,5-T		93-76-5	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	UJG	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
2,4,5-TP	Silvex	93-72-1	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
2,4-D		94-75-7	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	1.30E-01	JG	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
2,4-DB	2,4-D butyric acid	94-82-6	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
3,5-Dichlorobenzoic acid		51-36-5	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	UJK	6.30E-02	U	6.20E-02	UJK	6.20E-02	U	6.40E-02	UJK
Acifluorfen	Blazer	62476-59-9	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
Bentazon		25057-89-0	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	UJG	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
Bromoxynil		1689-84-5	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
Clopyralid		1702-17-6	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	UJG	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	UJG	6.40E-02	U
Dicamba I		1918-00-9	ug/L	6.30E-02	U	6.40E-02	U	3.10E-02	NJT	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	2.90E-02	JT
Dichlorprop		120-36-5	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
Diclofop-Methyl		51338-27-3	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
Dinoseb		88-85-7	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	UJG	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
Ioxynil		1689-83-4	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	6.20E-02	U	6.40E-02	U
MCPA		94-74-6	ug/L	6.30E-02	U	6.40E-02	U	1.60E-01	NJT	6.60E-02	U	6.40E-02	U	6.30E-02	U	6.30E-02	U	6.20E-02	U	1.10E-01	NJT	7.80E-02	NJK
MCPP	Mecoprop	93-65-2	ug/L	6.30E-02	U	6.40E-02	U	6.20E-02	U	6.60E-02	U	2.30E-01		2.50E-01		6.30E-02	U	6.20E-02	U	6.20E-02	U	3.10E-02	JT
Picloram		1918-02-01	ug/L	6.30E-02	UJG	6.40E-02	U	6.20E-02	UJG		REJ	6.40E-02	U	6.30E-02	UJG	6.30E-02	UJG	6.20E-02	UJG	6.20E-02	UJG	6.40E-02	UJG
Triclopyr		55335-06-3	ug/L	6.30E-02	U	6.40E-02	U	5.10E-02	NJT	6.60E-02	U	6.40E-02	U	6.30E-02	U	5.40E-02	NJT	1.10E-01		6.20E-02	U	3.00E-02	JT
Number of Detects =				0		0		3		1		1		1		1		1		1		4	
Sum of Detects =			ug/L	6.30E-02	U	6.40E-02	U	2.42E-01	NJ	1.30E-01	J	2.30E-01		2.50E-01		5.40E-02	NJ	1.10E-01		1.10E-01	NJ	1.68E-01	J
Polybrominated Diphenyl Ethers (Congeners)																							
2,4-DiBDE	BDE-007		pg/L	5.00E+00	U	4.88E+01	JT	5.00E+00	U	2.50E+01	UJK	1.11E+01	JT	2.13E+01	JT	5.00E+00	U	5.00E+00	UJK	5.00E+00	U	1.84E+01	JT
2,6-DiBDE	BDE-010		pg/L	5.00E+00	U	2.50E+01	UJK	5.00E+00	U	2.50E+01	UJK	5.00E+00	U	5.00E+00	UJK	5.00E+00	U	5.00E+00	UJK	5.00E+00	U	5.00E+00	UJK
4,4'-DiBDE	BDE-015	2050-47-7	pg/L	6.30E+00	NJK	1.08E+01	JT	1.18E+01	JT	9.00E+00	JT	6.46E+01		8.20E+01		5.00E+00	U	5.00E+00	UJK	3.26E+01		1.65E+01	JT
2,2',4-TrBDE	BDE-017	147217-75-2	pg/L	3.65E+01		1.09E+02		4.70E+01		3.70E+01	JT	2.91E+02		3.71E+02		7.64E+01		9.18E+01		1.54E+02		2.71E+02	
2,4,4'-TrBDE	BDE-028	41318-75-6	pg/L	9.01E+01		1.43E+02		1.12E+02		8.94E+01		8.04E+02		7.55E+02		1.75E+02		1.26E+02		2.85E+02		2.22E+02	
2,4,6-TrBDE	BDE-030		pg/L	5.00E+00	U	2.50E+01	UJK	7.30E+00	NJK	2.50E+01	UJK	5.00E+00	U	5.00E+00	UJK	2.30E+01	NJK	5.00E+00	UJK	5.00E+00	U	5.00E+00	UJK
2,2',4,4'-TeBDE	BDE-047	5436-43-1	pg/L	4.80E+03		9.38E+03		6.03E+03		6.90E+03		7.62E+03		6.44E+03		1.45E+04		6.31E+03		3.34E+03		6.63E+03	
2,2',4,5'-TeBDE	BDE-049	243982-82-3	pg/L	co-elute		2.07E+02		co-elute		1.75E+02		co-elute		5.55E+02		co-elute		2.27E+02		co-elute		2.38E+02	
2,2',4,5'/2,3',4',6-TeBDE	BDE-049/071		pg/L	1.60E+02		co-elute		2.34E+02		co-elute		8.06E+02		co-elute		5.72E+02		co-elute		2.97E+02		co-elute	
2,3',4,4'-TeBDE	BDE-066	189084-61-5	pg/L	1.00E+01	U	3.52E+02		1.36E+02		1.08E+02	JT	3.81E+02		1.00E+01	UJK	1.00E+01	U	1.68E+02		1.49E+02		5.15E+02	
2,3',4',6-TeBDE	BDE-071	189084-62-6	pg/L	co-elute		4.06E+01	JT	co-elute		2.40E+01	JT	co-elute		2.07E+02		co-elute		3.57E+01	JT	co-elute		3.98E+01	JT
3,3',4,4'-TeBDE	BDE-077	93703-48-1	pg/L	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK
2,2',3,4,4'-PeBDE	BDE-085	182346-21-0	pg/L	1.80E+02		7.16E+02		2.14E+02		3.04E+02		2.64E+02		2.48E+02		6.82E+02		2.18E+02		1.00E+01	U	8.96E+02	
2,2',4,4',5-PeBDE	BDE-099	60348-60-9	pg/L	3.96E+03		8.55E+03		5.72E+03		6.30E+03		6.76E+03		4.79E+03		1.85E+04		6.62E+03		2.20E+03		1.50E+04	
2,2',4,4',6-PeBDE	BDE-100	189084-64-8	pg/L	8.58E+02		1.61E+03		1.16E+03		1.22E+03		1.49E+03		1.02E+03		3.95E+03		1.34E+03		5.32E+02		2.42E+03	
2,3',4,4',6-PeBDE	BDE-119	189084-66-0	pg/L	1.85E+01		5.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.09E+02		1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK
3,3',4,4',5-PeBDE	BDE-126	366791-32-4	pg/L	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK
2,2',3,4,4',5'-HxBDE	BDE-138	182677-30-1	pg/L	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	4.39E+01	JT	1.00E+01	U	1.94E+02	
2,2',3,4,4',6-HxBDE	BDE-139		pg/L	1.00E+01	U	5.00E+01	UJK	3.26E+01	JT	5.70E+01	JG	5.53E+01		1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	3.44E+02	JG
2,2',3,4,4',6'-HxBDE	BDE-140	243982-83-4	pg/L	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	3.00E+01	NJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	9.64E+01	
2,2',4,4',5,5'-HxBDE	BDE-153	68631-49-2	pg/L	3.43E+02		1.54E+03		4.82E+02		5.22E+02		5.64E+02		2.77E+02		1.73E+03		8.00E+02		1.78E+02		2.30E+03	
2,2',4,4',5,6'-HxBDE	BDE-154	207122-15-4	pg/L	2.44E+02		5.52E+02		3.62E+02		3.78E+02		4.68E+02		3.19E+02		1.37E+03		4.90E+02		1.48E+02		1.12E+03	
2,3,3',4,4',5/3,3',4,4',5,5'-HxBDE	BDE-156/169		pg/L	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	5.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK	1.00E+01	U	1.00E+01	UJK
2,2',3,3',4,4',6-HpBDE	BDE-171		pg/L	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK
2,2',3,4,4',5,5'-HpBDE	BDE-180		pg/L	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK
2,2',3,4,4',5',6-HpBDE	BDE-183	207122-16-5	pg/L	2.00E+01	U	1.00E+02	UJK	4.67E+01	JT	1.00E+02	UJK	7.10E+01	JT	2.00E+01	UJK	1.39E+02		7.05E+01	JT	2.00E+01	U	1.02E+02	
2,2',3,4,4',6,6'-HpBDE	BDE-184		pg/L	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.06E+01	JT	2.00E+01	U	2.00E+01	UJK
2,3,3',4,4',5',6-HpBDE	BDE-191		pg/L	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
2,2',3,3',4,4',5,6'-OcBDE	BDE-196		pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	7.17E+01	JT	5.14E+01	JT	3.81E+02		5.86E+02	
2,2',3,3',4,4',6,6'/ 2,2',3,4,4',5,6,6'-OcBDE	BDE-197/204		pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	8.32E+01	JT	8.27E+01	JT	3.12E+02		3.87E+02	
2,2',3,3',4,5',6,6'-OcBDE	BDE-201		pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	3.19E+01	JT	2.00E+01	UJK	1.98E+02		4.34E+02	
2,2',3,4,4',5,5',6-OcBDE	BDE-203	337513-72-1	pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	4.33E+01	JT	3.30E+01	NJK	3.40E+02		6.48E+02	
2,3,3',4,4',5,5',6-OcBDE	BDE-205	446255-56-7	pg/L	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	63387-28-0	pg/L	1.57E+02	JT	5.00E+01	UJK	3.00E+02		2.50E+02	UJK	1.56E+02	JT	5.00E+01	UJK	6.45E+02		6.84E+02		2.59E+03		2.31E+03	
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	437701-79-6	pg/L	1.25E+02	JT	1.38E+02	JT	1.91E+02	JT	2.50E+02	UJK	2.30E+02	JT	5.00E+01	UJK	5.54E+02		3.44E+02		2.23E+03		2.91E+03	
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208		pg/L	9.96E+01	JT	5.00E+01	UJK	1.15E+02	JT	2.50E+02	UJK	1.21E+02	JT	5.00E+01	UJK	3.11E+02		4.77E+02		1.49E+03		3.50E+03	
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	1163-19-5	pg/L	2.00E+03		1.39E+03	UFB	3.34E+03		7.50E+02	UJK	3.06E+03		4.46E+03		6.83E+03		8.87E+03		3.55E+04		2.20E+04	
Number of Detects =				17		16		16		11		16		13		22		22		25		31	
Sum of Detects =			pg/L	1.44E+04		8.61E+03		1.68E+04		1.33E+04		1.10E+04		2.28E+04		4.35E+04		4.71E+04		1.25E+05		1.35E+05	
Polybrominated Diphenyl Ethers (Homologs)																							
Decabromodiphenyl ether			pg/L	2.00E+03		1.39E+03	U	3.34E+03		7.50E+02	UJ	3.06E+03		4.46E+03		6.83E+03		8.87E+03		3.55E+04		2.20E+04	
Dibromodiphenyl ethers			pg/L	6.70E+00	J	9.40E+00	J	1.50E+01	J	1.13E+01	J	5.30E+01	J	5.64E+01		1.62E+01	J	1.26E+01	J	1.45E+02		4.76E+02	
Heptabromodiphenyl ethers			pg/L	4.41E+01	J	1.20E+01	NJ	2.00E+01	U	1.00E+02	UJ	2.00E+01	U	2.00E+01	UJ	1.37E+02		1.31E+02		4.91E+02		8.36E+02	J
Hexabromodiphenyl ethers			pg/L	6.54E+02		5.51E+02	J	8.47E+02		1.25E+03		3.52E+02		9.19E+02		2.35E+03		2.54E+03		6.26E+03		8.18E+03	
Nonabromodiphenyl ethers			pg/L	3.82E+02	J	1.38E+02	J	6.06E+02	J	2.50E+02	UJ	5.07E+02	J	5.00E+01	UJ	1.51E+03		1.51E+03		6.31E+03		8.72E+03	
Octabromodiphenyl ethers			pg/L	2.00E+01	U	2.00E+01	UJ	2.00E+01	U	1.00E+02	UJ	2.00E+01	U	2.00E+01	UJ	2.30E+02	J	1.67E+02	J	1.23E+03		2.06E+03	
Pentabromodiphenyl ethers			pg/L	5.71E+03		3.71E+03		6.33E+03		6.03E+03		2.86E+03		7.99E+03		1.70E+04		1.78E+04		4.03E+04		4.59E+04	
Tetrabromodiphenyl ethers			pg/L	5.45E+03		4.08E+03		5.54E+03		5.94E+03		3.57E+03		7.70E+03		1.52E+04		1.57E+04		3.43E+04		4.49E+04	
Tribromodiphenyl ethers			pg/L	1.45E+02		1.02E+02		1.55E+02		5.13E+01	J	5.77E+02		1.69E+03		3.38E+02		2.93E+02		9.27E+02		1.53E+03	
Number of Detects =				8		7		7		5		7		6		9		9		9		9	
Perfluorinated Compounds																							
Perfluorobutane sulfonate	PFBS	45187-15-3	ng/L	2.00E+00	U	1.98E+00	U	1.94E+00	U	1.77E+01		1.98E+00	U	1.97E+00	U	1.96E+00	U	1.98E+00	U	2.08E+00	U	2.00E+00	U
Perfluorobutanoate	PFBA	375-22-4	ng/L	1.86E+00		1.46E+00	U	1.40E+00		1.83E+00		9.91E-01	U	1.27E+00	U	1.38E+00		1.53E+00	U	1.04E+00	U	3.24E+00	
Perfluorodecanoate	PFDA	335-76-2	ng/L	1.37E+00		2.82E+00		1.74E+00		2.77E+00		4.27E+00		3.57E+00		2.62E+00		1.54E+00		1.91E+00		2.55E+00	
Perfluorododecanoate	PFDoA	307-55-1	ng/L	1.00E+00	U	9.91E-01	U	9.68E-01	U	1.00E+00	U	9.91E-01	U	9.84E-01	U	9.82E-01	U	9.88E-01	U	1.04E+00	U	1.00E+00	U
Perfluoroheptanoate	PFHpA	375-85-9	ng/L	3.53E+00		5.10E+00		2.08E+00		3.44E+00		4.06E+00		4.73E+00		5.64E+00		9.69E+00		1.03E+01		7.83E+00	
Perfluorohexane sulfonate	PFHxS	108427-53-8	ng/L	3.31E+00		2.41E+00		1.94E+00	U	7.79E+00		3.17E+00		2.34E+00		4.42E+00		7.01E+00		2.57E+00		3.36E+00	
Perfluorohexanoate	PFHxA	307-24-4	ng/L	1.54E+01		1.72E+01		1.08E+01		1.43E+01		2.49E+01		9.62E+00		1.09E+01		2.28E+01		1.19E+01		1.61E+01	
Perfluorononanoate	PFNA	375-95-1	ng/L	3.52E+00		2.20E+01		2.36E+00		1.08E+01		1.31E+01		4.11E+00		4.47E+00		7.02E+00		1.34E+02		2.87E+01	
Perfluorooctane sulfonamide	PFOSA	754-91-6	ng/L	1.00E+00	U	2.48E+00	U	9.68E-01	U	2.51E+00	U	1.95E+00		2.46E+00	U	9.82E-01	U	2.47E+00	U	1.04E+00	U	2.50E+00	U
Perfluorooctane sulfonate	PFOS	45298-90-6	ng/L	6.02E+00		1.98E+00	U	4.50E+00		5.50E+01		5.89E+00		3.51E+00		9.71E+00		4.23E+00		7.57E+00		1.00E+01	
Perfluorooctanoate	PFOA	335-67-1	ng/L	1.16E+01		1.74E+01		1.13E+01		1.11E+01		3.05E+01		1.65E+01		2.70E+01		3.02E+01		2.43E+01		1.68E+01	
Perfluoropentanoate	PFPeA	2706-90-3	ng/L	1.90E+00		2.05E+00		1.16E+00		1.00E+00	U	5.80E+00		1.94E+00		3.77E+00		6.79E+00		1.50E+00	U	3.18E+00	
Perfluoroundecanoate	PFUnA	2058-94-8	ng/L	1.00E+00	U	9.91E-01	U	9.68E-01	U	1.00E+00	U	9.91E-01	U	9.84E-01	U	9.82E-01	U	9.88E-01	U	1.18E+00		1.00E+00	U
Number of Detects =				9		7		8		9		9		8		9		8		8		9	
Sum of Detects =			ng/L	4.85E+01		6.90E+01		3.53E+01		1.25E+02		9.36E+01		4.63E+01		6.99E+01		8.93E+01		1.94E+02		9.18E+01	
Polychlorinated Biphenyls (Congeners)																							
2-MoCB	PCB-001	2051-60-7	pg/L	na		na		1.00E+01	U	na		na		na		4.14E+01		na		5.08E+01		na	
3-MoCB	PCB-002	2051-61-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
4-MoCB	PCB-003	2051-62-9	pg/L	na		na		1.00E+01	U	na		na		na		2.91E+01		na		1.00E+01	U	na	
2,2'-DiCB	PCB-004	13029-08-8	pg/L	na		na		1.00E+01	U	na		na		na		8.48E+01		na		1.04E+03		na	
2,3/2,4'-DiCB	PCB-005/008		pg/L	na		na		1.21E+01	UJL	na		na		na		1.30E+02		na		7.70E+01	UJL	na	
2,3'-DiCB	PCB-006	25569-80-6	pg/L	na		na		1.00E+01	U	na		na		na		2.23E+01		na		3.06E+01		na	
2,4-DiCB	PCB-007	33284-50-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.39E+01		na	
2,5-DiCB	PCB-009	34883-39-1	pg/L	na		na		1.00E+01	U	na		na		na		1.11E+01		na		1.00E+01	U	na	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
2,2',3,3',4,4',5,6'-OcBDE	BDE-196		pg/L	2.00E+01	U	1.00E+02	UJK	2.36E+01	JT	1.00E+02	UJK	4.44E+01	JT	2.00E+01	UJK	2.00E+01	U	9.78E+01	JT	2.00E+01	U	2.00E+01	UJK
2,2',3,3',4,4',6,6'/ 2,2',3,4,4',5,6,6'-OcBDE	BDE-197/204		pg/L	2.00E+01	U	1.00E+02	UJK	3.23E+01	JT	1.00E+02	UJK	7.15E+01	JT	2.00E+01	UJK	6.84E+01	JT	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK
2,2',3,3',4,5',6,6'-OcBDE	BDE-201		pg/L	2.00E+01	U	1.00E+02	UJK	2.54E+01	JT	1.00E+02	UJK	5.63E+01	JT	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK
2,2',3,4,4',5,5',6-OcBDE	BDE-203	337513-72-1	pg/L	2.00E+01	U	1.00E+02	UJK	3.11E+01	JT	1.00E+02	UJK	1.23E+02		2.00E+01	UJK	2.00E+01	U	1.38E+02		2.00E+01	U	2.00E+01	UJK
2,3,3',4,4',5,5',6-OcBDE	BDE-205	446255-56-7	pg/L	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	1.00E+02	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK	2.00E+01	U	2.00E+01	UJK
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	63387-28-0	pg/L	3.34E+02		1.13E+03		2.46E+02	JT	2.50E+02	UJK	2.84E+02		5.00E+01	UJK	8.84E+02		6.10E+02		5.00E+01	U	5.00E+01	UJK
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	437701-79-6	pg/L	3.02E+02		1.39E+03		2.75E+02		2.50E+02	UJK	3.77E+02		5.00E+01	UJK	7.14E+02		6.78E+02		5.00E+01	U	5.00E+01	UJK
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208		pg/L	2.40E+02	JT	1.22E+03		1.25E+02	JT	2.50E+02	UJK	2.53E+02		5.00E+01	UJK	4.09E+02		7.83E+02		5.00E+01	U	5.00E+01	UJK
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	1163-19-5	pg/L	1.07E+04		1.88E+04		2.54E+03		2.15E+03		2.87E+03		2.50E+02	U	1.06E+04		5.61E+03		1.78E+03		2.50E+02	UJK
Number of Detects =				15		17		22		14		23		13		16		20		11		17	
Sum of Detects =			pg/L	2.23E+04		4.58E+04		1.79E+04		1.83E+04		2.38E+04		1.51E+04		5.44E+04		2.45E+04	J	9.10E+03		3.04E+04	
Polybrominated Diphenyl Ethers (Homologs)																							
Decabromodiphenyl ether			pg/L	1.07E+04		1.88E+04		2.54E+03		2.15E+03		2.87E+03		2.50E+02	U	1.06E+04		5.61E+03		1.78E+03		2.50E+02	UJ
Dibromodiphenyl ethers			pg/L	6.30E+00	NJ	5.96E+01	J	1.18E+01	J	9.00E+00	J	7.57E+01	J	1.03E+02	J	5.00E+00	U	5.00E+00	U	3.26E+01		3.49E+01	J
Heptabromodiphenyl ethers			pg/L	2.00E+01	U	1.00E+02	UJ	4.67E+01	J	1.00E+02	UJ	7.10E+01	J	2.00E+01	UJ	1.39E+02		9.11E+01	J	2.00E+01	U	1.02E+02	
Hexabromodiphenyl ethers			pg/L	5.87E+02		2.09E+03		8.77E+02		9.57E+02		1.09E+03		6.26E+02		3.10E+03		1.33E+03		3.26E+02		4.05E+03	
Nonabromodiphenyl ethers			pg/L	8.76E+02	J	3.74E+03		6.46E+02	J	2.50E+02	UJ	9.14E+02		5.00E+01	UJ	2.01E+03		2.07E+03		5.00E+01	U	5.00E+01	UJ
Octabromodiphenyl ethers			pg/L	2.00E+01	U	1.00E+02	UJ	1.12E+02	J	1.00E+02	UJ	2.95E+02	J	2.00E+01	UJ	6.84E+01	J	2.36E+02	J	2.00E+01	U	2.00E+01	UJ
Pentabromodiphenyl ethers			pg/L	5.02E+03		1.09E+04		7.09E+03		7.82E+03		8.62E+03		6.06E+03		2.31E+04		8.18E+03		2.73E+03		1.83E+04	
Tetrabromodiphenyl ethers			pg/L	4.96E+03		9.98E+03		6.40E+03		7.21E+03		8.81E+03		7.20E+03		1.51E+04		6.74E+03		3.79E+03		7.42E+03	
Tribromodiphenyl ethers			pg/L	1.27E+02		2.52E+02		1.66E+02		1.26E+02	J	1.10E+03		1.13E+03		2.74E+02		2.18E+02		4.39E+02		4.93E+02	
Number of Detects =				7		7		9		6		9		5		8		8		6		6	
Perfluorinated Compounds																							
Perfluorobutane sulfonate	PFBS	45187-15-3	ng/L	1.98E+00	U	2.03E+00	U	1.99E+00	U	1.38E+01		1.97E+00	U	1.47E+01		1.98E+00	U	2.04E+00	U	1.96E+00	U	1.97E+00	U
Perfluorobutanoate	PFBA	375-22-4	ng/L	9.91E-01	U	1.38E+00		1.31E+00		2.47E+00		3.60E+00		4.87E+00		9.91E-01	U	2.99E+00		2.95E+00		9.85E-01	U
Perfluorodecanoate	PFDA	335-76-2	ng/L	5.66E+00		7.31E+00		2.82E+00		4.28E+00		5.54E+00		3.66E+00		5.78E+00		6.30E+00		7.85E+00		1.04E+01	
Perfluorododecanoate	PFDoA	307-55-1	ng/L	9.91E-01	U	1.02E+00	U	9.97E-01	U	9.87E-01	U	9.83E-01	U	9.93E-01	U	9.91E-01	U	1.02E+00	U	9.81E-01	U	9.85E-01	U
Perfluoroheptanoate	PFHpA	375-85-9	ng/L	4.65E+00		5.27E+00		2.75E+00		6.00E+00		3.98E+00		6.49E+00		2.80E+00		3.74E+00		4.29E+00		6.96E+00	
Perfluorohexane sulfonate	PFHxS	108427-53-8	ng/L	1.98E+00	U	2.03E+00	U	3.12E+00		2.65E+00		6.87E+00		8.27E+00		1.98E+00	U	2.04E+00	U	1.96E+00	U	1.97E+00	U
Perfluorohexanoate	PFHxA	307-24-4	ng/L	3.41E+01		4.13E+01		1.32E+01		1.61E+01		1.21E+01		1.85E+01		2.55E+01		4.43E+01		5.21E+01		3.09E+01	
Perfluorononanoate	PFNA	375-95-1	ng/L	1.23E+01		2.32E+01		3.73E+00		5.83E+00		2.76E+00		5.76E+00		1.39E+00		3.29E+00		6.27E+00		9.16E+00	
Perfluorooctane sulfonamide	PFOSA	754-91-6	ng/L	9.91E-01	U	2.54E+00	U	9.97E-01	U	2.47E+00	U	9.83E-01	U	2.48E+00	U	9.91E-01	U	2.56E+00	U	1.08E+00		2.46E+00	U
Perfluorooctane sulfonate	PFOS	45298-90-6	ng/L	5.60E+00		2.24E+00		1.95E+01		2.12E+01		6.56E+00		8.78E+00		1.98E+00	U	4.37E+00		2.57E+00		1.07E+01	
Perfluorooctanoate	PFOA	335-67-1	ng/L	4.86E+01		5.25E+01		1.25E+01		2.26E+01		1.09E+01		1.32E+01		3.31E+01		3.89E+01		6.98E+01		4.65E+01	
Perfluoropentanoate	PFPeA	2706-90-3	ng/L	1.59E+01		1.26E+01		1.84E+00		1.38E+00	U	2.02E+00		1.98E+00		8.47E+00		1.65E+01		1.33E+01		1.82E+01	
Perfluoroundecanoate	PFUnA	2058-94-8	ng/L	9.91E-01	U	1.02E+00	U	9.97E-01	U	9.87E-01	U	9.83E-01	U	9.93E-01	U	9.91E-01	U	1.02E+00	U	9.81E-01	U	9.85E-01	U
Number of Detects =				7		8		9		9		9		10		6		8		9		7	
Sum of Detects =			ng/L	1.27E+02		1.46E+02		6.08E+01		9.49E+01		5.43E+01		8.62E+01		7.70E+01		1.20E+02		1.60E+02		1.33E+02	
Polychlorinated Biphenyls (Congeners)																							
2-MoCB	PCB-001	2051-60-7	pg/L	na		na		1.91E+01		na		1.01E+01		na		1.00E+01	U	na		na		na	
3-MoCB	PCB-002	2051-61-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
4-MoCB	PCB-003	2051-62-9	pg/L	na		na		1.35E+01		na		1.30E+01		na		1.00E+01	U	na		na		na	
2,2'-DiCB	PCB-004	13029-08-8	pg/L	na		na		4.69E+01		na		2.90E+01		na		1.00E+01	U	na		na		na	
2,3/2,4'-DiCB	PCB-005/008		pg/L	na		na		6.49E+01	UJL	na		3.75E+01	UJL	na		1.00E+01	U	na		na		na	
2,3'-DiCB	PCB-006	25569-80-6	pg/L	na		na		1.46E+01		na		1.68E+01		na		1.00E+01	U	na		na		na	
2,4-DiCB	PCB-007	33284-50-3	pg/L	na		na		1.23E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,5-DiCB	PCB-009	34883-39-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
2,6-DiCB	PCB-010	33146-45-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
3,3'-DiCB	PCB-011	2050-67-1	pg/L	na		na		4.29E+01	UJL	na		na		na		9.51E+01	UJL	na		2.83E+02	UJL	na	
3,4/3,4'-DiCB	PCB-012/013		pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.42E+01		na	
3,5-DiCB	PCB-014	34883-41-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
4,4'-DiCB	PCB-015	2050-68-2	pg/L	na		na		1.00E+01	UFB	na		na		na		3.62E+01		na		1.29E+02		na	
2,2',3-TrCB	PCB-016	38444-78-9	pg/L	na		na		1.43E+01		na		na		na		4.86E+01		na		8.82E+01		na	
2,2',4-TrCB	PCB-017	37680-66-3	pg/L	na		na		1.00E+01	U	na		na		na		4.75E+01		na		1.66E+02		na	
2,2',5-TrCB	PCB-018	37680-65-2	pg/L	na		na		1.59E+01	UFB	na		na		na		1.36E+02		na		2.65E+02		na	
2,2',6-TrCB	PCB-019	38444-73-4	pg/L	na		na		1.00E+01	U	na		na		na		1.84E+01		na		1.65E+02		na	
2,3,3'/2,3',4'-TriCB	PCB-020/033		pg/L	na		na		1.37E+01		na		na		na		9.46E+01		na		9.66E+01		na	
2,3,4-TrCB	PCB-021	55702-46-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,4'-TrCB	PCB-022	38444-85-8	pg/L	na		na		1.00E+01	U	na		na		na		5.42E+01		na		1.26E+02		na	
2,3,5-TrCB	PCB-023	55720-44-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,6-TrCB	PCB-024	55702-45-9	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3',4-TrCB	PCB-025	55712-37-3	pg/L	na		na		1.00E+01	U	na		na		na		1.07E+01		na		3.21E+01		na	
2,3',5-TrCB	PCB-026	38444-81-4	pg/L	na		na		1.00E+01	U	na		na		na		2.13E+01		na		5.46E+01		na	
2,3',6-TrCB	PCB-027	38444-76-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		3.84E+01		na	
2,4,4'-TrCB	PCB-028	7012-37-5	pg/L	na		na		1.46E+01		na		na		na		1.16E+02		na		2.84E+02		na	
2,4,5-TrCB	PCB-029	15862-07-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,4,6-TrCB	PCB-030	35693-92-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,4',5-TrCB	PCB-031	16606-02-3	pg/L	na		na		1.63E+01		na		na		na		1.23E+02		na		2.89E+02		na	
2,4',6-TrCB	PCB-032	38444-77-8	pg/L	na		na		1.00E+01	U	na		na		na		4.07E+01		na		1.33E+02		na	
2,3',5'-TrCB	PCB-034	37680-68-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
3,3',4-TrCB	PCB-035	37680-69-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.47E+01		na	
3,3',5-TrCB	PCB-036	38444-87-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.16E+01		na	
3,4,4'-TrCB	PCB-037	38444-90-5	pg/L	na		na		1.00E+01	U	na		na		na		3.58E+01		na		1.11E+02		na	
3,4,5-TrCB	PCB-038	53555-66-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
3,4',5-TrCB	PCB-039	38444-88-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3'-TeCB	PCB-040	38444-93-8	pg/L	na		na		1.00E+01	U	na		na		na		2.35E+01		na		4.38E+01		na	
2,3,4',6-TeCB	PCB-041	52663-59-9	pg/L	na		na		1.00E+01	U	na		na		na		1.14E+01		na		2.40E+01		na	
2,2',3,4'-TeCB	PCB-042	36559-22-5	pg/L	na		na		1.00E+01	U	na		na		na		2.91E+01		na		7.51E+01		na	
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049		pg/L	na		na		1.00E+01	U	na		na		na		9.47E+01		na		2.45E+02		na	
2,2',3,5'-TeCB	PCB-044	41464-39-5	pg/L	na		na		1.39E+01	UFB	na		na		na		1.27E+02		na		3.35E+02		na	
2,2',3,6-TeCB	PCB-045	70362-45-7	pg/L	na		na		1.00E+01	U	na		na		na		1.65E+01		na		3.44E+01		na	
2,2',3,6'-TeCB	PCB-046	41464-47-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.96E+01		na	
2,2',4,4'/2,2',4,5-TeCB	PCB-047/048		pg/L	na		na		1.00E+01	U	na		na		na		2.84E+01		na		8.16E+01		na	
2,2',4,6-TeCB	PCB-050	62796-65-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',4,6'-TeCB	PCB-051	68194-04-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		3.93E+01		na	
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069		pg/L	na		na		1.98E+01	UJL	na		na		na		1.50E+02		na		4.69E+02		na	
2,2',5,6'-TeCB	PCB-053	41464-41-9	pg/L	na		na		1.00E+01	U	na		na		na		1.62E+01		na		6.07E+01	N	na	
2,2',6,6'-TeCB	PCB-054	15968-05-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4-TeCB	PCB-055	74338-24-2	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4'-TeCB	PCB-056	41464-43-1	pg/L	na		na		1.00E+01	U	na		na		na		5.03E+01		na		1.15E+02		na	
2,3,3',5-TeCB	PCB-057	70424-67-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',5'-TeCB	PCB-058	41464-49-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',6-TeCB	PCB-059	74472-33-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,4,4'-TeCB	PCB-060	33025-41-1	pg/L	na		na		1.00E+01	U	na		na		na		1.73E+01		na		5.83E+01		na	
2,3,4,5-TeCB	PCB-061	33284-53-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,4,6-TeCB	PCB-062	54230-22-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,4',5-TeCB	PCB-063	74472-34-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,4',6/2,3',5,5'-TeCB	PCB-064/072		pg/L	na		na		1.00E+01	U	na		na		na		5.48E+01		na		1.23E+02		na	
2,3,5,6/2,4,4',6-TeCB	PCB-065/075		pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
2,6-DiCB	PCB-010	33146-45-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3'-DiCB	PCB-011	2050-67-1	pg/L	na		na		6.85E+01	UJL	na		9.40E+01	UJL	na		2.85E+01	UJL	na		na		na	
3,4/3,4'-DiCB	PCB-012/013		pg/L	na		na		1.00E+01	U	na		2.66E+01		na		1.00E+01	U	na		na		na	
3,5-DiCB	PCB-014	34883-41-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
4,4'-DiCB	PCB-015	2050-68-2	pg/L	na		na		2.03E+01	UFB	na		2.35E+01	UFB	na		1.00E+01	UFB	na		na		na	
2,2',3-TrCB	PCB-016	38444-78-9	pg/L	na		na		3.58E+01		na		1.78E+01		na		1.00E+01	U	na		na		na	
2,2',4-TrCB	PCB-017	37680-66-3	pg/L	na		na		2.15E+01		na		1.33E+01		na		1.00E+01	U	na		na		na	
2,2',5-TrCB	PCB-018	37680-65-2	pg/L	na		na		7.06E+01		na		4.01E+01		na		1.85E+01	UFB	na		na		na	
2,2',6-TrCB	PCB-019	38444-73-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3'/2,3',4'-TriCB	PCB-020/033		pg/L	na		na		3.33E+01		na		1.76E+01		na		1.00E+01	U	na		na		na	
2,3,4-TrCB	PCB-021	55702-46-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4'-TrCB	PCB-022	38444-85-8	pg/L	na		na		2.00E+01		na		1.25E+01		na		1.00E+01	U	na		na		na	
2,3,5-TrCB	PCB-023	55720-44-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,6-TrCB	PCB-024	55702-45-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4-TrCB	PCB-025	55712-37-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',5-TrCB	PCB-026	38444-81-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',6-TrCB	PCB-027	38444-76-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,4,4'-TrCB	PCB-028	7012-37-5	pg/L	na		na		4.18E+01		na		2.17E+01		na		1.56E+01		na		na		na	
2,4,5-TrCB	PCB-029	15862-07-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,4,6-TrCB	PCB-030	35693-92-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,4',5-TrCB	PCB-031	16606-02-3	pg/L	na		na		4.93E+01		na		3.03E+01		na		1.53E+01		na		na		na	
2,4',6-TrCB	PCB-032	38444-77-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',5'-TrCB	PCB-034	37680-68-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3',4-TrCB	PCB-035	37680-69-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3',5-TrCB	PCB-036	38444-87-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,4,4'-TrCB	PCB-037	38444-90-5	pg/L	na		na		1.51E+01		na		2.11E+01		na		1.00E+01	U	na		na		na	
3,4,5-TrCB	PCB-038	53555-66-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,4',5-TrCB	PCB-039	38444-88-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3'-TeCB	PCB-040	38444-93-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4',6-TeCB	PCB-041	52663-59-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4'-TeCB	PCB-042	36559-22-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049		pg/L	na		na		3.65E+01		na		2.08E+01		na		1.43E+01		na		na		na	
2,2',3,5'-TeCB	PCB-044	41464-39-5	pg/L	na		na		6.02E+01	UFB	na		3.19E+01	UFB	na		2.01E+01	UFB	na		na		na	
2,2',3,6-TeCB	PCB-045	70362-45-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,6'-TeCB	PCB-046	41464-47-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',4,4'/2,2',4,5-TeCB	PCB-047/048		pg/L	na		na		1.08E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',4,6-TeCB	PCB-050	62796-65-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',4,6'-TeCB	PCB-051	68194-04-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069		pg/L	na		na		8.99E+01		na		4.36E+01		na		2.77E+01	UJL	na		na		na	
2,2',5,6'-TeCB	PCB-053	41464-41-9	pg/L	na		na		1.20E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',6,6'-TeCB	PCB-054	15968-05-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4-TeCB	PCB-055	74338-24-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4'-TeCB	PCB-056	41464-43-1	pg/L	na		na		2.09E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',5-TeCB	PCB-057	70424-67-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',5'-TeCB	PCB-058	41464-49-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',6-TeCB	PCB-059	74472-33-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4,4'-TeCB	PCB-060	33025-41-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4,5-TeCB	PCB-061	33284-53-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4,6-TeCB	PCB-062	54230-22-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4',5-TeCB	PCB-063	74472-34-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4',6/2,3',5,5'-TeCB	PCB-064/072		pg/L	na		na		1.76E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,5,6/2,4,4',6-TeCB	PCB-065/075		pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
2,3',4,4'-TeCB	PCB-066	32598-10-0	pg/L	na		na		1.05E+01		na		na		na		9.22E+01		na		2.45E+02		na	
2,3',4,5-TeCB	PCB-067	73575-53-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.06E+01		na	
2,2',3,4-TeCB	PCB-068	73575-52-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3',4',5-TeCB	PCB-070	32598-11-1	pg/L	na		na		1.52E+01	UFB	na		na		na		1.34E+02		na		4.37E+02		na	
2,3',4',6-TeCB	PCB-071	41464-46-4	pg/L	na		na		1.00E+01	U	na		na		na		2.94E+01		na		6.86E+01		na	
2,2',5,5'-TeCB	PCB-073	74338-23-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,4,4',5-TeCB	PCB-074	32690-93-0	pg/L	na		na		1.00E+01	U	na		na		na		5.62E+01		na		1.54E+02		na	
2,3',4',5'-TeCB	PCB-076	70362-48-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
3,3',4,4'-TeCB	PCB-077	32598-13-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		3.91E+01		na	
3,3',4,5-TeCB	PCB-078	70362-49-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
3,3',4,5'-TeCB	PCB-079	41464-48-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
3,3',5,5'-TeCB	PCB-080	33284-52-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
3,4,4',5-TeCB	PCB-081	70362-50-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4-PeCB	PCB-082	52663-62-4	pg/L	na		na		1.00E+01	U	na		na		na		1.66E+01	N	na		9.24E+01		na	
2,2',3,3',5-PeCB	PCB-083	60145-20-2	pg/L	na		na		1.00E+01	U	na		na		na		1.22E+01		na		2.57E+01		na	
2,2',3,3',6-PeCB	PCB-084	52663-60-2	pg/L	na		na		1.00E+01	U	na		na		na		3.20E+01		na		1.22E+02		na	
2,2',3,4,4'-PeCB	PCB-085	65510-45-4	pg/L	na		na		1.00E+01	U	na		na		na		2.67E+01		na		1.21E+02		na	
2,2',3,4,5/2,2',3,4',5'/ 2,3,4',5,6-PeCB	PCB-086/097/117		pg/L	na		na		1.00E+01	U	na		na		na		5.17E+01		na		2.32E+02		na	
2,2',3,4,5'/2,3,4,4',6-PeCB	PCB-087/115		pg/L	na		na		1.11E+01	UFB	na		na		na		7.05E+01		na		3.09E+02		na	
2,2',3,4,6-PeCB	PCB-088	55215-17-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4,6'-PeCB	PCB-089	73575-57-2	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4',5-PeCB	PCB-090	68194-07-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4',6-PeCB	PCB-091	68194-05-8	pg/L	na		na		1.00E+01	U	na		na		na		2.40E+01		na		7.28E+01		na	
2,2',3,5,5'-PeCB	PCB-092	52663-61-3	pg/L	na		na		1.00E+01	U	na		na		na		4.51E+01		na		1.82E+02		na	
2,2',3,5,6/2,2',3,5',6/2,2',3,4',6'/ 2,2',4,5,6'-PeCB	PCB-093/095/098/102		pg/L	na		na		2.00E+01	UFB	na		na		na		1.60E+02		na		6.01E+02		na	
2,2',3,5,6'-PeCB	PCB-094	73575-55-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,6,6'-PeCB	PCB-096	73575-54-9	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',4,4',5-PeCB	PCB-099	38380-01-7	pg/L	na		na		1.00E+01	U	na		na		na		7.65E+01		na		2.97E+02		na	
2,2',4,4',6-PeCB	PCB-100	39485-83-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',4,5,5'-PeCB	PCB-101	37680-73-2	pg/L	na		na		2.28E+01	UFB	na		na		na		2.06E+02		na		7.77E+02		na	
2,2',4,5',6-PeCB	PCB-103	60145-21-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',4,6,6'-PeCB	PCB-104	56558-16-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4,4'-PeCB	PCB-105	32598-14-4	pg/L	na		na		1.00E+01	U	na		na		na		5.65E+01		na		2.69E+02		na	
2,3,3',4,5-PeCB	PCB-106	70424-69-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4',5/2,3,3',4,5'-PeCB	PCB-107/108		pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		4.89E+01		na	
2,3,3',4,6-PeCB	PCB-109	74472-35-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4',6-PeCB	PCB-110	38380-03-9	pg/L	na		na		2.48E+01	UFB	na		na		na		1.95E+02		na		7.56E+02		na	
2,3,3',5,5'-PeCB	PCB-111	39635-32-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',5,6/2,3',4,4',6-PeCB	PCB-112/119		pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',5',6-PeCB	PCB-113	68194-10-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,4,4',5-PeCB	PCB-114	74472-37-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.44E+01		na	
2,3,4,5,6/2,3',4',5',6-PeCB	PCB-116/125		pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3',4,4',5-PeCB	PCB-118	31508-00-6	pg/L	na		na		1.96E+01	UFB	na		na		na		1.35E+02		na		6.48E+02		na	
2,3',4,5,5'-PeCB	PCB-120	68194-12-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3',4,5',6-PeCB	PCB-121	56558-18-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4',5'-PeCB	PCB-122	76842-07-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3',4,4',5'-PeCB	PCB-123	65510-44-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.92E+01	N	na	
2,3',4',5,5'-PeCB	PCB-124	70424-70-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.68E+01		na	
3,3',4,4',5-PeCB	PCB-126	57465-28-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.33E+01		na	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
2,3',4,4'-TeCB	PCB-066	32598-10-0	pg/L	na		na		3.02E+01		na		1.00E+01	U	na		1.14E+01		na		na		na	
2,3',4,5-TeCB	PCB-067	73575-53-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4-TeCB	PCB-068	73575-52-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4',5-TeCB	PCB-070	32598-11-1	pg/L	na		na		5.65E+01	UFB	na		3.59E+01	UFB	na		2.19E+01	UFB	na		na		na	
2,3',4',6-TeCB	PCB-071	41464-46-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',5,5'-TeCB	PCB-073	74338-23-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,4,4',5-TeCB	PCB-074	32690-93-0	pg/L	na		na		1.96E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4',5'-TeCB	PCB-076	70362-48-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3',4,4'-TeCB	PCB-077	32598-13-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3',4,5-TeCB	PCB-078	70362-49-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3',4,5'-TeCB	PCB-079	41464-48-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3',5,5'-TeCB	PCB-080	33284-52-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,4,4',5-TeCB	PCB-081	70362-50-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4-PeCB	PCB-082	52663-62-4	pg/L	na		na		1.07E+01	N	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',5-PeCB	PCB-083	60145-20-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',6-PeCB	PCB-084	52663-60-2	pg/L	na		na		1.61E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,4'-PeCB	PCB-085	65510-45-4	pg/L	na		na		1.13E+01	N	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,5/2,2',3,4',5'/ 2,3,4',5,6-PeCB	PCB-086/097/117		pg/L	na		na		3.08E+01	UFB	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,5'/2,3,4,4',6-PeCB	PCB-087/115		pg/L	na		na		4.11E+01	UFB	na		1.85E+01	UFB	na		1.66E+01	UFB	na		na		na	
2,2',3,4,6-PeCB	PCB-088	55215-17-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,6'-PeCB	PCB-089	73575-57-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4',5-PeCB	PCB-090	68194-07-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4',6-PeCB	PCB-091	68194-05-8	pg/L	na		na		1.19E+01		na		1.12E+01	N	na		1.00E+01	U	na		na		na	
2,2',3,5,5'-PeCB	PCB-092	52663-61-3	pg/L	na		na		2.60E+01		na		1.49E+01	N	na		1.08E+01		na		na		na	
2,2',3,5,6/2,2',3,5',6/2,2',3,4',6'/ 2,2',4,5,6'-PeCB	PCB-093/095/098/102		pg/L	na		na		9.50E+01	UFB	na		4.34E+01	UFB	na		3.10E+01	UFB	na		na		na	
2,2',3,5,6'-PeCB	PCB-094	73575-55-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,6,6'-PeCB	PCB-096	73575-54-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',4,4',5-PeCB	PCB-099	38380-01-7	pg/L	na		na		3.83E+01		na		2.08E+01	UFB	na		1.90E+01	UFB	na		na		na	
2,2',4,4',6-PeCB	PCB-100	39485-83-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',4,5,5'-PeCB	PCB-101	37680-73-2	pg/L	na		na		1.09E+02	UFB	na		5.25E+01	UFB	na		3.87E+01	UFB	na		na		na	
2,2',4,5',6-PeCB	PCB-103	60145-21-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',4,6,6'-PeCB	PCB-104	56558-16-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,4'-PeCB	PCB-105	32598-14-4	pg/L	na		na		2.97E+01		na		1.00E+01	U	na		1.33E+01		na		na		na	
2,3,3',4,5-PeCB	PCB-106	70424-69-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4',5/2,3,3',4,5'-PeCB	PCB-107/108		pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,6-PeCB	PCB-109	74472-35-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4',6-PeCB	PCB-110	38380-03-9	pg/L	na		na		9.69E+01	UFB	na		4.64E+01	UFB	na		4.10E+01	UFB	na		na		na	
2,3,3',5,5'-PeCB	PCB-111	39635-32-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',5,6/2,3',4,4',6-PeCB	PCB-112/119		pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',5',6-PeCB	PCB-113	68194-10-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4,4',5-PeCB	PCB-114	74472-37-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4,5,6/2,3',4',5',6-PeCB	PCB-116/125		pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4,4',5-PeCB	PCB-118	31508-00-6	pg/L	na		na		7.19E+01		na		3.17E+01	UFB	na		3.16E+01	UFB	na		na		na	
2,3',4,5,5'-PeCB	PCB-120	68194-12-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4,5',6-PeCB	PCB-121	56558-18-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4',5'-PeCB	PCB-122	76842-07-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4,4',5'-PeCB	PCB-123	65510-44-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4',5,5'-PeCB	PCB-124	70424-70-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3',4,4',5-PeCB	PCB-126	57465-28-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
3,3',4,5,5'-PeCB	PCB-127	39635-33-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,4'-HxCB	PCB-128	38380-07-3	pg/L	na		na		1.00E+01	U	na		na		na		3.50E+01		na		1.62E+02		na	
2,2',3,3',4,5-HxCB	PCB-129	55215-18-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.96E+01		na	
2,2',3,3',4,5'-HxCB	PCB-130	52663-66-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		4.42E+01		na	
2,2',3,3',4,6-HxCB	PCB-131	61798-70-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,6'-HxCB	PCB-132	38380-05-1	pg/L	na		na		1.21E+01	UFB	na		na		na		7.93E+01		na		2.91E+02		na	
2,2',3,3',5,5'-HxCB	PCB-133	35694-04-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.08E+01		na	
2,2',3,3',5,6-HxCB	PCB-134	52704-70-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		3.77E+01		na	
2,2',3,3',5,6'-HxCB	PCB-135	52744-13-5	pg/L	na		na		1.00E+01	U	na		na		na		2.43E+01		na		7.70E+01		na	
2,2',3,3',6,6'-HxCB	PCB-136	38411-22-2	pg/L	na		na		1.00E+01	U	na		na		na		3.79E+01		na		9.15E+01		na	
2,2',3,4,4',5-HxCB	PCB-137	35694-06-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		3.08E+01		na	
2,2',3,4,4',5'-HxCB	PCB-138	35065-28-2	pg/L	na		na		1.64E+01	UFB	na		na		na		1.68E+02		na		7.15E+02		na	
2,2',3,4,4',6/2,2',3,4',5',6-HxCB	PCB-139/149		pg/L	na		na		1.84E+01	UFB	na		na		na		1.78E+02		na		5.77E+02		na	
2,2',3,4,4',6'-HxCB	PCB-140	59291-64-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4,5,5'-HxCB	PCB-141	52712-04-6	pg/L	na		na		1.00E+01	U	na		na		na		3.34E+01		na		9.08E+01		na	
2,2',3,4,5,6-HxCB	PCB-142	41411-61-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4,5,6'-HxCB	PCB-143	68194-15-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4,5',6-HxCB	PCB-144	68194-14-9	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.95E+01		na	
2,2',3,4,6,6'-HxCB	PCB-145	74472-40-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4',5,5'-HxCB	PCB-146	51908-16-8	pg/L	na		na		1.00E+01	U	na		na		na		3.60E+01		na		9.96E+01		na	
2,2',3,4',5,6-HxCB	PCB-147	68194-13-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4',5,6'-HxCB	PCB-148	74472-41-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4',6,6'-HxCB	PCB-150	68194-08-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,5,5',6-HxCB	PCB-151	52663-63-5	pg/L	na		na		1.00E+01	U	na		na		na		5.46E+01		na		1.43E+02		na	
2,2',3,5,6,6'-HxCB	PCB-152	68194-09-2	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',4,4',5,5'-HxCB	PCB-153	35065-27-1	pg/L	na		na		2.13E+01	UFB	na		na		na		1.92E+02		na		6.66E+02		na	
2,2',4,4',5,6'-HxCB	PCB-154	60145-22-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',4,4',6,6'-HxCB	PCB-155	33979-03-2	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4,4',5-HxCB	PCB-156	38380-08-4	pg/L	na		na		1.00E+01	U	na		na		na		2.02E+01		na		8.69E+01		na	
2,3,3',4,4',5'-HxCB	PCB-157	69782-90-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.75E+01		na	
2,3,3',4,4',6-HxCB	PCB-158	74472-42-7	pg/L	na		na		1.00E+01	U	na		na		na		1.84E+01		na		8.23E+01		na	
2,3,3',4,5,5'-HxCB	PCB-159	39635-35-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4,5,6-HxCB	PCB-160	41411-62-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4,5',6-HxCB	PCB-161	74472-43-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4',5,5'-HxCB	PCB-162	39635-34-2	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164		pg/L	na		na		1.00E+01	U	na		na		na		6.18E+01		na		2.06E+02		na	
2,3,3',5,5',6-HxCB	PCB-165	74472-46-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,4,4',5,6-HxCB	PCB-166	41411-63-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3',4,4',5,5'-HxCB	PCB-167	52663-72-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		3.28E+01		na	
2,3',4,4',5',6-HxCB	PCB-168	59291-65-5	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
3,3',4,4',5,5'-HxCB	PCB-169	32774-16-6	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,4',5-HpCB	PCB-170	35065-30-6	pg/L	na		na		1.00E+01	U	na		na		na		4.23E+01		na		8.58E+01		na	
2,2',3,3',4,4',6-HpCB	PCB-171	52663-71-5	pg/L	na		na		1.00E+01	U	na		na		na		1.73E+01		na		3.00E+01		na	
2,2',3,3',4,5,5'-HpCB	PCB-172	52663-74-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.23E+01	NJ	na	
2,2',3,3',4,5,6-HpCB	PCB-173	68194-16-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,5,6'-HpCB	PCB-174	38411-25-5	pg/L	na		na		1.00E+01	U	na		na		na		6.61E+01		na		1.30E+02		na	
2,2',3,3',4,5',6-HpCB	PCB-175	40186-70-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,6,6'-HpCB	PCB-176	52663-65-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.64E+01		na	
2,2',3,3',4,5',6'-HpCB	PCB-177	52663-70-4	pg/L	na		na		1.00E+01	U	na		na		na		2.85E+01		na		7.63E+01		na	
2,2',3,3',5,5',6-HpCB	PCB-178	52663-67-9	pg/L	na		na		1.00E+01	U	na		na		na		1.24E+01		na		2.89E+01		na	
2,2',3,3',5,6,6'-HpCB	PCB-179	52663-64-6	pg/L	na		na		1.00E+01	U	na		na		na		2.91E+01		na		5.54E+01		na	
2,2',3,4,4',5,5'-HpCB	PCB-180	35065-29-3	pg/L	na		na		1.00E+01	U	na		na		na		1.42E+02		na		2.67E+02		na	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
3,3',4,5,5'-PeCB	PCB-127	39635-33-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,4'-HxCB	PCB-128	38380-07-3	pg/L	na		na		1.38E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5-HxCB	PCB-129	55215-18-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5'-HxCB	PCB-130	52663-66-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,6-HxCB	PCB-131	61798-70-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,6'-HxCB	PCB-132	38380-05-1	pg/L	na		na		3.88E+01	UFB	na		1.78E+01	UFB	na		1.88E+01	UFB	na		na		na	
2,2',3,3',5,5'-HxCB	PCB-133	35694-04-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',5,6-HxCB	PCB-134	52704-70-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',5,6'-HxCB	PCB-135	52744-13-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',6,6'-HxCB	PCB-136	38411-22-2	pg/L	na		na		1.45E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,4',5-HxCB	PCB-137	35694-06-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,4',5'-HxCB	PCB-138	35065-28-2	pg/L	na		na		6.83E+01		na		3.16E+01	UFB	na		4.60E+01	UFB	na		na		na	
2,2',3,4,4',6/2,2',3,4',5',6-HxCB	PCB-139/149		pg/L	na		na		6.63E+01	UFB	na		3.09E+01	UFB	na		4.09E+01	UFB	na		na		na	
2,2',3,4,4',6'-HxCB	PCB-140	59291-64-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,5,5'-HxCB	PCB-141	52712-04-6	pg/L	na		na		1.15E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,5,6-HxCB	PCB-142	41411-61-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,5,6'-HxCB	PCB-143	68194-15-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,5',6-HxCB	PCB-144	68194-14-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,6,6'-HxCB	PCB-145	74472-40-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4',5,5'-HxCB	PCB-146	51908-16-8	pg/L	na		na		1.00E+01		na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4',5,6-HxCB	PCB-147	68194-13-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4',5,6'-HxCB	PCB-148	74472-41-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4',6,6'-HxCB	PCB-150	68194-08-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,5,5',6-HxCB	PCB-151	52663-63-5	pg/L	na		na		2.01E+01		na		1.00E+01	U	na		1.38E+01		na		na		na	
2,2',3,5,6,6'-HxCB	PCB-152	68194-09-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',4,4',5,5'-HxCB	PCB-153	35065-27-1	pg/L	na		na		7.08E+01	UFB	na		2.98E+01	UFB	na		5.27E+01	UFB	na		na		na	
2,2',4,4',5,6'-HxCB	PCB-154	60145-22-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',4,4',6,6'-HxCB	PCB-155	33979-03-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,4',5-HxCB	PCB-156	38380-08-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,4',5'-HxCB	PCB-157	69782-90-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,4',6-HxCB	PCB-158	74472-42-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,5,5'-HxCB	PCB-159	39635-35-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,5,6-HxCB	PCB-160	41411-62-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,5',6-HxCB	PCB-161	74472-43-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4',5,5'-HxCB	PCB-162	39635-34-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164		pg/L	na		na		2.16E+01		na		1.12E+01		na		1.15E+01	N	na		na		na	
2,3,3',5,5',6-HxCB	PCB-165	74472-46-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,4,4',5,6-HxCB	PCB-166	41411-63-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4,4',5,5'-HxCB	PCB-167	52663-72-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3',4,4',5',6-HxCB	PCB-168	59291-65-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
3,3',4,4',5,5'-HxCB	PCB-169	32774-16-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,4',5-HpCB	PCB-170	35065-30-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,4',6-HpCB	PCB-171	52663-71-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5,5'-HpCB	PCB-172	52663-74-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5,6-HpCB	PCB-173	68194-16-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5,6'-HpCB	PCB-174	38411-25-5	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.55E+01	N	na		na		na	
2,2',3,3',4,5',6-HpCB	PCB-175	40186-70-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,6,6'-HpCB	PCB-176	52663-65-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5',6'-HpCB	PCB-177	52663-70-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',5,5',6-HpCB	PCB-178	52663-67-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',5,6,6'-HpCB	PCB-179	52663-64-6	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,4',5,5'-HpCB	PCB-180	35065-29-3	pg/L	na		na		3.53E+01		na		1.59E+01		na		3.39E+01		na		na		na	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
2,2',3,4,4',5,6-HpCB	PCB-181	74472-47-2	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4,4',5,6'/ 2,2',3,4',5,5',6-HpCB	PCB-182/187		pg/L	na		na		1.00E+01	U	na		na		na		7.48E+01		na		1.85E+02		na	
2,2',3,4,4',5',6-HpCB	PCB-183	52663-69-1	pg/L	na		na		1.00E+01	U	na		na		na		3.39E+01		na		8.68E+01		na	
2,2',3,4,4',6,6'-HpCB	PCB-184	74472-48-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4,5,5',6-HpCB	PCB-185	52712-05-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.58E+01		na	
2,2',3,4,5,6,6'-HpCB	PCB-186	74472-49-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,4',5,6,6'-HpCB	PCB-188	74487-85-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4,4',5,5'-HpCB	PCB-189	39635-31-9	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.01E+01	NJ	na	
2,3,3',4,4',5,6-HpCB	PCB-190	41411-64-7	pg/L	na		na		1.00E+01	U	na		na		na		1.11E+01		na		2.30E+01		na	
2,3,3',4,4',5',6-HpCB	PCB-191	74472-50-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4,5,5',6-HpCB	PCB-192	74472-51-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4',5,5',6-HpCB	PCB-193	69782-91-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,4',5,5'-OcCB	PCB-194	35694-08-7	pg/L	na		na		1.00E+01	U	na		na		na		2.13E+01		na		5.09E+01	NJ	na	
2,2',3,3',4,4',5,6-OcCB	PCB-195	52663-78-2	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.07E+01		na	
2,2',3,3',4,4',5,6'-OcCB	PCB-196	42740-50-1	pg/L	na		na		1.00E+01	U	na		na		na		1.57E+01		na		3.28E+01		na	
2,2',3,3',4,4',6,6'-OcCB	PCB-197	33091-17-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,5,5',6-OcCB	PCB-198	68194-17-2	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,5,5',6'-OcCB	PCB-199	52663-75-9	pg/L	na		na		1.00E+01	U	na		na		na		3.88E+01		na		8.81E+01		na	
2,2',3,3',4,5,6,6'-OcCB	PCB-200	52663-73-7	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,5',6,6'-OcCB	PCB-201	40186-71-8	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.29E+01	NJ	na	
2,2',3,3',5,5',6,6'-OcCB	PCB-202	2136-99-4	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.84E+01		na	
2,2',3,4,4',5,5',6-OcCB	PCB-203	52663-76-0	pg/L	na		na		1.00E+01	U	na		na		na		2.28E+01		na		5.63E+01		na	
2,2',3,4,4',5,6,6'-OcCB	PCB-204	74472-52-9	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,3,3',4,4',5,5',6-OcCB	PCB-205	74472-53-0	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,4',5,5',6-NoCB	PCB-206	40186-72-9	pg/L	na		na		1.00E+01	U	na		na		na		1.47E+01		na		5.06E+01		na	
2,2',3,3',4,4',5,6,6'-NoCB	PCB-207	52663-79-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.00E+01	U	na	
2,2',3,3',4,5,5',6,6'-NoCB	PCB-208	52663-77-1	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		1.76E+01		na	
2,2',3,3',4,4',5,5',6,6'-DeCB	PCB-209	2051-24-3	pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.31E+01	UFB	na	
Number of Detects =				nc		nc		5		nc		nc		nc		77		nc		105		nc	
Sum of Detects =			pg/L	nc		nc		6.94E+01		nc		nc		nc		4.65E+03		nc		1.54E+04		nc	
Polychlorinated Biphenyls (Homologs)																							
Decachlorobiphenyl			pg/L	na		na		1.00E+01	U	na		na		na		1.00E+01	U	na		2.31E+01		na	
Dichlorobiphenyls			pg/L	na		na		5.50E+01	UFB	na		na		na		3.80E+02		na		1.60E+03	JL	na	
Heptachlorobiphenyls			pg/L	na		na		1.00E+01	U	na		na		na		4.58E+02		na		1.00E+03		na	
Hexachlorobiphenyls			pg/L	na		na		5.61E+01	UFB	na		na		na		9.39E+02		na		3.51E+03		na	
Monochlorobiphenyls			pg/L	na		na		1.00E+01	U	na		na		na		7.05E+01		na		5.08E+01		na	
Nonachlorobiphenyls			pg/L	na		na		1.00E+01	U	na		na		na		1.47E+01		na		6.82E+01		na	
Octachlorobiphenyls			pg/L	na		na		1.00E+01	U	na		na		na		9.86E+01		na		2.16E+02		na	
Pentachlorobiphenyls			pg/L	na		na		8.72E+01	UFB	na		na		na		1.09E+03		na		4.62E+03		na	
Tetrachlorobiphenyls			pg/L	na		na		5.94E+01	UFB	na		na		na		9.31E+02		na		2.62E+03		na	
Trichlorobiphenyls			pg/L	na		na		7.48E+01		na		na		na		7.47E+02		na		1.90E+03		na	
Number of Detects =				nc		nc		1		nc		nc		nc		9		nc		10		nc	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
2,2',3,4,4',5,6-HpCB	PCB-181	74472-47-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,4',5,6'/ 2,2',3,4',5,5',6-HpCB	PCB-182/187		pg/L	na		na		1.68E+01		na		1.11E+01	N	na		2.59E+01		na		na		na	
2,2',3,4,4',5',6-HpCB	PCB-183	52663-69-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,4',6,6'-HpCB	PCB-184	74472-48-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,5,5',6-HpCB	PCB-185	52712-05-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,5,6,6'-HpCB	PCB-186	74472-49-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4',5,6,6'-HpCB	PCB-188	74487-85-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,4',5,5'-HpCB	PCB-189	39635-31-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,4',5,6-HpCB	PCB-190	41411-64-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,4',5',6-HpCB	PCB-191	74472-50-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,5,5',6-HpCB	PCB-192	74472-51-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4',5,5',6-HpCB	PCB-193	69782-91-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,4',5,5'-OcCB	PCB-194	35694-08-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,4',5,6-OcCB	PCB-195	52663-78-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,4',5,6'-OcCB	PCB-196	42740-50-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.03E+01	N	na		na		na	
2,2',3,3',4,4',6,6'-OcCB	PCB-197	33091-17-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5,5',6-OcCB	PCB-198	68194-17-2	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5,5',6'-OcCB	PCB-199	52663-75-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.27E+01		na		na		na	
2,2',3,3',4,5,6,6'-OcCB	PCB-200	52663-73-7	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5',6,6'-OcCB	PCB-201	40186-71-8	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',5,5',6,6'-OcCB	PCB-202	2136-99-4	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,4,4',5,5',6-OcCB	PCB-203	52663-76-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.09E+01	N	na		na		na	
2,2',3,4,4',5,6,6'-OcCB	PCB-204	74472-52-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,3,3',4,4',5,5',6-OcCB	PCB-205	74472-53-0	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,4',5,5',6-NoCB	PCB-206	40186-72-9	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.10E+01	N	na		na		na	
2,2',3,3',4,4',5,6,6'-NoCB	PCB-207	52663-79-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,5,5',6,6'-NoCB	PCB-208	52663-77-1	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
2,2',3,3',4,4',5,5',6,6'-DeCB	PCB-209	2051-24-3	pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
Number of Detects =				nc		nc		38		nc		20		nc		15		nc		nc		nc	
Sum of Detects =			pg/L	nc		nc		1.06E+03		nc		3.99E+02		nc		2.26E+02	NJ	nc		nc		nc	
Polychlorinated Biphenyls (Homologs)																							
Decachlorobiphenyl			pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
Dichlorobiphenyls			pg/L	na		na		2.28E+02	JL	na		2.27E+02	JL	na		2.85E+01	UFB	na		na		na	
Heptachlorobiphenyls			pg/L	na		na		5.21E+01		na		1.59E+01		na		5.98E+01		na		na		na	
Hexachlorobiphenyls			pg/L	na		na		3.36E+02		na		1.21E+02	UFB	na		1.72E+02	UFB	na		na		na	
Monochlorobiphenyls			pg/L	na		na		3.26E+01		na		2.31E+01		na		1.00E+01	U	na		na		na	
Nonachlorobiphenyls			pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.00E+01	U	na		na		na	
Octachlorobiphenyls			pg/L	na		na		1.00E+01	U	na		1.00E+01	U	na		1.27E+01		na		na		na	
Pentachlorobiphenyls			pg/L	na		na		5.67E+02		na		2.13E+02	UFB	na		1.83E+02	UFB	na		na		na	
Tetrachlorobiphenyls			pg/L	na		na		3.54E+02	JL	na		1.32E+02		na		7.53E+01		na		na		na	
Trichlorobiphenyls			pg/L	na		na		2.87E+02		na		1.74E+02		na		4.94E+01		na		na		na	
Number of Detects =				nc		nc		7		nc		5		nc		4		nc		nc		nc	

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Bellingham STP				Bremerton STP				Burlington WWTP				City of Tacoma (Central No. 1)				Everett STP (Outfall 100)			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Metals																							
Copper		7440-50-8	ug/L	6.21E+00		2.69E+00		3.52E+00		3.96E+00		2.56E+00		5.27E+00		9.65E+00		9.16E+00		1.18E+01		5.34E+00	
Lead		7439-92-1	ug/L	4.40E-01		4.60E-01		2.80E-01		1.90E-01		3.10E-01		4.50E-01		7.20E-01		6.00E-01		1.17E+00		5.20E-01	
Zinc		7440-66-6	ug/L	3.97E+01		4.47E+01		2.17E+01		1.32E+01		4.11E+01		6.37E+01		4.45E+01		3.75E+01		2.96E+01		1.79E+01	

Key:

See User Study ID **ToxLPh3F** in the Ecology Environmental Information Management (EIM) System for more details.

The precision of the data in this table is only two significant figures.

Winter = A 24-hour composite from February 2009.

Summer = A 24-hour composite from July 2009.

co-elute = BDE049 and BDE071 coeluted in the analyses of the winter samples.

nc = Not calculated.

na = Not analyzed.

ng/L = Nanograms per liter.

pg/L = Picograms per liter.

ug/L = Micrograms per liter.

Data Qualifiers:

G = Value is likely greater than the reported result. Reported result may be biased low.

J = Analyte was positively identified. Value is the approximate concentration.

K = Bias could not be determined.

L = Value is likely less than the reported result. Reported result may be biased high.

NJ = Analyte was "tentatively identified." Value is its approximate concentration.

REJ = Datum is unusable for all purposes due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence of absence of the analyte cannot be verified.

T = The positive result is less than the quantitation limit.

U = Analyte was not detected at or above the reported result.

UFB = Result was less than three times the respective result in the field blank. In the EIM System, this qualifier was substituted with a "U" plus a note in the Result Value Comment field.

UJ = Analyte was not detected above the reported quantitation limit, which is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Appendix C. Summary of Analytical Results

Chemical of Concern	Alternate Name	CAS Number	Units	Gig Harbor STP				King County West Point				Pierce County Chambers Creek STP				Shelton STP				Sumner STP			
				Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer		Winter		Summer	
				Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Metals																							
Copper		7440-50-8	ug/L	9.28E+00		1.14E+01		1.17E+01		1.39E+01		1.19E+01		1.11E+01		7.31E+00		8.29E+00		1.32E+01		1.72E+01	
Lead		7439-92-1	ug/L	6.80E-01		6.00E-01		3.80E-01		3.90E-01		2.90E-01		3.00E-01		4.00E-01		3.50E-01		1.80E-01		1.50E-01	
Zinc		7440-66-6	ug/L	7.62E+01		9.51E+01		3.30E+01		3.86E+01		3.45E+01		3.55E+01		4.45E+01		5.31E+01		4.99E+01		5.29E+01	

Key:

See User Study ID **ToxLPh3F** in the Ecology Environmental Information Management (EIM) System for more details.

The precision of the data in this table is only two significant figures.

Winter = A 24-hour composite from February 2009.

Summer = A 24-hour composite from July 2009.

co-elute = BDE049 and BDE071 coeluted in the analyses of the winter samples.

nc = Not calculated.

na = Not analyzed.

ng/L = Nanograms per liter.

pg/L = Picograms per liter.

ug/L = Micrograms per liter.

Data Qualifiers:

G = Value is likely greater than the reported result. Reported result may be biased low.

J = Analyte was positively identified. Value is the approximate concentration.

K = Bias could not be determined.

L = Value is likely less than the reported result. Reported result may be biased high.

NJ = Analyte was "tentatively identified." Value is its approximate concentration.

REJ = Datum is unusable for all purposes due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence of absence of the analyte cannot be verified.

T = The positive result is less than the quantitation limit.

U = Analyte was not detected at or above the reported result.

UFB = Result was less than three times the respective result in the field blank. In the EIM System, this qualifier was substituted with a "U" plus a note in the Result Value Comment field.

UJ = Analyte was not detected above the reported quantitation limit, which is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Appendix D.

Percent Detection for Individual Chemicals

Appendix D. Percent Detection for Individual Chemicals

Chemical of Concern	Alternate Name	Number of Valid Results	Number of Laboratory Non-Detects (a)	Number of Field/Rinseate Non-Detects (b)	Percent Detection (c)
Polycyclic Aromatic Hydrocarbons (PAHs)					
Low Molecular Weight PAHs (LPAHs)					
Phenanthrene		20	6	0	**70.0**
Fluorene		20	8	0	**60.0**
Acenaphthene		20	13	0	**35.0**
Acenaphthylene		20	14	0	**30.0**
Naphthalene		20	6	8	**30.0**
Anthracene		20	16	0	**20.0**
High Molecular Weight PAHs (HPAHs)					
Pyrene		20	2	0	**90.0**
Fluoranthene		20	4	0	**80.0**
Indeno(1,2,3-cd)pyrene		20	18	0	**10.0**
Benzo(a)anthracene		20	19	0	**5.0**
Benzo(b)fluoranthene		20	19	0	**5.0**
Benzo(g,h,i)perylene		20	19	0	**5.0**
Chrysene		20	19	0	**5.0**
Benzo(a)pyrene		20	20	0	**0.0**
Benzo(k)fluoranthene		20	20	0	**0.0**
Dibenzo(a,h)anthracene		20	20	0	**0.0**
Carcinogenic PAHs (cPAHs)					
Indeno(1,2,3-cd)pyrene		20	18	0	**10.0**
Benzo(a)anthracene		20	19	0	**5.0**
Benzo(b)fluoranthene		20	19	0	**5.0**
Chrysene		20	19	0	**5.0**
Benzo(a)pyrene		20	20	0	**0.0**
Benzo(k)fluoranthene		20	20	0	**0.0**
Dibenzo(a,h)anthracene		20	20	0	**0.0**
Total PAHs (LPAHs+HPAHs)		20	1	0	**95.0**
Phthalates					
bis(2-Ethylhexyl) phthalate		20	2	0	**90.0**
Butylbenzyl phthalate		20	15	0	**25.0**
Diethyl phthalate		20	14	2	**20.0**
Di-N-butyl phthalate		20	18	0	**10.0**
Di-N-octyl phthalate		20	20	0	**0.0**
Dimethyl phthalate		20	19	1	**0.0**
Other Base/Neutral/Acid Extractables					
2-Chloroethanol phosphate (3:1)		10	0	0	**100.0**
Cholesterol		10	0	0	**100.0**
Triethyl citrate		20	0	0	**100.0**
1,4-Dichlorobenzene		20	1	0	**95.0**
2,4,6-Trichlorophenol		20	1	0	**95.0**
3B-Coprostanol		10	1	0	**90.0**
Triclosan		20	2	0	**90.0**
4-Methylphenol	p-Cresol	20	7	0	**65.0**
Dibenzofuran		20	8	0	**60.0**
Caffeine		17	7	0	**58.8**
Phenol		20	0	9	**55.0**
Bisphenol A		15	7	0	**53.3**
2,4-Dichlorophenol		20	11	0	**45.0**
2,4-Dimethylphenol		18	11	0	**38.9**
2-Methylphenol	o-Cresol	20	14	0	**30.0**
Benzyl alcohol		10	7	0	**30.0**
1-Methylnaphthalene		20	15	0	**25.0**
2,4-Dinitrophenol		20	16	0	**20.0**
2-Methylnaphthalene		20	16	0	**20.0**
Isophorone		20	16	0	**20.0**
Pentachlorophenol		20	16	0	**20.0**
2-Nitrophenol		20	17	0	**15.0**
2-Chloronaphthalene		20	18	0	**10.0**
N-Nitrosodimethylamine		10	9	0	**10.0**
bis(2-Chloroethoxy) methane		15	14	0	**6.7**
4-Nonylphenol		16	12	3	**6.3**
1,2-Dichlorobenzene		20	16	3	**5.0**
2,3,4,6-Tetrachlorophenol		20	19	0	**5.0**
N-Nitrosodiphenylamine		20	19	0	**5.0**

Appendix D. Percent Detection for Individual Chemicals

Chemical of Concern	Alternate Name	Number of Valid Results	Number of Laboratory Non-Detects (a)	Number of Field/Rinseate Non-Detects (b)	Percent Detection (c)
Retene		20	19	0	**5.0**
1,2,4-Trichlorobenzene		20	20	0	**0.0**
1,3-Dichlorobenzene		20	18	2	**0.0**
2,3,4,5-Tetrachlorophenol		20	20	0	**0.0**
2,4,5-Trichlorophenol		20	20	0	**0.0**
2,4-Dinitrotoluene		20	20	0	**0.0**
2,6-Dinitrotoluene		20	20	0	**0.0**
2-Chlorophenol		20	20	0	**0.0**
2-Nitroaniline	o-Nitroaniline	15	15	0	**0.0**
3,3'-Dichlorobenzidine		9	9	0	**0.0**
3-Nitroaniline	m-Nitroaniline	15	15	0	**0.0**
4,6-Dinitro-2-methylphenol		20	20	0	**0.0**
4-Bromophenylphenyl ether		20	20	0	**0.0**
4-Chloro-3-methylphenol	p-Chloro-m-cresol	20	20	0	**0.0**
4-Chlorophenylphenyl ether		20	20	0	**0.0**
4-Nitroaniline	p-Nitroaniline	10	10	0	**0.0**
4-Nitrophenol		20	20	0	**0.0**
Benzoic acid		10	5	5	**0.0**
bis(2-Chloroethyl) ether		20	20	0	**0.0**
Carbazole		20	20	0	**0.0**
Hexachlorobutadiene		20	20	0	**0.0**
Hexachlorocyclopentadiene		20	20	0	**0.0**
Hexachloroethane		20	20	0	**0.0**
Nitrobenzene		20	20	0	**0.0**
N-Nitrosodi-n-propylamine		20	20	0	**0.0**
4-Chloroaniline		0	0	0	**no data**
Pesticides					
Pentachloroanisole		10	7	0	**30.0**
Endosulfan I		20	16	0	**20.0**
Hexachlorobenzene		20	18	0	**10.0**
Toxaphene		20	18	0	**10.0**
alpha-BHC		20	19	0	**5.0**
Chlorpyriphos		20	19	0	**5.0**
2,4'-DDD		10	10	0	**0.0**
2,4'-DDE		10	10	0	**0.0**
2,4'-DDT		10	10	0	**0.0**
4,4'-DDD		20	20	0	**0.0**
4,4'-DDE		20	20	0	**0.0**
4,4'-DDT		20	20	0	**0.0**
Aldrin		20	20	0	**0.0**
beta-BHC		20	20	0	**0.0**
delta-BHC		20	20	0	**0.0**
gamma-BHC	Lindane	20	20	0	**0.0**
cis-Chlordane		20	20	0	**0.0**
trans-Chlordane		20	20	0	**0.0**
Chlordane, technical		10	10	0	**0.0**
Dacthal	DCPA	20	20	0	**0.0**
DDMU		10	10	0	**0.0**
Dieldrin		20	20	0	**0.0**
Endosulfan II		20	20	0	**0.0**
Endosulfan sulfate		20	20	0	**0.0**
Endrin		20	20	0	**0.0**
Endrin aldehyde		20	20	0	**0.0**
Endrin ketone		20	20	0	**0.0**
Heptachlor		20	20	0	**0.0**
Heptachlor epoxide		20	20	0	**0.0**
Methoxychlor		20	20	0	**0.0**
Mirex		10	10	0	**0.0**
cis-Nonachlor		20	20	0	**0.0**
trans-Nonachlor		20	20	0	**0.0**
Oxychlordane		20	20	0	**0.0**
Herbicides					
MCPP	Mecoprop	20	15	0	**25.0**
Triclopyr		20	15	0	**25.0**
2,4-D		20	17	0	**15.0**
Dicamba I		20	17	0	**15.0**
MCPA		20	17	0	**15.0**
2,4,5-T		20	20	0	**0.0**

Appendix D. Percent Detection for Individual Chemicals

Chemical of Concern	Alternate Name	Number of Valid Results	Number of Laboratory Non-Detects (a)	Number of Field/Rinseate Non-Detects (b)	Percent Detection (c)
2,4,5-TP	Silvex	20	20	0	**0.0**
2,4-DB	2,4-D butyric acid	19	19	0	**0.0**
3,5-Dichlorobenzoic acid		20	20	0	**0.0**
Acifluorfen	Blazer	19	19	0	**0.0**
Bentazon		20	20	0	**0.0**
Bromoxynil		20	20	0	**0.0**
Clopyralid		20	20	0	**0.0**
Dichlorprop		20	20	0	**0.0**
Diclofop-Methyl		20	20	0	**0.0**
Dinoseb		19	19	0	**0.0**
Ioxynil		20	20	0	**0.0**
Picloram		18	18	0	**0.0**
Polybrominated Diphenyl Ethers (Congeners)					
2,4,4'-TrBDE	BDE-028	20	0	0	**100.0**
2,2',4,4'-TeBDE	BDE-047	20	0	0	**100.0**
2,2',4,5'/2,3',4',6-TeBDE	BDE-049/071	10	0	0	**100.0**
2,2',4,4',5-PeBDE	BDE-099	20	0	0	**100.0**
2,2',4,4',6-PeBDE	BDE-100	20	0	0	**100.0**
2,2',4,4',5,5'-HxBDE	BDE-153	20	0	0	**100.0**
2,2',4,4',5,6'-HxBDE	BDE-154	20	0	0	**100.0**
2,2',4-TrBDE	BDE-017	20	1	0	**95.0**
2,3',4',6-TeBDE	BDE-071	10	1	0	**90.0**
2,2',3,4,4'-PeBDE	BDE-085	20	2	0	**90.0**
4,4'-DiBDE	BDE-015	20	3	0	**85.0**
2,2',4,5'-TeBDE	BDE-049	10	2	0	**80.0**
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	20	3	1	**80.0**
2,3',4,4'-TeBDE	BDE-066	20	6	0	**70.0**
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	20	6	0	**70.0**
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	20	7	0	**65.0**
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208	20	7	0	**65.0**
2,2',3,4,4',5',6-HpBDE	BDE-183	20	9	0	**55.0**
2,4-DiBDE	BDE-007	20	11	0	**45.0**
2,2',3,4,4',6-HxBDE	BDE-139	20	11	0	**45.0**
2,4,6-TrBDE	BDE-030	20	13	0	**35.0**
2,2',3,4,4',6'-HxBDE	BDE-140	20	13	0	**35.0**
2,2',3,3',4,4',5,6'-OcBDE	BDE-196	20	13	0	**35.0**
2,2',3,3',4,4',6,6'/ 2,2',3,4,4',5,6,6'-OcBDE	BDE-197/204	20	13	0	**35.0**
2,2',3,4,4',5,5',6-OcBDE	BDE-203	20	13	0	**35.0**
2,2',3,4,4',5'-HxBDE	BDE-138	20	14	0	**30.0**
2,3',4,4',6-PeBDE	BDE-119	20	15	0	**25.0**
2,2',3,3',4,5',6,6'-OcBDE	BDE-201	20	15	0	**25.0**
2,2',3,4,4',6,6'-HpBDE	BDE-184	20	18	0	**10.0**
2,3,3',4,4',5/3,3',4,4',5,5'-HxBDE	BDE-156/169	20	19	0	**5.0**
2,2',3,3',4,4',6-HpBDE	BDE-171	20	19	0	**5.0**
2,2',3,4,4',5,5'-HpBDE	BDE-180	20	19	0	**5.0**
2,3,3',4,4',5',6-HpBDE	BDE-191	20	19	0	**5.0**
2,6-DiBDE	BDE-010	20	20	0	**0.0**
3,3',4,4'-TeBDE	BDE-077	20	20	0	**0.0**
3,3',4,4',5-PeBDE	BDE-126	20	20	0	**0.0**
2,3,3',4,4',5,5',6-OcBDE	BDE-205	20	20	0	**0.0**
Polybrominated Diphenyl Ethers (Homologs)					
Hexabromodiphenyl ethers		20	0	0	**100.0**
Pentabromodiphenyl ethers		20	0	0	**100.0**
Tetrabromodiphenyl ethers		20	0	0	**100.0**
Tribromodiphenyl ethers		20	0	0	**100.0**
Dibromodiphenyl ethers		20	2	0	**90.0**
Decabromodiphenyl ether		20	4	0	**80.0**
Nonabromodiphenyl ethers		20	6	0	**70.0**
Heptabromodiphenyl ethers		20	9	0	**55.0**
Octabromodiphenyl ethers		20	12	0	**40.0**

Appendix D. Percent Detection for Individual Chemicals

Chemical of Concern	Alternate Name	Number of Valid Results	Number of Laboratory Non-Detects (a)	Number of Field/Rinseate Non-Detects (b)	Percent Detection (c)
Perfluorinated Compounds					
Perfluorodecanoate	PFDA	20	0	0	**100.0**
Perfluoroheptanoate	PFHpA	20	0	0	**100.0**
Perfluorohexanoate	PFHxA	20	0	0	**100.0**
Perfluorononanoate	PFNA	20	0	0	**100.0**
Perfluorooctanoate	PFOA	20	0	0	**100.0**
Perfluorooctane sulfonate	PFOS	20	2	0	**90.0**
Perfluoropentanoate	PFPeA	20	3	0	**85.0**
Perfluorohexane sulfonate	PFHxS	20	7	0	**65.0**
Perfluorobutanoate	PFBA	20	8	0	**60.0**
Perfluorobutane sulfonate	PFBS	20	17	0	**15.0**
Perfluorooctane sulfonamide	PFOSA	20	18	0	**10.0**
Perfluoroundecanoate	PFUnA	20	19	0	**5.0**
Perfluorododecanoate	PFDoA	20	20	0	**0.0**
Polychlorinated Biphenyls (Congeners)					
2,4,4'-TrCB	PCB-028	6	0	0	**100.0**
2,4',5-TrCB	PCB-031	6	0	0	**100.0**
2,2',3-TrCB	PCB-016	6	1	0	**83.3**
2,3,3'/2,3',4'-TriCB	PCB-020/033	6	1	0	**83.3**
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049	6	1	0	**83.3**
2,3',4,4'-TeCB	PCB-066	6	1	0	**83.3**
2,2',3,5,5'-PeCB	PCB-092	6	1	0	**83.3**
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164	6	1	0	**83.3**
2,2',3,4,4',5,5'-HpCB	PCB-180	6	1	0	**83.3**
2,2',3,4,4',5,6'/ 2,2',3,4',5,5',6-HpCB	PCB-182/187	6	1	0	**83.3**
2-MoCB	PCB-001	6	2	0	**66.7**
2,2'-DiCB	PCB-004	6	2	0	**66.7**
2,3'-DiCB	PCB-006	6	2	0	**66.7**
2,2',4-TrCB	PCB-017	6	2	0	**66.7**
2,2',5-TrCB	PCB-018	6	0	2	**66.7**
2,3,4'-TrCB	PCB-022	6	2	0	**66.7**
3,4,4'-TrCB	PCB-037	6	2	0	**66.7**
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069	6	2	0	**66.7**
2,2',3,4',6-PeCB	PCB-091	6	2	0	**66.7**
2,3,3',4,4'-PeCB	PCB-105	6	2	0	**66.7**
2,2',3,5,5',6-HxCB	PCB-151	6	2	0	**66.7**
4-MoCB	PCB-003	6	3	0	**50.0**
2,2',4,4'/2,2',4,5-TeCB	PCB-047/048	6	3	0	**50.0**
2,2',5,6'-TeCB	PCB-053	6	3	0	**50.0**
2,3,3',4'-TeCB	PCB-056	6	3	0	**50.0**
2,3,4',6/2,3',5,5'-TeCB	PCB-064/072	6	3	0	**50.0**
2,4,4',5-TeCB	PCB-074	6	3	0	**50.0**
2,2',3,3',4-PeCB	PCB-082	6	3	0	**50.0**
2,2',3,3',6-PeCB	PCB-084	6	3	0	**50.0**
2,2',3,4,4'-PeCB	PCB-085	6	3	0	**50.0**
2,2',4,4',5-PeCB	PCB-099	6	1	2	**50.0**
2,3',4,4',5-PeCB	PCB-118	6	0	3	**50.0**
2,2',3,3',4,4'-HxCB	PCB-128	6	3	0	**50.0**
2,2',3,3',6,6'-HxCB	PCB-136	6	3	0	**50.0**
2,2',3,4,4',5'-HxCB	PCB-138	6	0	3	**50.0**
2,2',3,4,5,5'-HxCB	PCB-141	6	3	0	**50.0**
2,2',3,4',5,5'-HxCB	PCB-146	6	3	0	**50.0**
2,2',3,3',4,5,6'-HpCB	PCB-174	6	3	0	**50.0**
2,2',3,3',4,4',5,6'-OcCB	PCB-196	6	3	0	**50.0**
2,2',3,3',4,5,5',6'-OcCB	PCB-199	6	3	0	**50.0**
2,2',3,4,4',5,5',6-OcCB	PCB-203	6	3	0	**50.0**
2,2',3,3',4,4',5,5',6-NoCB	PCB-206	6	3	0	**50.0**
2,4-DiCB	PCB-007	6	4	0	**33.3**
3,4/3,4'-DiCB	PCB-012/013	6	4	0	**33.3**
4,4'-DiCB	PCB-015	6	0	4	**33.3**
2,2',6-TrCB	PCB-019	6	4	0	**33.3**
2,3',4-TrCB	PCB-025	6	4	0	**33.3**
2,3',5-TrCB	PCB-026	6	4	0	**33.3**
2,4',6-TrCB	PCB-032	6	4	0	**33.3**

Appendix D. Percent Detection for Individual Chemicals

Chemical of Concern	Alternate Name	Number of Valid Results	Number of Laboratory Non-Detects (a)	Number of Field/Rinseate Non-Detects (b)	Percent Detection (c)
2,2',3,3'-TeCB	PCB-040	6	4	0	**33.3**
2,3,4',6-TeCB	PCB-041	6	4	0	**33.3**
2,2',3,4'-TeCB	PCB-042	6	4	0	**33.3**
2,2',3,5'-TeCB	PCB-044	6	0	4	**33.3**
2,2',3,6-TeCB	PCB-045	6	4	0	**33.3**
2,3,4,4'-TeCB	PCB-060	6	4	0	**33.3**
2,3',4',5-TeCB	PCB-070	6	0	4	**33.3**
2,3',4',6-TeCB	PCB-071	6	4	0	**33.3**
2,2',3,3',5-PeCB	PCB-083	6	4	0	**33.3**
2,2',3,4,5/2,2',3,4',5'/ 2,3,4',5,6-PeCB	PCB-086/097/117	6	3	1	**33.3**
2,2',3,4,5'/2,3,4,4',6-PeCB	PCB-087/115	6	0	4	**33.3**
2,2',3,5,6/2,2',3,5',6/2,2',3,4',6'/ 2,2',4,5,6'-PeCB	PCB-093/095/098/102	6	0	4	**33.3**
2,2',4,5,5'-PeCB	PCB-101	6	0	4	**33.3**
2,3,3',4',6-PeCB	PCB-110	6	0	4	**33.3**
2,2',3,3',4,6'-HxCB	PCB-132	6	0	4	**33.3**
2,2',3,3',5,6'-HxCB	PCB-135	6	4	0	**33.3**
2,2',3,4,4',6/2,2',3,4',5',6-HxCB	PCB-139/149	6	0	4	**33.3**
2,2',4,4',5,5'-HxCB	PCB-153	6	0	4	**33.3**
2,3,3',4,4',5-HxCB	PCB-156	6	4	0	**33.3**
2,3,3',4,4',6-HxCB	PCB-158	6	4	0	**33.3**
2,2',3,3',4,4',5-HpCB	PCB-170	6	4	0	**33.3**
2,2',3,3',4,4',6-HpCB	PCB-171	6	4	0	**33.3**
2,2',3,3',4,5',6'-HpCB	PCB-177	6	4	0	**33.3**
2,2',3,3',5,5',6-HpCB	PCB-178	6	4	0	**33.3**
2,2',3,3',5,6,6'-HpCB	PCB-179	6	4	0	**33.3**
2,2',3,4,4',5',6-HpCB	PCB-183	6	4	0	**33.3**
2,3,3',4,4',5,6-HpCB	PCB-190	6	4	0	**33.3**
2,2',3,3',4,4',5,5'-OcCB	PCB-194	6	4	0	**33.3**
2,3/2,4'-DiCB	PCB-005/008	6	5	0	**16.7**
2,5-DiCB	PCB-009	6	5	0	**16.7**
2,3',6-TrCB	PCB-027	6	5	0	**16.7**
3,3',4-TrCB	PCB-035	6	5	0	**16.7**
3,3',5-TrCB	PCB-036	6	5	0	**16.7**
2,2',3,6'-TeCB	PCB-046	6	5	0	**16.7**
2,2',4,6'-TeCB	PCB-051	6	5	0	**16.7**
2,3',4,5-TeCB	PCB-067	6	5	0	**16.7**
3,3',4,4'-TeCB	PCB-077	6	5	0	**16.7**
2,3,3',4',5/2,3,3',4,5'-PeCB	PCB-107/108	6	5	0	**16.7**
2,3,4,4',5-PeCB	PCB-114	6	5	0	**16.7**
2,3',4,4',5'-PeCB	PCB-123	6	5	0	**16.7**
2,3',4',5,5'-PeCB	PCB-124	6	5	0	**16.7**
3,3',4,4',5-PeCB	PCB-126	6	5	0	**16.7**
2,2',3,3',4,5-HxCB	PCB-129	6	5	0	**16.7**
2,2',3,3',4,5'-HxCB	PCB-130	6	5	0	**16.7**
2,2',3,3',5,5'-HxCB	PCB-133	6	5	0	**16.7**
2,2',3,3',5,6-HxCB	PCB-134	6	5	0	**16.7**
2,2',3,4,4',5-HxCB	PCB-137	6	5	0	**16.7**
2,2',3,4,5',6-HxCB	PCB-144	6	5	0	**16.7**
2,3,3',4,4',5'-HxCB	PCB-157	6	5	0	**16.7**
2,3',4,4',5,5'-HxCB	PCB-167	6	5	0	**16.7**
2,2',3,3',4,5,5'-HpCB	PCB-172	6	5	0	**16.7**
2,2',3,3',4,6,6'-HpCB	PCB-176	6	5	0	**16.7**
2,2',3,4,5,5',6-HpCB	PCB-185	6	5	0	**16.7**
2,3,3',4,4',5,5'-HpCB	PCB-189	6	5	0	**16.7**
2,2',3,3',4,4',5,6-OcCB	PCB-195	6	5	0	**16.7**
2,2',3,3',4,5',6,6'-OcCB	PCB-201	6	5	0	**16.7**
2,2',3,3',5,5',6,6'-OcCB	PCB-202	6	5	0	**16.7**
2,2',3,3',4,5,5',6,6'-NoCB	PCB-208	6	5	0	**16.7**
3-MoCB	PCB-002	6	6	0	**0.0**
2,6-DiCB	PCB-010	6	6	0	**0.0**
3,3'-DiCB	PCB-011	6	6	0	**0.0**
3,5-DiCB	PCB-014	6	6	0	**0.0**
2,3,4-TrCB	PCB-021	6	6	0	**0.0**

Appendix D. Percent Detection for Individual Chemicals

Chemical of Concern	Alternate Name	Number of Valid Results	Number of Laboratory Non-Detects (a)	Number of Field/Rinseate Non-Detects (b)	Percent Detection (c)
2,3,5-TrCB	PCB-023	6	6	0	**0.0**
2,3,6-TrCB	PCB-024	6	6	0	**0.0**
2,4,5-TrCB	PCB-029	6	6	0	**0.0**
2,4,6-TrCB	PCB-030	6	6	0	**0.0**
2,3',5'-TrCB	PCB-034	6	6	0	**0.0**
3,4,5-TrCB	PCB-038	6	6	0	**0.0**
3,4',5-TrCB	PCB-039	6	6	0	**0.0**
2,2',4,6-TeCB	PCB-050	6	6	0	**0.0**
2,2',6,6'-TeCB	PCB-054	6	6	0	**0.0**
2,3,3',4-TeCB	PCB-055	6	6	0	**0.0**
2,3,3',5-TeCB	PCB-057	6	6	0	**0.0**
2,3,3',5'-TeCB	PCB-058	6	6	0	**0.0**
2,3,3',6-TeCB	PCB-059	6	6	0	**0.0**
2,3,4,5-TeCB	PCB-061	6	6	0	**0.0**
2,3,4,6-TeCB	PCB-062	6	6	0	**0.0**
2,3,4',5-TeCB	PCB-063	6	6	0	**0.0**
2,3,5,6/2,4,4',6-TeCB	PCB-065/075	6	6	0	**0.0**
2,2',3,4-TeCB	PCB-068	6	6	0	**0.0**
2,2',5,5'-TeCB	PCB-073	6	6	0	**0.0**
2,3',4',5'-TeCB	PCB-076	6	6	0	**0.0**
3,3',4,5-TeCB	PCB-078	6	6	0	**0.0**
3,3',4,5'-TeCB	PCB-079	6	6	0	**0.0**
3,3',5,5'-TeCB	PCB-080	6	6	0	**0.0**
3,4,4',5-TeCB	PCB-081	6	6	0	**0.0**
2,2',3,4,6-PeCB	PCB-088	6	6	0	**0.0**
2,2',3,4,6'-PeCB	PCB-089	6	6	0	**0.0**
2,2',3,4',5-PeCB	PCB-090	6	6	0	**0.0**
2,2',3,5,6'-PeCB	PCB-094	6	6	0	**0.0**
2,2',3,6,6'-PeCB	PCB-096	6	6	0	**0.0**
2,2',4,4',6-PeCB	PCB-100	6	6	0	**0.0**
2,2',4,5',6-PeCB	PCB-103	6	6	0	**0.0**
2,2',4,6,6'-PeCB	PCB-104	6	6	0	**0.0**
2,3,3',4,5-PeCB	PCB-106	6	6	0	**0.0**
2,3,3',4,6-PeCB	PCB-109	6	6	0	**0.0**
2,3,3',5,5'-PeCB	PCB-111	6	6	0	**0.0**
2,3,3',5,6/2,3',4,4',6-PeCB	PCB-112/119	6	6	0	**0.0**
2,3,3',5',6-PeCB	PCB-113	6	6	0	**0.0**
2,3,4,5,6/2,3',4',5',6-PeCB	PCB-116/125	6	6	0	**0.0**
2,3',4,5,5'-PeCB	PCB-120	6	6	0	**0.0**
2,3',4,5',6-PeCB	PCB-121	6	6	0	**0.0**
2,3,3',4',5'-PeCB	PCB-122	6	6	0	**0.0**
3,3',4,5,5'-PeCB	PCB-127	6	6	0	**0.0**
2,2',3,3',4,6-HxCB	PCB-131	6	6	0	**0.0**
2,2',3,4,4',6'-HxCB	PCB-140	6	6	0	**0.0**
2,2',3,4,5,6-HxCB	PCB-142	6	6	0	**0.0**
2,2',3,4,5,6'-HxCB	PCB-143	6	6	0	**0.0**
2,2',3,4,6,6'-HxCB	PCB-145	6	6	0	**0.0**
2,2',3,4',5,6-HxCB	PCB-147	6	6	0	**0.0**
2,2',3,4',5,6'-HxCB	PCB-148	6	6	0	**0.0**
2,2',3,4',6,6'-HxCB	PCB-150	6	6	0	**0.0**
2,2',3,5,6,6'-HxCB	PCB-152	6	6	0	**0.0**
2,2',4,4',5,6'-HxCB	PCB-154	6	6	0	**0.0**
2,2',4,4',6,6'-HxCB	PCB-155	6	6	0	**0.0**
2,3,3',4,5,5'-HxCB	PCB-159	6	6	0	**0.0**
2,3,3',4,5,6-HxCB	PCB-160	6	6	0	**0.0**
2,3,3',4,5',6-HxCB	PCB-161	6	6	0	**0.0**
2,3,3',4',5,5'-HxCB	PCB-162	6	6	0	**0.0**
2,3,3',5,5',6-HxCB	PCB-165	6	6	0	**0.0**
2,3,4,4',5,6-HxCB	PCB-166	6	6	0	**0.0**
2,3',4,4',5',6-HxCB	PCB-168	6	6	0	**0.0**
3,3',4,4',5,5'-HxCB	PCB-169	6	6	0	**0.0**
2,2',3,3',4,5,6-HpCB	PCB-173	6	6	0	**0.0**
2,2',3,3',4,5',6-HpCB	PCB-175	6	6	0	**0.0**
2,2',3,4,4',5,6-HpCB	PCB-181	6	6	0	**0.0**
2,2',3,4,4',6,6'-HpCB	PCB-184	6	6	0	**0.0**

Appendix D. Percent Detection for Individual Chemicals

Chemical of Concern	Alternate Name	Number of Valid Results	Number of Laboratory Non-Detects (a)	Number of Field/Rinseate Non-Detects (b)	Percent Detection (c)
2,2',3,4,5,6,6'-HpCB	PCB-186	6	6	0	**0.0**
2,2',3,4',5,6,6'-HpCB	PCB-188	6	6	0	**0.0**
2,3,3',4,4',5',6-HpCB	PCB-191	6	6	0	**0.0**
2,3,3',4,5,5',6-HpCB	PCB-192	6	6	0	**0.0**
2,3,3',4',5,5',6-HpCB	PCB-193	6	6	0	**0.0**
2,2',3,3',4,4',6,6'-OcCB	PCB-197	6	6	0	**0.0**
2,2',3,3',4,5,5',6-OcCB	PCB-198	6	6	0	**0.0**
2,2',3,3',4,5,6,6'-OcCB	PCB-200	6	6	0	**0.0**
2,2',3,4,4',5,6,6'-OcCB	PCB-204	6	6	0	**0.0**
2,3,3',4,4',5,5',6-OcCB	PCB-205	6	6	0	**0.0**
2,2',3,3',4,4',5,6,6'-NoCB	PCB-207	6	6	0	**0.0**
2,2',3,3',4,4',5,5',6,6'-DeCB	PCB-209	6	5	1	**0.0**
Polychlorinated Biphenyls (Homologs)					
Trichlorobiphenyls		6	0	0	**100.0**
Heptachlorobiphenyls		6	1	0	**83.3**
Tetrachlorobiphenyls		6	0	1	**83.3**
Dichlorobiphenyls		6	0	2	**66.7**
Monochlorobiphenyls		6	2	0	**66.7**
Hexachlorobiphenyls		6	0	3	**50.0**
Octachlorobiphenyls		6	3	0	**50.0**
Pentachlorobiphenyls		6	0	3	**50.0**
Nonachlorobiphenyls		6	4	0	**33.3**
Decachlorobiphenyl		6	5	0	**16.7**
Metals					
Copper		20	0	0	**100.0**
Lead		20	0	0	**100.0**
Zinc		20	0	0	**100.0**

Key:

The number of valid results varies for each chemical because some results were rejected for quality assurance reasons, and not all chemicals were sampled and analyzed the same number of times for each event.

(a) = Results qualified with a "U" because the analyte was not detected at or above the reported quantitation limit.

(b) = Results qualified with a "UFB" because the result was not at least 3 times the concentration in the respective field or rinseate blank.

(c) = ((Valid Results - Laboratory Non-Detects - Field/Rinseate Non-Detects) / Valid Results) x 100%

Appendix E.

Summary Statistics

Appendix E. Summary Statistics

Chemical of Concern	Alternate Name	Units	Sample Size	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
Polycyclic Aromatic Hydrocarbons (PAHs)								
Low Molecular Weight PAHs (LPAHs)								
Fluorene		ug/L	20	8.04E-04	1.43E-03	7.95E-03	1.90E-02	1.72E-01
Phenanthrene		ug/L	20	3.85E-03	4.89E-03	5.70E-03	1.45E-02	6.63E-02
Entire Chemical Class:		ug/L	20	3.84E-03	6.97E-03	1.72E-02	7.43E-02	7.22E-01
High Molecular Weight PAHs (HPAHs)								
Fluoranthene		ug/L	20	3.62E-03	4.23E-03	4.75E-03	8.43E-03	1.01E-02
Pyrene		ug/L	20	4.25E-03	4.68E-03	6.15E-03	8.60E-03	1.87E-02
Entire Chemical Class:		ug/L	20	4.29E-03	7.90E-03	1.05E-02	1.59E-02	4.80E-02
Total PAHs (LPAHs+HPAHs)		ug/L	20	5.19E-03	1.61E-02	3.95E-02	9.77E-02	7.32E-01
Phthalates								
bis(2-Ethylhexyl) phthalate		ug/L	20	2.38E-01	4.60E-01	9.35E-01	1.93E+00	3.50E+00
Entire Chemical Class:		ug/L	20	2.38E-01	4.60E-01	1.17E+00	1.93E+00	3.50E+00
Other Base/Neutral/Acid Extractables								
1,4-Dichlorobenzene		ug/L	20	7.00E-02	1.33E-01	2.15E-01	4.80E-01	9.27E-01
2,4,6-Trichlorophenol		ug/L	20	2.87E-02	4.83E-02	9.50E-02	1.53E-01	2.72E-01
2-Chloroethanol phosphate (3:1)		ug/L	10	7.90E-02	1.60E-01	2.30E-01	3.05E-01	4.21E-01
3B-Coprostanol		ug/L	10	3.58E+00	6.50E+00	9.05E+00	1.48E+01	1.78E+01
4-Methylphenol	p-Cresol	ug/L	20	1.20E-01	2.10E-01	3.27E-01	4.97E-01	3.07E+00
Bisphenol A		ug/L	15	2.00E-01	2.65E-01	2.80E-01	7.55E-01	1.32E+00
Caffeine		ug/L	17	1.88E-02	6.17E-02	1.51E-01	7.00E-01	1.80E+01
Cholesterol		ug/L	10	6.25E+00	8.43E+00	1.25E+01	1.70E+01	2.80E+01
Dibenzofuran		ug/L	20	1.82E-03	2.53E-03	6.15E-03	1.68E-02	1.90E-01
Phenol		ug/L	20	4.09E-01	4.13E-01	7.35E-01	1.03E+00	1.57E+00
Triclosan		ug/L	20	1.78E-01	3.45E-01	5.40E-01	8.53E-01	1.02E+00
Triethyl citrate		ug/L	20	1.28E-01	4.98E-01	8.25E-01	1.10E+00	1.51E+00
Polybrominated Diphenyl Ethers (Congeners)								
4,4'-DiBDE	BDE-015	pg/L	20	1.96E+00	8.71E+00	1.22E+01	4.66E+01	1.46E+02
2,2',4-TrBDE	BDE-017	pg/L	20	2.58E+01	4.45E+01	8.53E+01	2.76E+02	4.61E+02
2,4,4'-TrBDE	BDE-028	pg/L	20	7.39E+01	9.65E+01	1.95E+02	4.60E+02	1.07E+03
2,2',4,4'-TeBDE	BDE-047	pg/L	20	3.32E+03	5.33E+03	6.54E+03	1.06E+04	3.24E+04
2,2',4,5'-TeBDE	BDE-049	pg/L	10	1.52E+01	6.28E+01	2.17E+02	3.24E+02	9.43E+02
2,2',4,5'/2,3',4',6-TeBDE	BDE-049/071	pg/L	10	1.73E+02	2.03E+02	3.46E+02	5.58E+02	1.12E+03
2,3',4,4'-TeBDE	BDE-066	pg/L	20	1.52E+01	4.62E+01	1.52E+02	4.05E+02	1.06E+03

Appendix E. Summary Statistics

Chemical of Concern	Alternate Name	Units	Sample Size	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
2,3',4',6-TeBDE	BDE-071	pg/L	10	1.44E+01	3.67E+01	4.60E+01	1.36E+02	3.89E+02
2,2',3,4,4'-PeBDE	BDE-085	pg/L	20	6.98E+01	1.86E+02	2.56E+02	4.56E+02	1.23E+03
2,2',4,4',5-PeBDE	BDE-099	pg/L	20	2.25E+03	4.57E+03	6.30E+03	1.40E+04	3.27E+04
2,2',4,4',6-PeBDE	BDE-100	pg/L	20	5.51E+02	1.00E+03	1.28E+03	2.51E+03	6.66E+03
2,2',4,4',5,5'-HxBDE	BDE-153	pg/L	20	2.07E+02	3.57E+02	5.43E+02	1.38E+03	3.35E+03
2,2',4,4',5,6'-HxBDE	BDE-154	pg/L	20	1.48E+02	3.12E+02	4.04E+02	8.54E+02	2.31E+03
2,2',3,4,4',5',6-HpBDE	BDE-183	pg/L	20	6.82E+00	1.39E+01	4.39E+01	1.09E+02	4.96E+02
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	pg/L	20	3.84E+01	9.12E+01	2.65E+02	6.55E+02	2.32E+03
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	pg/L	20	3.63E+01	1.11E+02	2.53E+02	5.85E+02	2.26E+03
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208	pg/L	20	1.68E+01	4.59E+01	1.23E+02	4.26E+02	1.59E+03
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	pg/L	20	6.61E+02	1.95E+03	3.20E+03	9.30E+03	2.27E+04
Entire Chemical Class:		pg/L	20	9.07E+03	1.49E+04	2.25E+04	4.41E+04	1.26E+05
Polybrominated Diphenyl Ethers (Homologs)								
Decabromodiphenyl ether		pg/L	20	6.61E+02	1.95E+03	3.20E+03	9.30E+03	2.27E+04
Dibromodiphenyl ethers		pg/L	20	2.13E+00	9.30E+00	1.56E+01	5.72E+01	1.62E+02
Heptabromodiphenyl ethers		pg/L	20	6.42E+00	1.36E+01	4.43E+01	1.09E+02	5.08E+02
Hexabromodiphenyl ethers		pg/L	20	3.51E+02	6.47E+02	1.02E+03	2.40E+03	6.36E+03
Nonabromodiphenyl ethers		pg/L	20	6.22E+01	1.41E+02	6.26E+02	1.64E+03	6.43E+03
Pentabromodiphenyl ethers		pg/L	20	2.85E+03	5.95E+03	7.91E+03	1.72E+04	4.06E+04
Tetrabromodiphenyl ethers		pg/L	20	3.78E+03	5.52E+03	7.21E+03	1.13E+04	3.48E+04
Tribromodiphenyl ethers		pg/L	20	9.95E+01	1.53E+02	2.84E+02	6.65E+02	1.54E+03
Perfluorinated Compounds								
Perfluorobutanoate	PFBA	ng/L	20	7.33E-01	8.80E-01	1.38E+00	2.59E+00	3.66E+00
Perfluorodecanoate	PFDA	ng/L	20	1.53E+00	2.60E+00	3.62E+00	5.69E+00	7.98E+00
Perfluoroheptanoate	PFHpA	ng/L	20	2.72E+00	3.69E+00	4.69E+00	6.12E+00	9.72E+00
Perfluorohexane sulfonate	PFHxS	ng/L	20	1.26E+00	1.27E+00	2.61E+00	3.63E+00	7.81E+00
Perfluorohexanoate	PFHxA	ng/L	20	1.07E+01	1.29E+01	1.67E+01	2.69E+01	4.47E+01
Perfluorononanoate	PFNA	ng/L	20	2.31E+00	3.68E+00	6.05E+00	1.25E+01	3.40E+01
Perfluorooctane sulfonate	PFOS	ng/L	20	1.35E+00	4.05E+00	5.96E+00	9.78E+00	2.29E+01
Perfluorooctanoate	PFOA	ng/L	20	1.11E+01	1.30E+01	2.35E+01	3.46E+01	5.34E+01
Perfluoropentanoate	PFPeA	ng/L	20	7.00E-01	1.89E+00	2.62E+00	9.50E+00	1.66E+01
Entire Chemical Class:		pg/L	20	4.58E+01	6.69E+01	9.05E+01	1.25E+02	1.62E+02
Polychlorinated Biphenyls (Congeners)								
2-MoCB	PCB-001	pg/L	6	5.00E+00	6.28E+00	1.46E+01	3.58E+01	4.85E+01
2,2'-DiCB	PCB-004	pg/L	6	5.00E+00	1.10E+01	3.80E+01	7.53E+01	8.01E+02
2,3'-DiCB	PCB-006	pg/L	6	5.00E+00	7.40E+00	1.57E+01	2.09E+01	2.85E+01

Appendix E. Summary Statistics

Chemical of Concern	Alternate Name	Units	Sample Size	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
2,2',3-TrCB	PCB-016	pg/L	6	7.33E+00	1.52E+01	2.68E+01	4.54E+01	7.83E+01
2,2',4-TrCB	PCB-017	pg/L	6	5.00E+00	7.08E+00	1.74E+01	4.10E+01	1.36E+02
2,2',5-TrCB	PCB-018	pg/L	6	8.28E+00	1.70E+01	5.54E+01	1.20E+02	2.33E+02
2,3,3'/2,3',4'-TriCB	PCB-020/033	pg/L	6	7.18E+00	1.47E+01	2.55E+01	7.93E+01	9.61E+01
2,3,4'-TrCB	PCB-022	pg/L	6	5.00E+00	6.88E+00	1.63E+01	4.57E+01	1.08E+02
2,4,4'-TrCB	PCB-028	pg/L	6	1.49E+01	1.71E+01	3.18E+01	9.75E+01	2.42E+02
2,4',5-TrCB	PCB-031	pg/L	6	1.56E+01	1.98E+01	3.98E+01	1.05E+02	2.48E+02
3,4,4'-TrCB	PCB-037	pg/L	6	5.00E+00	7.53E+00	1.81E+01	3.21E+01	9.22E+01
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049	pg/L	6	7.33E+00	1.59E+01	2.87E+01	8.02E+01	2.07E+02
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069	pg/L	6	1.09E+01	2.13E+01	6.68E+01	1.35E+02	3.89E+02
2,3',4,4'-TeCB	PCB-066	pg/L	6	6.38E+00	1.07E+01	2.08E+01	7.67E+01	2.07E+02
2,2',3,4',6-PeCB	PCB-091	pg/L	6	5.00E+00	6.55E+00	1.15E+01	2.10E+01	6.06E+01
2,2',3,5,5'-PeCB	PCB-092	pg/L	6	6.45E+00	1.18E+01	2.04E+01	4.03E+01	1.48E+02
2,3,3',4,4'-PeCB	PCB-105	pg/L	6	5.00E+00	7.08E+00	2.15E+01	4.98E+01	2.16E+02
2,2',3,5,5',6-HxCB	PCB-151	pg/L	6	5.00E+00	7.20E+00	1.70E+01	4.60E+01	1.21E+02
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164	pg/L	6	6.55E+00	1.13E+01	1.65E+01	5.18E+01	1.70E+02
2,2',3,4,4',5,5'-HpCB	PCB-180	pg/L	6	7.73E+00	2.04E+01	3.46E+01	1.15E+02	2.36E+02
2,2',3,4,4',5,6'/2,2',3,4',5,5',6-HpCB	PCB-182/187	pg/L	6	6.52E+00	1.25E+01	2.14E+01	6.26E+01	1.57E+02
Entire Chemical Class:		pg/L	6	1.09E+02	2.69E+02	7.30E+02	3.73E+03	1.26E+04
Polychlorinated Biphenyls (Homologs)								
Dichlorobiphenyls		pg/L	6	1.76E+01	7.75E+01	2.27E+02	3.42E+02	1.29E+03
Heptachlorobiphenyls		pg/L	6	7.73E+00	2.50E+01	5.60E+01	3.58E+02	8.65E+02
Monochlorobiphenyls		pg/L	6	5.00E+00	9.53E+00	2.79E+01	4.63E+01	6.56E+01
Tetrachlorobiphenyls		pg/L	6	4.11E+01	8.95E+01	2.43E+02	7.87E+02	2.20E+03
Trichlorobiphenyls		pg/L	6	5.58E+01	9.97E+01	2.31E+02	6.32E+02	1.61E+03
Metals								
Copper		ug/L	20	2.68E+00	5.32E+00	9.22E+00	1.17E+01	1.41E+01
Lead		ug/L	20	1.79E-01	2.98E-01	3.95E-01	5.40E-01	7.43E-01
Zinc		ug/L	20	1.77E+01	3.41E+01	4.04E+01	5.07E+01	7.71E+01

Key:

The precision of the data in this table is only two significant figures.

Appendix F.

Comparision of Two Methods for Handling Non-Detect Values

Appendix F. Comparison of Two Methods for Handling Non-Detect Values (Regression on Order Statistics versus Substitution)

Chemical of Concern	Alternate Name	Relative Percent Differences Substitute Non-Detect Values with:		
		Zero	Half the Reporting Limit	Reporting Limit
Polycyclic Aromatic Hydrocarbons				
Low Molecular Weight PAHs (LPAHs)				
Fluorene		0.0%	0.0%	0.0%
Phenanthrene		0.0%	0.0%	**9.2%**
Entire Chemical Class =		0.0%	0.0%	**15.3%**
High Molecular Weight PAHs (HPAHs)				
Fluoranthene		0.0%	0.0%	**23.3%**
Pyrene		0.0%	0.0%	**2.4%**
Entire Chemical Class =		0.0%	0.0%	**7.3%**
Total PAHs (LPAHs+HPAHs)		0.0%	0.0%	0.0%
Phthalates				
bis(2-Ethylhexyl) phthalate		0.0%	0.0%	**11.6%**
Entire Chemical Class =		0.0%	0.0%	0.0%
Other Base/Neutral/Acid Extractables				
1,4-Dichlorobenzene		0.0%	0.0%	0.0%
2,4,6-Trichlorophenol		0.0%	0.0%	0.0%
3B-Coprostanol		0.0%	0.0%	0.0%
4-Methylphenol	p-Cresol	**43.5%**	**58.2%**	**78.0%**
Bisphenol A		**33.3%**	**6.9%**	**72.7%**
Caffeine		**40.9%**	**5.5%**	**71.5%**
Dibenzofuran		0.0%	0.0%	**7.8%**
Phenol		0.0%	0.0%	**2.0%**
Triclosan		0.0%	0.0%	**1.8%**
Polybrominated Diphenyl Ethers (Congeners)				
4,4'-DiBDE	BDE-015	0.0%	**2.8%**	**16.5%**
2,2',4-TrBDE	BDE-017	0.0%	0.0%	0.0%
2,2',4,5'-TeBDE	BDE-049	0.0%	0.0%	0.0%
2,3',4,4'-TeBDE	BDE-066	0.0%	0.0%	0.0%
2,3',4',6-TeBDE	BDE-071	0.0%	0.0%	0.0%
2,2',3,4,4'-PeBDE	BDE-085	0.0%	0.0%	0.0%
2,2',3,4,4',5',6-HpBDE	BDE-183	**44.1%**	**12.9%**	**46.8%**
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	0.0%	0.0%	**0.8%**
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	0.0%	0.0%	**3.9%**
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208	0.0%	**1.6%**	**66.3%**
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	0.0%	0.0%	0.0%
Entire Chemical Class =		0.0%	0.0%	0.0%

Appendix F. Comparison of Two Methods for Handling Non-Detect Values (Regression on Order Statistics versus Substitution)

Chemical of Concern	Alternate Name	Relative Percent Differences Substitute Non-Detect Values with:		
		Zero	Half the Reporting Limit	Reporting Limit
Polybrominated Diphenyl Ethers (Homologs)				
Decabromodiphenyl ether		0.0%	0.0%	0.0%
Dibromodiphenyl ethers		0.0%	0.0%	0.0%
Heptabromodiphenyl ethers		**45.0%**	**12.0%**	**58.5%**
Nonabromodiphenyl ethers		0.0%	0.0%	0.0%
Perfluorinated Compounds				
Perfluorobutanoate	PFBA	0.0%	0.0%	**3.6%**
Perfluorohexane sulfonate	PFHxS	0.0%	0.0%	0.0%
Perfluorooctane sulfonate	PFOS	0.0%	0.0%	0.0%
Perfluoropentanoate	PFPeA	0.0%	0.0%	0.0%
Entire Chemical Class =		0.0%	0.0%	0.0%
Polychlorinated Biphenyls (Congeners)				
2-MoCB	PCB-001	0.0%	0.0%	0.0%
2,2'-DiCB	PCB-004	0.0%	0.0%	0.0%
2,3'-DiCB	PCB-006	0.0%	0.0%	0.0%
2,2',3-TrCB	PCB-016	0.0%	0.0%	0.0%
2,2',4-TrCB	PCB-017	0.0%	0.0%	0.0%
2,2',5-TrCB	PCB-018	0.0%	0.0%	0.0%
2,3,3'/2,3',4'-TriCB	PCB-020/033	0.0%	0.0%	0.0%
2,3,4'-TrCB	PCB-022	0.0%	0.0%	0.0%
3,4,4'-TrCB	PCB-037	0.0%	0.0%	0.0%
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049	0.0%	0.0%	0.0%
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069	0.0%	0.0%	0.0%
2,3',4,4'-TeCB	PCB-066	0.0%	0.0%	0.0%
2,2',3,4',6-PeCB	PCB-091	0.0%	0.0%	0.0%
2,2',3,5,5'-PeCB	PCB-092	0.0%	0.0%	0.0%
2,3,3',4,4'-PeCB	PCB-105	0.0%	0.0%	0.0%
2,2',3,5,5',6-HxCB	PCB-151	0.0%	0.0%	0.0%
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164	0.0%	0.0%	0.0%
2,2',3,4,4',5,5'-HpCB	PCB-180	0.0%	0.0%	0.0%
2,2',3,4,4',5,6'/2,2',3,4',5,5',6-HpCB	PCB-182/187	0.0%	0.0%	0.0%
Entire Chemical Class =		0.0%	0.0%	0.0%
Polychlorinated Biphenyls (Homologs)				
Dichlorobiphenyls		0.0%	0.0%	0.0%
Heptachlorobiphenyls		0.0%	0.0%	0.0%
Monochlorobiphenyls		0.0%	0.0%	0.0%
Tetrachlorobiphenyls		0.0%	0.0%	0.0%

Key: Percent differences determined by:

$$\frac{\text{(Substituted Value - ROS Value))}}{\text{((Substituted Value + ROS Value) / 2)}}$$

Regression on Order Statistics (ROS) Values were from Appendix E.

Appendix G.

Loading Rates from Each of the Ten POTWs

Appendix G. Loading Rates for Each of the Ten POTWs

Chemical of Concern	Alternate Name	Bellingham STP (kg/year)	Bremerton STP (kg/year)	Burlington WWTP (kg/year)	City of Tacoma (Central No. 1) (kg/year)	Everett STP (Outfall 100) (kg/year)	Gig Harbor STP (kg/year)	King County West Point (kg/year)	Pierce County Chambers Creek STP (kg/year)	Shelton STP (kg/year)	Sumner STP (kg/year)
Polycyclic Aromatic Hydrocarbons											
Low Molecular Weight PAHs (LPAHs)											
Acenaphthene		nd	2.53E-01	nd	1.91E-01	nd	5.16E-02	9.60E-01	2.11E-01	nd	2.85E-02
Acenaphthylene		nd	1.64E-01	nd	1.20E-01	nd	3.26E-02	5.18E-01	nd	nd	3.64E-02
Anthracene		nd	3.40E-02	nd	nd	nd	6.56E-03	4.41E-01	nd	nd	1.40E-02
Fluorene		1.18E-01	5.26E-01	1.60E-02	3.42E-01	nd	1.14E-01	1.79E+00	3.58E-01	1.21E-02	1.79E-01
Naphthalene		nd	1.07E+00	2.24E-02	nd	nd	2.79E-01	nd	8.53E-01	nd	5.14E-02
Phenanthrene		1.27E-01	2.12E-01	nd	1.50E-01	nd	4.30E-02	1.31E+00	3.71E-01	1.13E-02	8.34E-02
High Molecular Weight PAHs (HPAHs)											
Benzo(a)anthracene		nd	nd	nd	nd	6.45E-02	nd	nd	nd	nd	nd
Benzo(a)pyrene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene		nd	nd	nd	nd	1.78E-01	nd	nd	nd	nd	nd
Benzo(g,h,i)perylene		nd	nd	nd	nd	8.72E-02	nd	nd	nd	nd	nd
Benzo(k)fluoranthene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene		nd	nd	nd	nd	8.42E-02	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Fluoranthene		1.05E-01	2.53E-02	6.46E-03	2.46E-01	1.36E-01	4.49E-03	7.61E-01	2.22E-01	nd	1.35E-02
Indeno(1,2,3-cd)pyrene		nd	nd	nd	nd	1.61E-01	nd	4.93E-01	nd	nd	nd
Pyrene		1.22E-01	3.45E-02	1.08E-02	3.19E-01	3.44E-01	8.54E-03	1.39E+00	1.62E-01	nd	1.04E-02
Carcinogenic PAHs (cPAHs)											
Benzo(a)anthracene		nd	nd	nd	nd	6.45E-02	nd	nd	nd	nd	nd
Benzo(a)pyrene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzo(b)fluoranthene		nd	nd	nd	nd	1.78E-01	nd	nd	nd	nd	nd
Benzo(k)fluoranthene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chrysene		nd	nd	nd	nd	8.42E-02	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene		nd	nd	nd	nd	1.61E-01	nd	4.93E-01	nd	nd	nd
Total PAHs (LPAHs+HPAHs)		4.72E-01	2.32E+00	5.57E-02	1.37E+00	1.05E+00	5.40E-01	7.66E+00	2.18E+00	2.34E-02	4.17E-01
Phthalates											
bis(2-Ethylhexyl) phthalate		6.50E+00	8.41E+00	1.55E+00	7.01E+01	6.37E+01	1.79E+00	1.45E+02	1.99E+01	1.70E+00	1.03E+00
Butylbenzyl phthalate		nd	1.17E+00	8.84E-01	6.66E+00	nd	2.21E-01	3.04E+01	nd	nd	nd
Di-N-butyl phthalate		5.27E+00	nd	nd	nd	nd	nd	nd	3.89E+00	nd	nd
Di-N-octyl phthalate		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Diethyl phthalate		nd	nd	5.67E-01	3.92E+00	nd	3.35E-01	nd	nd	nd	6.39E-01
Dimethyl phthalate		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Other Base/Neutral/Acid Extractables											
1,2,4-Trichlorobenzene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene		nd	nd	nd	nd	nd	nd	nd	1.92E+00	nd	nd
1,3-Dichlorobenzene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene		3.82E+00	1.07E+00	1.51E+00	1.57E+01	1.21E+00	2.23E-01	1.89E+02	6.18E+00	1.92E-01	4.58E-01
1-Methylnaphthalene		nd	3.45E-01	nd	nd	nd	7.04E-02	1.47E+00	3.83E-01	nd	1.94E-02
2,3,4,5-Tetrachlorophenol		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,3,4,6-Tetrachlorophenol		nd	nd	nd	nd	nd	nd	nd	nd	2.49E-01	nd

Appendix G. Loading Rates for Each of the Ten POTWs

Chemical of Concern	Alternate Name	Bellingham STP (kg/year)	Bremerton STP (kg/year)	Burlington WWTP (kg/year)	City of Tacoma (Central No. 1) (kg/year)	Everett STP (Outfall 100) (kg/year)	Gig Harbor STP (kg/year)	King County West Point (kg/year)	Pierce County Chambers Creek STP (kg/year)	Shelton STP (kg/year)	Sumner STP (kg/year)
2,4,5-Trichlorophenol		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,4,6-Trichlorophenol		9.18E-01	5.44E-01	1.44E-01	3.02E+00	7.11E-01	1.84E-01	1.77E+01	2.62E+00	7.83E-01	1.10E-01
2,4-Dichlorophenol		8.16E+00	2.97E+00	1.11E+00	1.43E+01	6.52E+00	5.97E-01	5.82E+01	1.26E+01	nd	1.25E+00
2,4-Dimethylphenol		7.22E+00	nd	1.16E+00	nd	nd	2.18E-01	6.01E+01	8.16E+00	nd	nd
2,4-Dinitrophenol		nd	nd	1.16E+00	nd	nd	6.37E-01	6.01E+01	nd	nd	1.21E+00
2,4-Dinitrotoluene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,6-Dinitrotoluene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Chloroethanol phosphate (3:1)		1.19E+00	1.60E+00	3.40E-01	8.52E+00	6.30E+00	1.01E-01	3.71E+01	1.01E+01	5.22E-01	5.28E-01
2-Chloronaphthalene		9.73E-02	nd	nd	nd	nd	nd	nd	nd	1.07E-02	nd
2-Chlorophenol		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Methylnaphthalene		nd	5.22E-01	nd	nd	nd	1.03E-01	1.60E+00	nd	nd	2.43E-02
2-Methylphenol	o-Cresol	nd	nd	9.30E-01	1.33E+01	nd	5.58E-01	5.69E+01	nd	1.24E+00	1.31E+00
2-Nitroaniline	o-Nitroaniline	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Nitrophenol		nd	9.51E-01	nd	5.15E+00	nd	1.73E-01	nd	nd	nd	nd
3,3'-Dichlorobenzidine		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3B-Coprostanol		1.60E+02	nd	3.40E+01	3.85E+02	2.20E+02	2.23E+01	1.11E+03	1.90E+02	1.68E+01	1.19E+01
3-Nitroaniline	m-Nitroaniline	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,6-Dinitro-2-methylphenol		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Bromophenylphenyl ether		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Chloro-3-methylphenol	p-Chloro-m-cresol	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Chloroaniline		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Chlorophenylphenyl ether		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Methylphenol	p-Cresol	2.80E+01	3.74E+00	nd	1.39E+01	nd	5.00E+00	6.01E+01	4.20E+00	4.53E-01	1.33E+00
4-Nitroaniline	p-Nitroaniline	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Nitrophenol		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4-Nonylphenol		nd	nd	nd	1.78E+01	nd	nd	nd	nd	nd	nd
Benzoic acid		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Benzyl alcohol		2.38E+01	nd	nd	nd	nd	1.68E-01	nd	2.22E+00	nd	nd
bis(2-Chloroethoxy) methane		nd	nd	nd	nd	nd	nd	8.00E+00	nd	nd	nd
bis(2-Chloroethyl) ether		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bisphenol A		1.14E+01	3.36E+00	5.90E-01	3.30E+01	nd	3.21E-01	8.92E+01	3.95E+01	7.90E-01	nd
Caffeine		nd	8.62E+00	1.38E+01	9.28E+00	nd	2.37E+01	5.41E+01	1.79E+01	3.09E-01	nd
Carbazole		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Cholesterol		2.21E+02	4.99E+01	3.85E+01	6.32E+02	2.49E+02	3.57E+01	1.54E+03	1.95E+02	2.34E+01	1.36E+01
Dibenzofuran		1.18E-01	5.83E-01	1.05E-02	3.01E-01	7.47E-02	1.08E-01	1.54E+00	2.35E-01	1.20E-02	1.43E-01
Hexachlorobutadiene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hexachlorocyclopentadiene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hexachloroethane		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Isophorone		1.78E+00	nd	nd	4.40E+00	nd	nd	1.18E+01	nd	2.47E-01	nd
Nitrobenzene		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
N-Nitrosodimethylamine		nd	nd	nd	1.79E+01	nd	nd	nd	nd	nd	nd
N-Nitrosodi-n-propylamine		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
N-Nitrosodiphenylamine		nd	nd	nd	nd	nd	nd	nd	nd	nd	3.75E-01
Pentachlorophenol		1.12E+00	2.26E-01	7.82E-02	nd	nd	nd	nd	nd	nd	nd
Phenol		1.75E+01	6.72E+00	nd	nd	7.91E+00	1.17E+00	2.39E+02	1.27E+01	2.49E+00	nd
Retene		nd	nd	nd	nd	nd	nd	nd	nd	6.53E-03	nd
Triclosan		8.67E+00	3.21E+00	8.50E-01	3.00E+01	6.81E+00	8.26E-01	8.44E+01	1.82E+01	7.42E-01	1.00E+00
Triethyl citrate		1.62E+01	4.81E+00	4.91E+00	3.16E+01	4.91E+00	1.17E+00	9.08E+01	2.84E+01	7.69E-01	8.20E-01

Appendix G. Loading Rates for Each of the Ten POTWs

Chemical of Concern	Alternate Name	Bellingham STP (kg/year)	Bremerton STP (kg/year)	Burlington WWTP (kg/year)	City of Tacoma (Central No. 1) (kg/year)	Everett STP (Outfall 100) (kg/year)	Gig Harbor STP (kg/year)	King County West Point (kg/year)	Pierce County Chambers Creek STP (kg/year)	Shelton STP (kg/year)	Sumner STP (kg/year)
Pesticides											
2,4'-DDD		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,4'-DDE		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,4'-DDT		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDD		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDE		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DDT		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Aldrin		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
alpha-BHC		nd	nd	nd	nd	nd	2.65E-03	nd	nd	nd	nd
beta-BHC		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
delta-BHC		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
gamma-BHC	Lindane	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
cis-Chlordane		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
trans-Chlordane		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chlordane, technical		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Chlorpyriphos		nd	nd	nd	nd	9.71E-02	nd	nd	nd	nd	nd
Dacthal	DCPA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
DDMU		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dieldrin		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Endosulfan I		nd	nd	4.42E-03	nd	nd	5.00E-03	nd	nd	1.82E-02	9.10E-03
Endosulfan II		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Endosulfan sulfate		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Endrin		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Endrin aldehyde		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Endrin ketone		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Heptachlor		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Heptachlor epoxide		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Hexachlorobenzene		nd	1.34E-02	nd	nd	nd	nd	nd	nd	6.80E-03	nd
Methoxychlor		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mirex		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
cis-Nonachlor		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
trans-Nonachlor		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Oxychlordane		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Pentachloroanisole		nd	nd	9.75E-03	nd	3.66E-02	nd	nd	nd	nd	8.34E-03
Toxaphene		nd	nd	nd	2.37E+00	nd	6.28E-02	nd	nd	nd	nd
Herbicides											
2,4,5-T		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,4,5-TP	Silvex	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,4-D		nd	6.28E-01	1.11E-01	nd	nd	nd	1.03E+01	nd	nd	nd
2,4-DB	2,4-D butyric acid	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
3,5-Dichlorobenzoic acid		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Acifluorfen	Blazer	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bentazon		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Bromoxynil		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Clopyralid		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Dicamba I		nd	1.80E-01	nd	nd	nd	nd	4.09E+00	nd	nd	8.34E-02
Dichlorprop		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Diclofop-Methyl		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd

Appendix G. Loading Rates for Each of the Ten POTWs

Chemical of Concern	Alternate Name	Bellingham STP (kg/year)	Bremerton STP (kg/year)	Burlington WWTP (kg/year)	City of Tacoma (Central No. 1) (kg/year)	Everett STP (Outfall 100) (kg/year)	Gig Harbor STP (kg/year)	King County West Point (kg/year)	Pierce County Chambers Creek STP (kg/year)	Shelton STP (kg/year)	Sumner STP (kg/year)
Dinoseb		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Ioxynil		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
MCPA		nd	nd	nd	nd	nd	nd	1.23E+01	nd	nd	2.61E-01
MCPP	Mecoprop	7.65E-01	3.05E-01	nd	nd	nd	nd	nd	5.93E+00	nd	8.61E-02
Picloram		nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Triclopyr		nd	nd	1.06E-01	nd	nd	nd	5.37E+00	nd	2.25E-01	8.47E-02
Polybrominated Diphenyl Ethers (Congeners)											
2,4-DiBDE	BDE-007	nd	5.38E-05	1.38E-05	nd	2.75E-04	2.86E-05	nd	4.00E-04	nd	2.90E-05
2,6-DiBDE	BDE-010	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
4,4'-DiBDE	BDE-015	1.37E-04	6.15E-05	1.13E-04	3.96E-04	4.27E-03	9.55E-06	1.33E-03	1.81E-03	nd	6.82E-05
2,2',4-TrBDE	BDE-017	5.35E-04	1.77E-04	7.43E-04	2.15E-03	5.65E-03	8.12E-05	5.37E-03	8.18E-03	2.31E-04	5.90E-04
2,4,4'-TrBDE	BDE-028	1.45E-03	4.40E-04	1.82E-03	6.09E-03	1.21E-02	1.30E-04	1.29E-02	1.93E-02	4.14E-04	7.04E-04
2,4,6-TrBDE	BDE-030	1.27E-04	6.92E-05	nd	4.63E-04	3.00E-04	nd	1.27E-03	nd	3.50E-05	nd
2,2',4,4'-TeBDE	BDE-047	7.79E-02	3.19E-02	1.14E-02	4.04E-01	5.34E-01	7.92E-03	8.27E-01	1.74E-01	2.86E-02	1.39E-02
2,2',4,5'-TeBDE	BDE-049	3.04E-06	nd	nd	9.67E-03	1.85E-02	2.31E-04	2.24E-02	1.37E-02	6.24E-04	6.61E-04
2,2',4,5'/2,3',4',6-TeBDE	BDE-049/071	3.28E-03	1.12E-03	8.96E-04	1.42E-02	2.02E-02	1.79E-04	2.99E-02	1.99E-02	1.57E-03	8.25E-04
2,3',4,4'-TeBDE	BDE-066	1.36E-03	1.43E-03	2.83E-04	7.56E-03	2.58E-02	1.99E-04	1.56E-02	4.77E-03	2.38E-04	9.22E-04
2,3',4',6-TeBDE	BDE-071	nd	4.74E-04	1.22E-03	1.41E-03	2.27E-03	4.53E-05	3.07E-03	5.12E-03	9.81E-05	1.11E-04
3,3',4,4'-TeBDE	BDE-077	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,2',3,4,4'-PeBDE	BDE-085	2.21E-03	1.69E-03	2.35E-04	8.82E-03	1.86E-02	5.00E-04	3.31E-02	6.33E-03	1.24E-03	1.25E-03
2,2',4,4',5-PeBDE	BDE-099	6.40E-02	2.86E-02	9.69E-03	3.92E-01	5.13E-01	6.98E-03	7.69E-01	1.43E-01	3.45E-02	2.39E-02
2,2',4,4',6-PeBDE	BDE-100	1.33E-02	6.42E-03	2.22E-03	7.78E-02	9.93E-02	1.38E-03	1.52E-01	3.10E-02	7.27E-03	4.10E-03
2,3',4,4',6-PeBDE	BDE-119	6.60E-04	nd	1.56E-04	nd	nd	2.43E-05	nd	1.41E-03	nd	nd
3,3',4,4',5-PeBDE	BDE-126	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,2',3,4,4',5'-HxBDE	BDE-138	4.30E-04	nd	nd	2.46E-03	5.93E-03	nd	nd	nd	6.72E-05	2.76E-04
2,2',3,4,4',6-HxBDE	BDE-139	2.97E-04	nd	nd	4.21E-03	4.97E-03	nd	5.73E-03	7.45E-04	nd	4.85E-04
2,2',3,4,4',6'-HxBDE	BDE-140	2.44E-04	1.46E-04	nd	1.26E-03	1.94E-03	nd	nd	4.33E-04	nd	1.41E-04
2,2',4,4',5,5'-HxBDE	BDE-153	5.60E-03	3.78E-03	8.17E-04	3.50E-02	5.90E-02	1.05E-03	6.42E-02	1.04E-02	3.48E-03	3.44E-03
2,2',4,4',5,6'-HxBDE	BDE-154	3.80E-03	2.31E-03	6.24E-04	2.43E-02	3.39E-02	4.44E-04	4.73E-02	9.73E-03	2.56E-03	1.76E-03
2,3,3',4,4',5/3,3',4,4',5,5'-HxBDE	BDE-156/169	nd	nd	nd	nd	5.83E-04	nd	nd	nd	nd	nd
2,2',3,3',4,4',6-HpBDE	BDE-171	nd	nd	nd	nd	4.79E-04	nd	nd	nd	nd	nd
2,2',3,4,4',5,5'-HpBDE	BDE-180	nd	nd	nd	nd	7.52E-04	nd	nd	nd	nd	nd
2,2',3,4,4',5',6-HpBDE	BDE-183	4.77E-04	nd	nd	3.68E-03	7.98E-03	nd	6.19E-03	1.00E-03	2.88E-04	1.56E-04
2,2',3,4,4',6,6'-HpBDE	BDE-184	nd	nd	nd	nd	5.29E-04	nd	nd	nd	4.20E-05	nd
2,3,3',4,4',5',6-HpBDE	BDE-191	nd	nd	nd	nd	2.79E-04	nd	nd	nd	nd	nd
2,2',3,3',4,4',5,6'-OcBDE	BDE-196	nd	nd	nd	1.69E-03	7.08E-03	nd	4.71E-03	6.72E-04	1.48E-04	nd
2,2',3,3',4,4',6,6'/ 2,2',3,4,4',5,6,6'-OcBDE	BDE-197/204	nd	nd	nd	2.28E-03	5.12E-03	nd	5.26E-03	1.01E-03	1.08E-04	nd
2,2',3,3',4,5',6,6'-OcBDE	BDE-201	nd	nd	nd	5.76E-04	4.63E-03	nd	4.82E-03	8.19E-04	nd	nd
2,2',3,4,4',5,5',6-OcBDE	BDE-203	nd	nd	nd	1.05E-03	7.24E-03	nd	5.19E-03	1.64E-03	2.03E-04	nd
2,3,3',4,4',5,5',6-OcBDE	BDE-205	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	1.55E-03	1.26E-03	2.05E-04	1.83E-02	3.59E-02	8.17E-04	2.37E-02	3.82E-03	2.05E-03	nd
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	2.24E-03	9.39E-04	2.89E-04	1.23E-02	3.76E-02	9.45E-04	2.56E-02	4.97E-03	1.91E-03	nd
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208	1.06E-03	7.13E-04	1.66E-04	1.08E-02	3.66E-02	8.15E-04	1.60E-02	3.44E-03	1.64E-03	nd
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	2.29E-02	1.10E-02	8.53E-03	2.16E-01	4.21E-01	1.65E-02	3.00E-01	3.70E-02	2.23E-02	2.65E-03

Appendix G. Loading Rates for Each of the Ten POTWs

Chemical of Concern	Alternate Name	Bellingham STP (kg/year)	Bremerton STP (kg/year)	Burlington WWTP (kg/year)	City of Tacoma (Central No. 1) (kg/year)	Everett STP (Outfall 100) (kg/year)	Gig Harbor STP (kg/year)	King County West Point (kg/year)	Pierce County Chambers Creek STP (kg/year)	Shelton STP (kg/year)	Sumner STP (kg/year)
Polybrominated Diphenyl Ethers (Homologs)											
Decabromodiphenyl ether		2.29E-02	1.10E-02	6.79E-03	2.16E-01	4.21E-01	1.65E-02	3.00E-01	3.70E-02	2.23E-02	2.65E-03
Dibromodiphenyl ethers		1.37E-04	7.82E-05	9.40E-05	3.96E-04	4.55E-03	3.68E-05	1.33E-03	2.21E-03	nd	9.38E-05
Heptabromodiphenyl ethers		4.77E-04	nd	nd	3.68E-03	9.72E-03	nd	6.19E-03	1.00E-03	3.16E-04	1.56E-04
Hexabromodiphenyl ethers		1.02E-02	6.23E-03	1.44E-03	6.72E-02	1.06E-01	1.49E-03	1.17E-01	2.12E-02	6.09E-03	6.08E-03
Nonabromodiphenyl ethers		4.42E-03	2.17E-03	6.03E-04	4.15E-02	1.10E-01	2.58E-03	4.93E-02	1.16E-02	5.61E-03	nd
Octabromodiphenyl ethers		nd	nd	nd	5.46E-03	2.41E-02	nd	1.04E-02	3.77E-03	4.18E-04	nd
Pentabromodiphenyl ethers		8.01E-02	3.67E-02	1.23E-02	4.78E-01	6.31E-01	8.89E-03	9.54E-01	1.81E-01	4.30E-02	2.92E-02
Tetrabromodiphenyl ethers		8.10E-02	3.41E-02	1.28E-02	4.25E-01	5.80E-01	8.34E-03	8.71E-01	1.98E-01	3.00E-02	1.56E-02
Tribromodiphenyl ethers		2.10E-03	6.13E-04	2.57E-03	8.67E-03	1.80E-02	2.12E-04	1.87E-02	2.76E-02	6.76E-04	1.29E-03
Perfluorinated Compounds											
Perfluorobutane sulfonate	PFBS	nd	5.55E-02	nd	nd	nd	nd	9.46E-01	1.94E-01	nd	nd
Perfluorobutanoate	PFBA	2.20E-02	9.60E-03	nd	2.95E-02	2.75E-02	1.05E-03	2.42E-01	1.05E-01	4.79E-03	4.78E-03
Perfluorodecanoate	PFDA	3.56E-02	1.34E-02	8.89E-03	5.72E-02	3.27E-02	7.24E-03	4.54E-01	1.14E-01	1.66E-02	2.54E-02
Perfluorododecanoate	PFDoA	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Perfluoroheptanoate	PFHpA	7.33E-02	1.64E-02	9.97E-03	2.11E-01	1.33E-01	5.54E-03	5.60E-01	1.29E-01	8.99E-03	1.56E-02
Perfluorohexane sulfonate	PFHxS	4.86E-02	2.60E-02	6.25E-03	1.57E-01	4.34E-02	nd	3.69E-01	1.87E-01	nd	nd
Perfluorohexanoate	PFHxA	2.77E-01	7.46E-02	3.91E-02	4.63E-01	2.05E-01	4.21E-02	1.87E+00	3.78E-01	9.59E-02	1.15E-01
Perfluorononanoate	PFNA	2.17E-01	3.91E-02	1.95E-02	1.58E-01	1.19E+00	1.98E-02	6.12E-01	1.05E-01	6.43E-03	2.14E-02
Perfluorooctane sulfonamide	PFOSA	nd	nd	3.61E-03	nd	nd	nd	nd	nd	nd	3.21E-03
Perfluorooctane sulfonate	PFOS	5.96E-02	1.77E-01	1.07E-02	1.92E-01	1.29E-01	4.38E-03	2.60E+00	1.90E-01	7.37E-03	1.84E-02
Perfluorooctanoate	PFOA	2.46E-01	6.66E-02	5.33E-02	7.86E-01	3.01E-01	5.64E-02	2.25E+00	2.98E-01	9.89E-02	1.62E-01
Perfluoropentanoate	PFPeA	3.36E-02	4.93E-03	8.78E-03	1.45E-01	2.88E-02	1.59E-02	1.62E-01	4.94E-02	3.43E-02	4.38E-02
Perfluoroundecanoate	PFUnA	nd	nd	nd	nd	1.23E-02	nd	nd	nd	nd	nd
Polychlorinated Biphenyls (Congeners)											
2-MoCB	PCB-001	na	nd	na	1.14E-03	7.44E-04	na	2.44E-03	2.50E-04	nd	na
3-MoCB	PCB-002	na	nd	na	nd	nd	na	nd	nd	nd	na
4-MoCB	PCB-003	na	nd	na	8.00E-04	nd	na	1.73E-03	3.21E-04	nd	na
2,2'-DiCB	PCB-004	na	nd	na	2.33E-03	1.52E-02	na	6.00E-03	7.17E-04	nd	na
2,3/2,4'-DiCB	PCB-005/008	na	nd	na	3.57E-03	nd	na	nd	nd	nd	na
2,3'-DiCB	PCB-006	na	nd	na	6.13E-04	4.48E-04	na	1.87E-03	4.15E-04	nd	na
2,4-DiCB	PCB-007	na	nd	na	nd	2.04E-04	na	1.57E-03	nd	nd	na
2,5-DiCB	PCB-009	na	nd	na	3.05E-04	nd	na	nd	nd	nd	na
2,6-DiCB	PCB-010	na	nd	na	nd	nd	na	nd	nd	nd	na
3,3'-DiCB	PCB-011	na	nd	na	nd	nd	na	nd	nd	nd	na
3,4/3,4'-DiCB	PCB-012/013	na	nd	na	nd	3.55E-04	na	nd	6.58E-04	nd	na
3,5-DiCB	PCB-014	na	nd	na	nd	nd	na	nd	nd	nd	na
4,4'-DiCB	PCB-015	na	nd	na	9.95E-04	1.89E-03	na	nd	nd	nd	na
2,2',3-TrCB	PCB-016	na	8.50E-05	na	1.34E-03	1.29E-03	na	4.58E-03	4.40E-04	nd	na
2,2',4-TrCB	PCB-017	na	nd	na	1.31E-03	2.43E-03	na	2.75E-03	3.29E-04	nd	na
2,2',5-TrCB	PCB-018	na	nd	na	3.74E-03	3.88E-03	na	9.03E-03	9.91E-04	nd	na
2,2',6-TrCB	PCB-019	na	nd	na	5.06E-04	2.42E-03	na	nd	nd	nd	na
2,3,3'/2,3',4'-TriCB	PCB-020/033	na	8.14E-05	na	2.60E-03	1.42E-03	na	4.26E-03	4.35E-04	nd	na
2,3,4-TrCB	PCB-021	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,4'-TrCB	PCB-022	na	nd	na	1.49E-03	1.85E-03	na	2.56E-03	3.09E-04	nd	na
2,3,5-TrCB	PCB-023	na	nd	na	nd	nd	na	nd	nd	nd	na

Appendix G. Loading Rates for Each of the Ten POTWs

Chemical of Concern	Alternate Name	Bellingham STP (kg/year)	Bremerton STP (kg/year)	Burlington WWTP (kg/year)	City of Tacoma (Central No. 1) (kg/year)	Everett STP (Outfall 100) (kg/year)	Gig Harbor STP (kg/year)	King County West Point (kg/year)	Pierce County Chambers Creek STP (kg/year)	Shelton STP (kg/year)	Sumner STP (kg/year)
2,3,6-TrCB	PCB-024	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3',4-TrCB	PCB-025	na	nd	na	2.94E-04	4.70E-04	na	nd	nd	nd	na
2,3',5-TrCB	PCB-026	na	nd	na	5.85E-04	8.00E-04	na	nd	nd	nd	na
2,3',6-TrCB	PCB-027	na	nd	na	nd	5.63E-04	na	nd	nd	nd	na
2,4,4'-TrCB	PCB-028	na	8.68E-05	na	3.19E-03	4.16E-03	na	5.35E-03	5.36E-04	4.29E-05	na
2,4,5-TrCB	PCB-029	na	nd	na	nd	nd	na	nd	nd	nd	na
2,4,6-TrCB	PCB-030	na	nd	na	nd	nd	na	nd	nd	nd	na
2,4',5-TrCB	PCB-031	na	9.69E-05	na	3.38E-03	4.23E-03	na	6.31E-03	7.49E-04	4.20E-05	na
2,4',6-TrCB	PCB-032	na	nd	na	1.12E-03	1.95E-03	na	nd	nd	nd	na
2,3',5'-TrCB	PCB-034	na	nd	na	nd	nd	na	nd	nd	nd	na
3,3',4-TrCB	PCB-035	na	nd	na	nd	3.62E-04	na	nd	nd	nd	na
3,3',5-TrCB	PCB-036	na	nd	na	nd	3.16E-04	na	nd	nd	nd	na
3,4,4'-TrCB	PCB-037	na	nd	na	9.84E-04	1.63E-03	na	1.93E-03	5.22E-04	nd	na
3,4,5-TrCB	PCB-038	na	nd	na	nd	nd	na	nd	nd	nd	na
3,4',5-TrCB	PCB-039	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3'-TeCB	PCB-040	na	nd	na	6.46E-04	6.42E-04	na	nd	nd	nd	na
2,3,4',6-TeCB	PCB-041	na	nd	na	3.13E-04	3.52E-04	na	nd	nd	nd	na
2,2',3,4'-TeCB	PCB-042	na	nd	na	8.00E-04	1.10E-03	na	nd	nd	nd	na
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049	na	nd	na	2.60E-03	3.59E-03	na	4.67E-03	5.14E-04	3.93E-05	na
2,2',3,5'-TeCB	PCB-044	na	nd	na	3.49E-03	4.91E-03	na	nd	nd	nd	na
2,2',3,6-TeCB	PCB-045	na	nd	na	4.53E-04	5.04E-04	na	nd	nd	nd	na
2,2',3,6'-TeCB	PCB-046	na	nd	na	nd	2.87E-04	na	nd	nd	nd	na
2,2',4,4'/2,2',4,5-TeCB	PCB-047/048	na	nd	na	7.80E-04	1.20E-03	na	1.38E-03	nd	nd	na
2,2',4,6-TeCB	PCB-050	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',4,6'-TeCB	PCB-051	na	nd	na	nd	5.76E-04	na	nd	nd	nd	na
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069	na	nd	na	4.12E-03	6.87E-03	na	1.15E-02	1.08E-03	nd	na
2,2',5,6'-TeCB	PCB-053	na	nd	na	4.45E-04	8.90E-04	na	1.54E-03	nd	nd	na
2,2',6,6'-TeCB	PCB-054	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4-TeCB	PCB-055	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4'-TeCB	PCB-056	na	nd	na	1.38E-03	1.68E-03	na	2.67E-03	nd	nd	na
2,3,3',5-TeCB	PCB-057	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',5'-TeCB	PCB-058	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',6-TeCB	PCB-059	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,4,4'-TeCB	PCB-060	na	nd	na	4.75E-04	8.54E-04	na	nd	nd	nd	na
2,3,4,5-TeCB	PCB-061	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,4,6-TeCB	PCB-062	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,4',5-TeCB	PCB-063	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,4',6/2,3',5,5'-TeCB	PCB-064/072	na	nd	na	1.51E-03	1.80E-03	na	2.25E-03	nd	nd	na
2,3,5,6/2,4,4',6-TeCB	PCB-065/075	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3',4,4'-TeCB	PCB-066	na	6.24E-05	na	2.53E-03	3.59E-03	na	3.86E-03	nd	3.13E-05	na
2,3',4,5-TeCB	PCB-067	na	nd	na	nd	1.55E-04	na	nd	nd	nd	na
2,2',3,4-TeCB	PCB-068	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3',4',5-TeCB	PCB-070	na	nd	na	3.68E-03	6.40E-03	na	nd	nd	nd	na
2,3',4',6-TeCB	PCB-071	na	nd	na	8.08E-04	1.00E-03	na	nd	nd	nd	na
2,2',5,5'-TeCB	PCB-073	na	nd	na	nd	nd	na	nd	nd	nd	na
2,4,4',5-TeCB	PCB-074	na	nd	na	1.54E-03	2.26E-03	na	2.51E-03	nd	nd	na
2,3',4',5'-TeCB	PCB-076	na	nd	na	nd	nd	na	nd	nd	nd	na
3,3',4,4'-TeCB	PCB-077	na	nd	na	nd	5.73E-04	na	nd	nd	nd	na
3,3',4,5-TeCB	PCB-078	na	nd	na	nd	nd	na	nd	nd	nd	na

Appendix G. Loading Rates for Each of the Ten POTWs

Chemical of Concern	Alternate Name	Bellingham STP (kg/year)	Bremerton STP (kg/year)	Burlington WWTP (kg/year)	City of Tacoma (Central No. 1) (kg/year)	Everett STP (Outfall 100) (kg/year)	Gig Harbor STP (kg/year)	King County West Point (kg/year)	Pierce County Chambers Creek STP (kg/year)	Shelton STP (kg/year)	Sumner STP (kg/year)
3,3',4,5'-TeCB	PCB-079	na	nd	na	nd	nd	na	nd	nd	nd	na
3,3',5,5'-TeCB	PCB-080	na	nd	na	nd	nd	na	nd	nd	nd	na
3,4,4',5-TeCB	PCB-081	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4-PeCB	PCB-082	na	nd	na	4.55E-04	1.35E-03	na	1.37E-03	nd	nd	na
2,2',3,3',5-PeCB	PCB-083	na	nd	na	3.35E-04	3.76E-04	na	nd	nd	nd	na
2,2',3,3',6-PeCB	PCB-084	na	nd	na	8.79E-04	1.79E-03	na	2.06E-03	nd	nd	na
2,2',3,4,4'-PeCB	PCB-085	na	nd	na	7.34E-04	1.77E-03	na	1.44E-03	nd	nd	na
2,2',3,4,5/2,2',3,4',5'/ 2,3,4',5,6-PeCB	PCB-086/097/117	na	nd	na	1.42E-03	3.40E-03	na	nd	nd	nd	na
2,2',3,4,5'/2,3,4,4',6-PeCB	PCB-087/115	na	nd	na	1.94E-03	4.53E-03	na	nd	nd	nd	na
2,2',3,4,6-PeCB	PCB-088	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4,6'-PeCB	PCB-089	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4',5-PeCB	PCB-090	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4',6-PeCB	PCB-091	na	nd	na	6.60E-04	1.07E-03	na	1.52E-03	2.77E-04	nd	na
2,2',3,5,5'-PeCB	PCB-092	na	nd	na	1.24E-03	2.67E-03	na	3.33E-03	3.67E-04	2.97E-05	na
2,2',3,5,6/2,2',3,5',6/2,2',3,4',6'/ 2,2',4,5,6'-PeCB	PCB-093/095/098/102	na	nd	na	4.40E-03	8.80E-03	na	nd	nd	nd	na
2,2',3,5,6'-PeCB	PCB-094	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,6,6'-PeCB	PCB-096	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',4,4',5-PeCB	PCB-099	na	nd	na	2.10E-03	4.35E-03	na	4.90E-03	nd	nd	na
2,2',4,4',6-PeCB	PCB-100	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',4,5,5'-PeCB	PCB-101	na	nd	na	5.66E-03	1.14E-02	na	nd	nd	nd	na
2,2',4,5',6-PeCB	PCB-103	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',4,6,6'-PeCB	PCB-104	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4,4'-PeCB	PCB-105	na	nd	na	1.55E-03	3.94E-03	na	3.80E-03	nd	3.66E-05	na
2,3,3',4,5-PeCB	PCB-106	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4',5/2,3,3',4,5'-PeCB	PCB-107/108	na	nd	na	nd	7.16E-04	na	nd	nd	nd	na
2,3,3',4,6-PeCB	PCB-109	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4',6-PeCB	PCB-110	na	nd	na	5.36E-03	1.11E-02	na	nd	nd	nd	na
2,3,3',5,5'-PeCB	PCB-111	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',5,6/2,3',4,4',6-PeCB	PCB-112/119	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',5',6-PeCB	PCB-113	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,4,4',5-PeCB	PCB-114	na	nd	na	nd	3.57E-04	na	nd	nd	nd	na
2,3,4,5,6/2,3',4',5',6-PeCB	PCB-116/125	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3',4,4',5-PeCB	PCB-118	na	nd	na	3.71E-03	9.49E-03	na	9.20E-03	nd	nd	na
2,3',4,5,5'-PeCB	PCB-120	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3',4,5',6-PeCB	PCB-121	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4',5'-PeCB	PCB-122	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3',4,4',5'-PeCB	PCB-123	na	nd	na	nd	2.81E-04	na	nd	nd	nd	na
2,3',4',5,5'-PeCB	PCB-124	na	nd	na	nd	3.93E-04	na	nd	nd	nd	na
3,3',4,4',5-PeCB	PCB-126	na	nd	na	nd	1.95E-04	na	nd	nd	nd	na
3,3',4,5,5'-PeCB	PCB-127	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,4'-HxCB	PCB-128	na	nd	na	9.62E-04	2.37E-03	na	1.77E-03	nd	nd	na
2,2',3,3',4,5-HxCB	PCB-129	na	nd	na	nd	4.34E-04	na	nd	nd	nd	na
2,2',3,3',4,5'-HxCB	PCB-130	na	nd	na	nd	6.48E-04	na	nd	nd	nd	na
2,2',3,3',4,6-HxCB	PCB-131	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,6'-HxCB	PCB-132	na	nd	na	2.18E-03	4.26E-03	na	nd	nd	nd	na
2,2',3,3',5,5'-HxCB	PCB-133	na	nd	na	nd	1.58E-04	na	nd	nd	nd	na
2,2',3,3',5,6-HxCB	PCB-134	na	nd	na	nd	5.52E-04	na	nd	nd	nd	na

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2,2',3,3',5,6'-HxCB	PCB-135	na	nd	na	6.68E-04	1.13E-03	na	nd	nd	nd	na
2,2',3,3',6,6'-HxCB	PCB-136	na	nd	na	1.04E-03	1.34E-03	na	1.86E-03	nd	nd	na
2,2',3,4,4',5-HxCB	PCB-137	na	nd	na	nd	4.51E-04	na	nd	nd	nd	na
2,2',3,4,4',5'-HxCB	PCB-138	na	nd	na	4.62E-03	1.05E-02	na	8.74E-03	nd	nd	na
2,2',3,4,4',6/2,2',3,4',5',6-HxCB	PCB-139/149	na	nd	na	4.89E-03	8.45E-03	na	nd	nd	nd	na
2,2',3,4,4',6'-HxCB	PCB-140	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4,5,5'-HxCB	PCB-141	na	nd	na	9.18E-04	1.33E-03	na	1.47E-03	nd	nd	na
2,2',3,4,5,6-HxCB	PCB-142	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4,5,6'-HxCB	PCB-143	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4,5',6-HxCB	PCB-144	na	nd	na	nd	2.86E-04	na	nd	nd	nd	na
2,2',3,4,6,6'-HxCB	PCB-145	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4',5,5'-HxCB	PCB-146	na	nd	na	9.89E-04	1.46E-03	na	1.28E-03	nd	nd	na
2,2',3,4',5,6-HxCB	PCB-147	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4',5,6'-HxCB	PCB-148	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4',6,6'-HxCB	PCB-150	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,5,5',6-HxCB	PCB-151	na	nd	na	1.50E-03	2.09E-03	na	2.57E-03	nd	3.79E-05	na
2,2',3,5,6,6'-HxCB	PCB-152	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',4,4',5,5'-HxCB	PCB-153	na	nd	na	5.28E-03	9.76E-03	na	nd	nd	nd	na
2,2',4,4',5,6'-HxCB	PCB-154	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',4,4',6,6'-HxCB	PCB-155	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4,4',5-HxCB	PCB-156	na	nd	na	5.55E-04	1.27E-03	na	nd	nd	nd	na
2,3,3',4,4',5'-HxCB	PCB-157	na	nd	na	nd	2.56E-04	na	nd	nd	nd	na
2,3,3',4,4',6-HxCB	PCB-158	na	nd	na	5.06E-04	1.21E-03	na	nd	nd	nd	na
2,3,3',4,5,5'-HxCB	PCB-159	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4,5,6-HxCB	PCB-160	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4,5',6-HxCB	PCB-161	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4',5,5'-HxCB	PCB-162	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164	na	nd	na	1.70E-03	3.02E-03	na	2.76E-03	2.77E-04	3.16E-05	na
2,3,3',5,5',6-HxCB	PCB-165	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,4,4',5,6-HxCB	PCB-166	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3',4,4',5,5'-HxCB	PCB-167	na	nd	na	nd	4.81E-04	na	nd	nd	nd	na
2,3',4,4',5',6-HxCB	PCB-168	na	nd	na	nd	nd	na	nd	nd	nd	na
3,3',4,4',5,5'-HxCB	PCB-169	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,4',5-HpCB	PCB-170	na	nd	na	1.16E-03	1.26E-03	na	nd	nd	nd	na
2,2',3,3',4,4',6-HpCB	PCB-171	na	nd	na	4.75E-04	4.39E-04	na	nd	nd	nd	na
2,2',3,3',4,5,5'-HpCB	PCB-172	na	nd	na	nd	3.26E-04	na	nd	nd	nd	na
2,2',3,3',4,5,6-HpCB	PCB-173	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,5,6'-HpCB	PCB-174	na	nd	na	1.82E-03	1.90E-03	na	nd	nd	4.27E-05	na
2,2',3,3',4,5',6-HpCB	PCB-175	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,6,6'-HpCB	PCB-176	na	nd	na	nd	2.40E-04	na	nd	nd	nd	na
2,2',3,3',4,5',6'-HpCB	PCB-177	na	nd	na	7.83E-04	1.12E-03	na	nd	nd	nd	na
2,2',3,3',5,5',6-HpCB	PCB-178	na	nd	na	3.41E-04	4.23E-04	na	nd	nd	nd	na
2,2',3,3',5,6,6'-HpCB	PCB-179	na	nd	na	8.00E-04	8.12E-04	na	nd	nd	nd	na
2,2',3,4,4',5,5'-HpCB	PCB-180	na	nd	na	3.90E-03	3.91E-03	na	4.52E-03	3.93E-04	9.32E-05	na
2,2',3,4,4',5,6-HpCB	PCB-181	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4,4',5,6'/ 2,2',3,4',5,5',6-HpCB	PCB-182/187	na	nd	na	2.06E-03	2.71E-03	na	2.15E-03	2.74E-04	7.12E-05	na
2,2',3,4,4',5',6-HpCB	PCB-183	na	nd	na	9.32E-04	1.27E-03	na	nd	nd	nd	na
2,2',3,4,4',6,6'-HpCB	PCB-184	na	nd	na	nd	nd	na	nd	nd	nd	na

Appendix G. Loading Rates for Each of the Ten POTWs

Chemical of Concern	Alternate Name	Bellingham STP (kg/year)	Bremerton STP (kg/year)	Burlington WWTP (kg/year)	City of Tacoma (Central No. 1) (kg/year)	Everett STP (Outfall 100) (kg/year)	Gig Harbor STP (kg/year)	King County West Point (kg/year)	Pierce County Chambers Creek STP (kg/year)	Shelton STP (kg/year)	Sumner STP (kg/year)
2,2',3,4,5,5',6-HpCB	PCB-185	na	nd	na	nd	2.31E-04	na	nd	nd	nd	na
2,2',3,4,5,6,6'-HpCB	PCB-186	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,4',5,6,6'-HpCB	PCB-188	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4,4',5,5'-HpCB	PCB-189	na	nd	na	nd	1.47E-04	na	nd	nd	nd	na
2,3,3',4,4',5,6-HpCB	PCB-190	na	nd	na	3.05E-04	3.37E-04	na	nd	nd	nd	na
2,3,3',4,4',5',6-HpCB	PCB-191	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4,5,5',6-HpCB	PCB-192	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4',5,5',6-HpCB	PCB-193	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,4',5,5'-OcCB	PCB-194	na	nd	na	5.85E-04	7.45E-04	na	nd	nd	nd	na
2,2',3,3',4,4',5,6-OcCB	PCB-195	na	nd	na	nd	3.03E-04	na	nd	nd	nd	na
2,2',3,3',4,4',5,6'-OcCB	PCB-196	na	nd	na	4.31E-04	4.81E-04	na	nd	nd	2.82E-05	na
2,2',3,3',4,4',6,6'-OcCB	PCB-197	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,5,5',6-OcCB	PCB-198	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,5,5',6'-OcCB	PCB-199	na	nd	na	1.07E-03	1.29E-03	na	nd	nd	3.49E-05	na
2,2',3,3',4,5,6,6'-OcCB	PCB-200	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,5',6,6'-OcCB	PCB-201	na	nd	na	nd	1.89E-04	na	nd	nd	nd	na
2,2',3,3',5,5',6,6'-OcCB	PCB-202	na	nd	na	nd	2.70E-04	na	nd	nd	nd	na
2,2',3,4,4',5,5',6-OcCB	PCB-203	na	nd	na	6.27E-04	8.25E-04	na	nd	nd	3.00E-05	na
2,2',3,4,4',5,6,6'-OcCB	PCB-204	na	nd	na	nd	nd	na	nd	nd	nd	na
2,3,3',4,4',5,5',6-OcCB	PCB-205	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,4',5,5',6-NoCB	PCB-206	na	nd	na	4.04E-04	7.41E-04	na	nd	nd	3.03E-05	na
2,2',3,3',4,4',5,6,6'-NoCB	PCB-207	na	nd	na	nd	nd	na	nd	nd	nd	na
2,2',3,3',4,5,5',6,6'-NoCB	PCB-208	na	nd	na	nd	2.58E-04	na	nd	nd	nd	na
2,2',3,3',4,4',5,5',6,6'-DeCB	PCB-209	na	nd	na	nd	nd	na	nd	nd	nd	na
Polychlorinated Biphenyls (Homologs)											
Decachlorobiphenyl		na	nd	na	nd	3.38E-04	na	nd	nd	nd	na
Dichlorobiphenyls		na	nd	na	1.04E-02	2.34E-02	na	2.91E-02	5.62E-03	nd	na
Heptachlorobiphenyls		na	nd	na	1.26E-02	1.47E-02	na	6.67E-03	3.93E-04	1.64E-04	na
Hexachlorobiphenyls		na	nd	na	2.58E-02	5.14E-02	na	4.30E-02	nd	nd	na
Monochlorobiphenyls		na	nd	na	1.94E-03	7.44E-04	na	4.17E-03	5.71E-04	nd	na
Nonachlorobiphenyls		na	nd	na	4.04E-04	9.99E-04	na	nd	nd	nd	na
Octachlorobiphenyls		na	nd	na	2.71E-03	3.17E-03	na	nd	nd	3.49E-05	na
Pentachlorobiphenyls		na	nd	na	3.00E-02	6.77E-02	na	7.25E-02	nd	nd	na
Tetrachlorobiphenyls		na	nd	na	2.56E-02	3.83E-02	na	4.53E-02	3.27E-03	2.07E-04	na
Trichlorobiphenyls		na	4.45E-04	na	2.05E-02	2.78E-02	na	3.68E-02	4.31E-03	1.36E-04	na
Metals											
Copper		7.56E+01	2.22E+01	8.88E+00	2.58E+02	1.26E+02	1.15E+01	1.64E+03	2.84E+02	2.14E+01	4.22E+01
Lead		7.65E+00	1.40E+00	8.62E-01	1.81E+01	1.24E+01	7.15E-01	4.93E+01	7.29E+00	1.03E+00	4.58E-01
Zinc		7.17E+02	1.04E+02	1.19E+02	1.13E+03	3.48E+02	9.56E+01	4.58E+03	8.65E+02	1.34E+02	1.43E+02

Key:

The precision of the data in this table is only two significant figures.

na = Chemical was not analyzed during either the winter or summer sampling event.

nd = Chemical was not detected during either the winter or summer sampling event.

kg/year = Kilograms per year.

Appendix H.

Estimated Loadings to Puget Sound

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Admiralty Inlet			Commencement Bay			Hood Canal (North)			Hood Canal (South)			Main Basin		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
Polycyclic Aromatic Hydrocarbons (kg/year)																
Low Molecular Weight PAHs (LPAHs)																
Fluorene		1.80E-03	9.99E-03	2.39E-02	6.58E-02	3.66E-01	8.75E-01	3.97E-04	2.21E-03	5.28E-03	3.18E-05	1.77E-04	4.22E-04	3.92E-01	2.18E+00	5.22E+00
Phenanthrene		6.14E-03	7.16E-03	1.82E-02	2.25E-01	2.63E-01	6.68E-01	1.36E-03	1.58E-03	4.03E-03	1.09E-04	1.27E-04	3.22E-04	1.34E+00	1.57E+00	3.98E+00
Entire Chemical Class:		8.76E-03	2.16E-02	9.33E-02	3.21E-01	7.90E-01	3.42E+00	1.94E-03	4.77E-03	2.06E-02	1.55E-04	3.81E-04	1.65E-03	1.91E+00	4.71E+00	2.04E+01
High Molecular Weight PAHs (HPAHs)																
Fluoranthene		5.31E-03	5.97E-03	1.06E-02	1.95E-01	2.19E-01	3.88E-01	1.17E-03	1.32E-03	2.34E-03	9.39E-05	1.06E-04	1.87E-04	1.16E+00	1.30E+00	2.31E+00
Pyrene		5.88E-03	7.73E-03	1.08E-02	2.16E-01	2.83E-01	3.96E-01	1.30E-03	1.71E-03	2.39E-03	1.04E-04	1.37E-04	1.91E-04	1.28E+00	1.69E+00	2.36E+00
Entire Chemical Class:		9.93E-03	1.32E-02	2.00E-02	3.64E-01	4.84E-01	7.32E-01	2.20E-03	2.92E-03	4.42E-03	1.76E-04	2.33E-04	3.53E-04	2.17E+00	2.88E+00	4.37E+00
Total PAHs (LPAHs+HPAHs)		2.02E-02	4.96E-02	1.23E-01	7.40E-01	1.82E+00	4.50E+00	4.47E-03	1.10E-02	2.71E-02	3.57E-04	8.78E-04	2.17E-03	4.41E+00	1.08E+01	2.68E+01
Phthalates (kg/year)																
bis(2-Ethylhexyl) phthalate		5.78E-01	1.18E+00	2.42E+00	2.12E+01	4.31E+01	8.87E+01	1.28E-01	2.60E-01	5.35E-01	1.02E-02	2.08E-02	4.28E-02	1.26E+02	2.57E+02	5.29E+02
Entire Chemical Class:		5.78E-01	1.46E+00	2.43E+00	2.12E+01	5.37E+01	8.90E+01	1.28E-01	3.24E-01	5.37E-01	1.02E-02	2.59E-02	4.29E-02	1.26E+02	3.20E+02	5.31E+02
Other Base/Neutral/Acid Extractables (kg/year)																
1,4-Dichlorobenzene		1.67E-01	2.70E-01	6.03E-01	6.10E+00	9.90E+00	2.21E+01	3.68E-02	5.97E-02	1.33E-01	2.94E-03	4.78E-03	1.07E-02	3.64E+01	5.90E+01	1.32E+02
2,4,6-Trichlorophenol		6.06E-02	1.19E-01	1.92E-01	2.22E+00	4.38E+00	7.02E+00	1.34E-02	2.64E-02	4.24E-02	1.07E-03	2.11E-03	3.39E-03	1.32E+01	2.61E+01	4.19E+01
2-Chloroethanol phosphate (3:1)		2.01E-01	2.89E-01	3.83E-01	7.37E+00	1.06E+01	1.40E+01	4.45E-02	6.39E-02	8.47E-02	3.56E-03	5.11E-03	6.78E-03	4.39E+01	6.32E+01	8.38E+01
3B-Coprostanol		8.17E+00	1.14E+01	1.85E+01	2.99E+02	4.17E+02	6.79E+02	1.81E+00	2.51E+00	4.10E+00	1.44E-01	2.01E-01	3.28E-01	1.78E+03	2.49E+03	4.05E+03
4-Methylphenol	p-Cresol	2.64E-01	4.11E-01	6.25E-01	9.67E+00	1.51E+01	2.29E+01	5.83E-02	9.08E-02	1.38E-01	4.67E-03	7.26E-03	1.10E-02	5.77E+01	8.98E+01	1.36E+02
Bisphenol A		3.33E-01	3.52E-01	9.49E-01	1.22E+01	1.29E+01	3.48E+01	7.35E-02	7.78E-02	2.10E-01	5.88E-03	6.22E-03	1.68E-02	7.27E+01	7.69E+01	2.07E+02
Caffeine		7.75E-02	1.90E-01	8.80E-01	2.84E+00	6.97E+00	3.22E+01	1.71E-02	4.21E-02	1.94E-01	1.37E-03	3.36E-03	1.56E-02	1.69E+01	4.16E+01	1.92E+02
Cholesterol		1.06E+01	1.57E+01	2.14E+01	3.88E+02	5.76E+02	7.83E+02	2.34E+00	3.47E+00	4.72E+00	1.87E-01	2.78E-01	3.78E-01	2.31E+03	3.43E+03	4.67E+03
Dibenzofuran		3.18E-03	7.73E-03	2.11E-02	1.16E-01	2.83E-01	7.72E-01	7.02E-04	1.71E-03	4.65E-03	5.62E-05	1.37E-04	3.72E-04	6.94E-01	1.69E+00	4.60E+00
Phenol		5.19E-01	9.24E-01	1.29E+00	1.90E+01	3.39E+01	4.72E+01	1.15E-01	2.04E-01	2.85E-01	9.18E-03	1.63E-02	2.28E-02	1.13E+02	2.02E+02	2.81E+02
Triclosan		4.34E-01	6.79E-01	1.07E+00	1.59E+01	2.49E+01	3.93E+01	9.59E-02	1.50E-01	2.37E-01	7.67E-03	1.20E-02	1.89E-02	9.47E+01	1.48E+02	2.34E+02
Triethyl citrate		6.25E-01	1.04E+00	1.38E+00	2.29E+01	3.80E+01	5.07E+01	1.38E-01	2.29E-01	3.06E-01	1.11E-02	1.83E-02	2.44E-02	1.37E+02	2.27E+02	3.02E+02
Polybrominated Diphenyl Ethers (Congeners) (kg/year)																
4,4'-DiBDE	BDE-015	1.09E-05	1.53E-05	5.85E-05	4.01E-04	5.62E-04	2.15E-03	2.42E-06	3.39E-06	1.29E-05	1.94E-07	2.71E-07	1.03E-06	2.39E-03	3.35E-03	1.28E-02
2,2',4-TrBDE	BDE-017	5.59E-05	1.07E-04	3.47E-04	2.05E-03	3.93E-03	1.27E-02	1.24E-05	2.37E-05	7.67E-05	9.89E-07	1.89E-06	6.13E-06	1.22E-02	2.34E-02	7.58E-02
2,4,4'-TrBDE	BDE-028	1.21E-04	2.44E-04	5.78E-04	4.44E-03	8.96E-03	2.12E-02	2.68E-05	5.40E-05	1.28E-04	2.14E-06	4.32E-06	1.02E-05	2.65E-02	5.34E-02	1.26E-01
2,2',4,4'-TeBDE	BDE-047	6.70E-03	8.21E-03	1.33E-02	2.45E-01	3.01E-01	4.86E-01	1.48E-03	1.82E-03	2.93E-03	1.18E-04	1.45E-04	2.35E-04	1.46E+00	1.79E+00	2.90E+00
2,2',4,5'-TeBDE	BDE-049	7.90E-05	2.73E-04	4.07E-04	2.89E-03	1.00E-02	1.49E-02	1.75E-05	6.03E-05	8.99E-05	1.40E-06	4.82E-06	7.19E-06	1.73E-02	5.96E-02	8.88E-02
2,2',4,5'/2,3',4',6-TeBDE	BDE-049/071	2.55E-04	4.35E-04	7.01E-04	9.36E-03	1.59E-02	2.57E-02	5.65E-05	9.61E-05	1.55E-04	4.52E-06	7.69E-06	1.24E-05	5.58E-02	9.50E-02	1.53E-01
2,3',4,4'-TeBDE	BDE-066	5.80E-05	1.91E-04	5.09E-04	2.13E-03	7.00E-03	1.87E-02	1.28E-05	4.22E-05	1.13E-04	1.03E-06	3.38E-06	9.00E-06	1.27E-02	4.17E-02	1.11E-01

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Port Gardner			San Juan Islands			Sinclair-Dyes Inlet			South Sound (East)			South Sound (West)		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
Polycyclic Aromatic Hydrocarbons (kg/year)																
Low Molecular Weight PAHs (LPAHs)																
Fluorene		6.35E-02	3.53E-01	8.44E-01	4.48E-03	2.49E-02	5.96E-02	1.96E-02	1.09E-01	2.61E-01	3.84E-02	2.14E-01	5.10E-01	2.56E-02	1.42E-01	3.40E-01
Phenanthrene		2.17E-01	2.53E-01	6.44E-01	1.53E-02	1.79E-02	4.54E-02	6.71E-02	7.82E-02	1.99E-01	1.31E-01	1.53E-01	3.90E-01	8.76E-02	1.02E-01	2.60E-01
Entire Chemical Class:		3.10E-01	7.62E-01	3.30E+00	2.18E-02	5.38E-02	2.33E-01	9.56E-02	2.35E-01	1.02E+00	1.87E-01	4.61E-01	1.99E+00	1.25E-01	3.07E-01	1.33E+00
High Molecular Weight PAHs (HPAHs)																
Fluoranthene		1.88E-01	2.11E-01	3.74E-01	1.32E-02	1.49E-02	2.64E-02	5.80E-02	6.52E-02	1.16E-01	1.14E-01	1.28E-01	2.26E-01	7.57E-02	8.51E-02	1.51E-01
Pyrene		2.08E-01	2.73E-01	3.82E-01	1.47E-02	1.93E-02	2.70E-02	6.42E-02	8.44E-02	1.18E-01	1.26E-01	1.65E-01	2.31E-01	8.38E-02	1.10E-01	1.54E-01
Entire Chemical Class:		3.51E-01	4.66E-01	7.06E-01	2.48E-02	3.29E-02	4.98E-02	1.08E-01	1.44E-01	2.18E-01	2.12E-01	2.82E-01	4.27E-01	1.42E-01	1.88E-01	2.85E-01
Total PAHs (LPAHs+HPAHs)		7.14E-01	1.75E+00	4.34E+00	5.04E-02	1.24E-01	3.06E-01	2.21E-01	5.42E-01	1.34E+00	4.32E-01	1.06E+00	2.62E+00	2.88E-01	7.07E-01	1.75E+00
Phthalates (kg/year)																
bis(2-Ethylhexyl) phthalate		2.04E+01	4.15E+01	8.55E+01	1.44E+00	2.93E+00	6.03E+00	6.31E+00	1.28E+01	2.64E+01	1.24E+01	2.51E+01	5.17E+01	8.24E+00	1.67E+01	3.45E+01
Entire Chemical Class:		2.04E+01	5.18E+01	8.59E+01	1.44E+00	3.65E+00	6.06E+00	6.31E+00	1.60E+01	2.65E+01	1.24E+01	3.13E+01	5.19E+01	8.24E+00	2.09E+01	3.46E+01
Other Base/Neutral/Acid Extractables (kg/year)																
1,4-Dichlorobenzene		5.89E+00	9.55E+00	2.13E+01	4.15E-01	6.74E-01	1.50E+00	1.82E+00	2.95E+00	6.58E+00	3.56E+00	5.78E+00	1.29E+01	2.37E+00	3.85E+00	8.60E+00
2,4,6-Trichlorophenol		2.14E+00	4.22E+00	6.77E+00	1.51E-01	2.98E-01	4.78E-01	6.62E-01	1.30E+00	2.09E+00	1.30E+00	2.55E+00	4.10E+00	8.64E-01	1.70E+00	2.73E+00
2-Chloroethanol phosphate (3:1)		7.11E+00	1.02E+01	1.35E+01	5.01E-01	7.21E-01	9.56E-01	2.19E+00	3.16E+00	4.18E+00	4.30E+00	6.18E+00	8.19E+00	2.87E+00	4.12E+00	5.46E+00
3B-Coprostanol		2.89E+02	4.02E+02	6.55E+02	2.04E+01	2.84E+01	4.62E+01	8.92E+01	1.24E+02	2.02E+02	1.75E+02	2.43E+02	3.96E+02	1.16E+02	1.62E+02	2.64E+02
4-Methylphenol	p-Cresol	9.33E+00	1.45E+01	2.21E+01	6.58E-01	1.02E+00	1.56E+00	2.88E+00	4.48E+00	6.82E+00	5.64E+00	8.78E+00	1.34E+01	3.76E+00	5.85E+00	8.90E+00
Bisphenol A		1.18E+01	1.24E+01	3.35E+01	8.29E-01	8.78E-01	2.37E+00	3.63E+00	3.84E+00	1.04E+01	7.11E+00	7.52E+00	2.03E+01	4.74E+00	5.01E+00	1.35E+01
Caffeine		2.74E+00	6.73E+00	3.11E+01	1.93E-01	4.74E-01	2.19E+00	8.46E-01	2.08E+00	9.60E+00	1.66E+00	4.07E+00	1.88E+01	1.10E+00	2.71E+00	1.25E+01
Cholesterol		3.74E+02	5.55E+02	7.55E+02	2.64E+01	3.92E+01	5.33E+01	1.16E+02	1.71E+02	2.33E+02	2.26E+02	3.36E+02	4.57E+02	1.51E+02	2.24E+02	3.04E+02
Dibenzofuran		1.12E-01	2.73E-01	7.44E-01	7.92E-03	1.93E-02	5.25E-02	3.47E-02	8.44E-02	2.30E-01	6.79E-02	1.65E-01	4.50E-01	4.53E-02	1.10E-01	3.00E-01
Phenol		1.83E+01	3.27E+01	4.55E+01	1.29E+00	2.30E+00	3.21E+00	5.67E+00	1.01E+01	1.41E+01	1.11E+01	1.97E+01	2.75E+01	7.40E+00	1.32E+01	1.84E+01
Triclosan		1.53E+01	2.40E+01	3.79E+01	1.08E+00	1.69E+00	2.67E+00	4.73E+00	7.41E+00	1.17E+01	9.27E+00	1.45E+01	2.29E+01	6.18E+00	9.67E+00	1.53E+01
Triethyl citrate		2.21E+01	3.67E+01	4.89E+01	1.56E+00	2.59E+00	3.45E+00	6.82E+00	1.13E+01	1.51E+01	1.34E+01	2.22E+01	2.96E+01	8.91E+00	1.48E+01	1.97E+01
Polybrominated Diphenyl Ethers (Congeners) (kg/year)																
4,4'-DiBDE	BDE-015	3.87E-04	5.42E-04	2.07E-03	2.73E-05	3.82E-05	1.46E-04	1.20E-04	1.67E-04	6.39E-04	2.34E-04	3.28E-04	1.25E-03	1.56E-04	2.18E-04	8.34E-04
2,2',4-TrBDE	BDE-017	1.98E-03	3.79E-03	1.23E-02	1.39E-04	2.67E-04	8.65E-04	6.10E-04	1.17E-03	3.79E-03	1.20E-03	2.29E-03	7.41E-03	7.97E-04	1.53E-03	4.94E-03
2,4,4'-TrBDE	BDE-028	4.29E-03	8.64E-03	2.04E-02	3.02E-04	6.10E-04	1.44E-03	1.32E-03	2.67E-03	6.31E-03	2.59E-03	5.23E-03	1.24E-02	1.73E-03	3.48E-03	8.24E-03
2,2',4,4'-TeBDE	BDE-047	2.37E-01	2.90E-01	4.69E-01	1.67E-02	2.05E-02	3.31E-02	7.31E-02	8.96E-02	1.45E-01	1.43E-01	1.76E-01	2.84E-01	9.54E-02	1.17E-01	1.89E-01
2,2',4,5'-TeBDE	BDE-049	2.79E-03	9.64E-03	1.44E-02	1.97E-04	6.80E-04	1.01E-03	8.62E-04	2.98E-03	4.44E-03	1.69E-03	5.83E-03	8.69E-03	1.13E-03	3.89E-03	5.79E-03
2,2',4,5'/2,3',4',6-TeBDE	BDE-049/071	9.03E-03	1.54E-02	2.48E-02	6.37E-04	1.08E-03	1.75E-03	2.79E-03	4.75E-03	7.65E-03	5.46E-03	9.30E-03	1.50E-02	3.64E-03	6.20E-03	9.99E-03
2,3',4,4'-TeBDE	BDE-066	2.05E-03	6.75E-03	1.80E-02	1.45E-04	4.76E-04	1.27E-03	6.34E-04	2.09E-03	5.56E-03	1.24E-03	4.08E-03	1.09E-02	8.27E-04	2.72E-03	7.25E-03

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Strait of Georgia			Strait of Juan de Fuca			Whidbey Basin			Total Puget Sound		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
Polycyclic Aromatic Hydrocarbons (kg/year)													
Low Molecular Weight PAHs (LPAHs)													
Fluorene		3.28E-02	1.83E-01	4.36E-01	6.00E-03	3.34E-02	7.98E-02	2.07E-02	1.15E-01	2.75E-01	6.72E-01	3.74E+00	8.93E+00
Phenanthrene		1.12E-01	1.31E-01	3.33E-01	2.05E-02	2.40E-02	6.09E-02	7.08E-02	8.25E-02	2.10E-01	2.30E+00	2.68E+00	6.81E+00
Entire Chemical Class:		1.60E-01	3.94E-01	1.71E+00	2.93E-02	7.21E-02	3.12E-01	1.01E-01	2.48E-01	1.08E+00	3.27E+00	8.06E+00	3.49E+01
High Molecular Weight PAHs (HPAHs)													
Fluoranthene		9.71E-02	1.09E-01	1.94E-01	1.78E-02	2.00E-02	3.54E-02	6.12E-02	6.88E-02	1.22E-01	1.99E+00	2.23E+00	3.96E+00
Pyrene		1.07E-01	1.41E-01	1.98E-01	1.97E-02	2.58E-02	3.61E-02	6.77E-02	8.90E-02	1.25E-01	2.20E+00	2.89E+00	4.04E+00
Entire Chemical Class:		1.82E-01	2.41E-01	3.65E-01	3.32E-02	4.41E-02	6.68E-02	1.14E-01	1.52E-01	2.30E-01	3.71E+00	4.93E+00	7.47E+00
Total PAHs (LPAHs+HPAHs)		3.69E-01	9.07E-01	2.24E+00	6.75E-02	1.66E-01	4.10E-01	2.33E-01	5.72E-01	1.41E+00	7.55E+00	1.86E+01	4.59E+01
Phthalates (kg/year)													
bis(2-Ethylhexyl) phthalate		1.06E+01	2.15E+01	4.42E+01	1.93E+00	3.93E+00	8.09E+00	6.66E+00	1.35E+01	2.79E+01	2.16E+02	4.39E+02	9.05E+02
Entire Chemical Class:		1.06E+01	2.68E+01	4.44E+01	1.93E+00	4.90E+00	8.12E+00	6.66E+00	1.69E+01	2.80E+01	2.16E+02	5.47E+02	9.08E+02
Other Base/Neutral/Acid Extractables (kg/year)													
1,4-Dichlorobenzene		3.04E+00	4.94E+00	1.10E+01	5.57E-01	9.03E-01	2.02E+00	1.92E+00	3.11E+00	6.95E+00	6.23E+01	1.01E+02	2.26E+02
2,4,6-Trichlorophenol		1.11E+00	2.18E+00	3.50E+00	2.03E-01	3.99E-01	6.41E-01	6.99E-01	1.38E+00	2.21E+00	2.27E+01	4.46E+01	7.17E+01
2-Chloroethanol phosphate (3:1)		3.68E+00	5.28E+00	7.01E+00	6.72E-01	9.66E-01	1.28E+00	2.32E+00	3.33E+00	4.42E+00	7.52E+01	1.08E+02	1.43E+02
3B-Coprostanol		1.49E+02	2.08E+02	3.39E+02	2.73E+01	3.80E+01	6.20E+01	9.41E+01	1.31E+02	2.14E+02	3.05E+03	4.25E+03	6.93E+03
4-Methylphenol	p-Cresol	4.82E+00	7.51E+00	1.14E+01	8.82E-01	1.37E+00	2.09E+00	3.04E+00	4.73E+00	7.20E+00	9.87E+01	1.54E+02	2.34E+02
Bisphenol A		6.08E+00	6.43E+00	1.73E+01	1.11E+00	1.18E+00	3.17E+00	3.83E+00	4.05E+00	1.09E+01	1.24E+02	1.32E+02	3.55E+02
Caffeine		1.42E+00	3.48E+00	1.61E+01	2.59E-01	6.36E-01	2.94E+00	8.93E-01	2.19E+00	1.01E+01	2.90E+01	7.11E+01	3.29E+02
Cholesterol		1.94E+02	2.87E+02	3.90E+02	3.54E+01	5.25E+01	7.14E+01	1.22E+02	1.81E+02	2.46E+02	3.96E+03	5.87E+03	7.99E+03
Dibenzofuran		5.81E-02	1.41E-01	3.85E-01	1.06E-02	2.58E-02	7.04E-02	3.66E-02	8.90E-02	2.43E-01	1.19E+00	2.89E+00	7.87E+00
Phenol		9.49E+00	1.69E+01	2.35E+01	1.74E+00	3.09E+00	4.31E+00	5.98E+00	1.06E+01	1.48E+01	1.94E+02	3.45E+02	4.82E+02
Triclosan		7.92E+00	1.24E+01	1.96E+01	1.45E+00	2.27E+00	3.58E+00	5.00E+00	7.82E+00	1.23E+01	1.62E+02	2.54E+02	4.01E+02
Triethyl citrate		1.14E+01	1.90E+01	2.53E+01	2.09E+00	3.47E+00	4.62E+00	7.20E+00	1.19E+01	1.59E+01	2.34E+02	3.88E+02	5.17E+02
Polybrominated Diphenyl Ethers (Congeners) (kg/year)													
4,4'-DiBDE	BDE-015	2.00E-04	2.80E-04	1.07E-03	3.66E-05	5.13E-05	1.96E-04	1.26E-04	1.77E-04	6.74E-04	4.09E-03	5.73E-03	2.19E-02
2,2',4-TrBDE	BDE-017	1.02E-03	1.96E-03	6.34E-03	1.87E-04	3.58E-04	1.16E-03	6.44E-04	1.23E-03	4.00E-03	2.09E-02	4.01E-02	1.30E-01
2,4,4'-TrBDE	BDE-028	2.22E-03	4.47E-03	1.06E-02	4.05E-04	8.17E-04	1.93E-03	1.40E-03	2.82E-03	6.66E-03	4.53E-02	9.14E-02	2.16E-01
2,2',4,4'-TeBDE	BDE-047	1.22E-01	1.50E-01	2.43E-01	2.24E-02	2.75E-02	4.44E-02	7.71E-02	9.46E-02	1.53E-01	2.50E+00	3.07E+00	4.96E+00
2,2',4,5'-TeBDE	BDE-049	1.44E-03	4.98E-03	7.43E-03	2.64E-04	9.12E-04	1.36E-03	9.10E-04	3.14E-03	4.68E-03	2.95E-02	1.02E-01	1.52E-01
2,2',4,5'/2,3',4',6-TeBDE	BDE-049/071	4.67E-03	7.95E-03	1.28E-02	8.54E-04	1.45E-03	2.34E-03	2.94E-03	5.01E-03	8.08E-03	9.55E-02	1.63E-01	2.62E-01
2,3',4,4'-TeBDE	BDE-066	1.06E-03	3.49E-03	9.30E-03	1.94E-04	6.39E-04	1.70E-03	6.69E-04	2.20E-03	5.86E-03	2.17E-02	7.14E-02	1.90E-01

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Admiralty Inlet			Commencement Bay			Hood Canal (North)			Hood Canal (South)			Main Basin		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
2,3',4',6-TeBDE	BDE-071	4.62E-05	5.78E-05	1.71E-04	1.69E-03	2.12E-03	6.27E-03	1.02E-05	1.28E-05	3.78E-05	8.16E-07	1.02E-06	3.03E-06	1.01E-02	1.26E-02	3.74E-02
2,2',3,4,4'-PeBDE	BDE-085	2.34E-04	3.22E-04	5.72E-04	8.57E-03	1.18E-02	2.10E-02	5.17E-05	7.11E-05	1.27E-04	4.13E-06	5.69E-06	1.01E-05	5.11E-02	7.03E-02	1.25E-01
2,2',4,4',5-PeBDE	BDE-099	5.74E-03	7.92E-03	1.76E-02	2.11E-01	2.90E-01	6.44E-01	1.27E-03	1.75E-03	3.88E-03	1.02E-04	1.40E-04	3.11E-04	1.25E+00	1.73E+00	3.84E+00
2,2',4,4',6-PeBDE	BDE-100	1.26E-03	1.61E-03	3.15E-03	4.62E-02	5.90E-02	1.16E-01	2.79E-04	3.56E-04	6.97E-04	2.23E-05	2.84E-05	5.58E-05	2.75E-01	3.51E-01	6.89E-01
2,2',4,4',5,5'-HxBDE	BDE-153	4.49E-04	6.82E-04	1.73E-03	1.65E-02	2.50E-02	6.33E-02	9.93E-05	1.51E-04	3.82E-04	7.94E-06	1.21E-05	3.06E-05	9.81E-02	1.49E-01	3.78E-01
2,2',4,4',5,6'-HxBDE	BDE-154	3.92E-04	5.08E-04	1.07E-03	1.44E-02	1.86E-02	3.94E-02	8.68E-05	1.12E-04	2.37E-04	6.94E-06	8.98E-06	1.90E-05	8.57E-02	1.11E-01	2.35E-01
2,2',3,4,4',5',6-HpBDE	BDE-183	1.74E-05	5.52E-05	1.37E-04	6.39E-04	2.02E-03	5.03E-03	3.85E-06	1.22E-05	3.04E-05	3.08E-07	9.76E-07	2.43E-06	3.81E-03	1.21E-02	3.00E-02
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	1.15E-04	3.33E-04	8.23E-04	4.20E-03	1.22E-02	3.02E-02	2.53E-05	7.36E-05	1.82E-04	2.03E-06	5.89E-06	1.45E-05	2.50E-02	7.28E-02	1.80E-01
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	1.40E-04	3.17E-04	7.35E-04	5.13E-03	1.16E-02	2.69E-02	3.09E-05	7.02E-05	1.63E-04	2.47E-06	5.61E-06	1.30E-05	3.06E-02	6.93E-02	1.61E-01
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208	5.76E-05	1.55E-04	5.35E-04	2.11E-03	5.67E-03	1.96E-02	1.27E-05	3.42E-05	1.18E-04	1.02E-06	2.73E-06	9.47E-06	1.26E-02	3.38E-02	1.17E-01
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	2.44E-03	4.02E-03	1.17E-02	8.96E-02	1.47E-01	4.29E-01	5.40E-04	8.89E-04	2.58E-03	4.32E-05	7.11E-05	2.07E-04	5.34E-01	8.79E-01	2.55E+00
Entire Chemical Class:		1.88E-02	2.83E-02	5.54E-02	6.88E-01	1.04E+00	2.03E+00	4.15E-03	6.26E-03	1.23E-02	3.32E-04	5.01E-04	9.80E-04	4.10E+00	6.19E+00	1.21E+01
Polybrominated Diphenyl Ethers (Homologs) (kg/year)																
Decabromodiphenyl ether		2.44E-03	4.02E-03	1.17E-02	8.96E-02	1.47E-01	4.29E-01	5.40E-04	8.89E-04	2.58E-03	4.32E-05	7.11E-05	2.07E-04	5.34E-01	8.79E-01	2.55E+00
Dibromodiphenyl ethers		1.17E-05	1.96E-05	7.19E-05	4.28E-04	7.19E-04	2.63E-03	2.58E-06	4.33E-06	1.59E-05	2.07E-07	3.47E-07	1.27E-06	2.55E-03	4.28E-03	1.57E-02
Heptabromodiphenyl ethers		1.71E-05	5.57E-05	1.37E-04	6.25E-04	2.04E-03	5.03E-03	3.77E-06	1.23E-05	3.04E-05	3.02E-07	9.85E-07	2.43E-06	3.73E-03	1.22E-02	3.00E-02
Hexabromodiphenyl ethers		8.13E-04	1.29E-03	3.01E-03	2.98E-02	4.71E-02	1.10E-01	1.80E-04	2.84E-04	6.66E-04	1.44E-05	2.27E-05	5.33E-05	1.78E-01	2.81E-01	6.58E-01
Nonabromodiphenyl ethers		1.78E-04	7.87E-04	2.05E-03	6.52E-03	2.88E-02	7.53E-02	3.93E-05	1.74E-04	4.54E-04	3.14E-06	1.39E-05	3.63E-05	3.88E-02	1.72E-01	4.49E-01
Pentabromodiphenyl ethers		7.48E-03	9.93E-03	2.16E-02	2.74E-01	3.64E-01	7.92E-01	1.65E-03	2.20E-03	4.78E-03	1.32E-04	1.76E-04	3.82E-04	1.63E+00	2.17E+00	4.72E+00
Tetrabromodiphenyl ethers		6.93E-03	9.05E-03	1.42E-02	2.54E-01	3.32E-01	5.19E-01	1.53E-03	2.00E-03	3.13E-03	1.23E-04	1.60E-04	2.50E-04	1.52E+00	1.98E+00	3.09E+00
Tribromodiphenyl ethers		1.92E-04	3.56E-04	8.35E-04	7.02E-03	1.31E-02	3.06E-02	4.24E-05	7.88E-05	1.85E-04	3.39E-06	6.30E-06	1.48E-05	4.19E-02	7.79E-02	1.82E-01
Perfluorinated Compounds (kg/year)																
Perfluorobutanoate	PFBA	1.11E-03	1.73E-03	3.25E-03	4.05E-02	6.36E-02	1.19E-01	2.45E-04	3.83E-04	7.20E-04	1.96E-05	3.07E-05	5.76E-05	2.42E-01	3.79E-01	7.11E-01
Perfluorodecanoate	PFDA	3.27E-03	4.54E-03	7.15E-03	1.20E-01	1.67E-01	2.62E-01	7.23E-04	1.00E-03	1.58E-03	5.78E-05	8.03E-05	1.26E-04	7.15E-01	9.93E-01	1.56E+00
Perfluoroheptanoate	PFHpA	4.63E-03	5.89E-03	7.69E-03	1.70E-01	2.16E-01	2.82E-01	1.02E-03	1.30E-03	1.70E-03	8.19E-05	1.04E-04	1.36E-04	1.01E+00	1.29E+00	1.68E+00
Perfluorohexane sulfonate	PFHxS	1.60E-03	3.28E-03	4.56E-03	5.87E-02	1.20E-01	1.67E-01	3.54E-04	7.25E-04	1.01E-03	2.83E-05	5.80E-05	8.05E-05	3.50E-01	7.17E-01	9.95E-01
Perfluorohexanoate	PFHxA	1.62E-02	2.09E-02	3.37E-02	5.95E-01	7.67E-01	1.24E+00	3.59E-03	4.63E-03	7.46E-03	2.87E-04	3.70E-04	5.97E-04	3.55E+00	4.57E+00	7.37E+00
Perfluorononanoate	PFNA	4.62E-03	7.60E-03	1.57E-02	1.69E-01	2.79E-01	5.76E-01	1.02E-03	1.68E-03	3.47E-03	8.17E-05	1.34E-04	2.78E-04	1.01E+00	1.66E+00	3.43E+00
Perfluorooctane sulfonate	PFOS	5.09E-03	7.48E-03	1.23E-02	1.87E-01	2.74E-01	4.51E-01	1.13E-03	1.65E-03	2.72E-03	9.00E-05	1.32E-04	2.17E-04	1.11E+00	1.64E+00	2.69E+00
Perfluorooctanoate	PFOA	1.64E-02	2.95E-02	4.34E-02	6.00E-01	1.08E+00	1.59E+00	3.62E-03	6.52E-03	9.60E-03	2.89E-04	5.21E-04	7.68E-04	3.58E+00	6.44E+00	9.49E+00
Perfluoropentanoate	PFPeA	2.37E-03	3.29E-03	1.19E-02	8.68E-02	1.20E-01	4.38E-01	5.24E-04	7.27E-04	2.64E-03	4.19E-05	5.81E-05	2.11E-04	5.18E-01	7.18E-01	2.61E+00
Entire Chemical Class:		8.41E-02	1.14E-01	1.57E-01	3.08E+00	4.17E+00	5.77E+00	1.86E-02	2.52E-02	3.48E-02	1.49E-03	2.01E-03	2.78E-03	1.84E+01	2.49E+01	3.44E+01
Polychlorinated Biphenyls (Congeners) (kg/year)																
2-MoCB	PCB-001	7.89E-06	1.83E-05	4.50E-05	2.89E-04	6.73E-04	1.65E-03	1.74E-06	4.06E-06	9.95E-06	1.39E-07	3.24E-07	7.96E-07	1.72E-03	4.01E-03	9.84E-03
2,2'-DiCB	PCB-004	1.38E-05	4.77E-05	9.47E-05	5.07E-04	1.75E-03	3.47E-03	3.06E-06	1.05E-05	2.09E-05	2.44E-07	8.43E-07	1.67E-06	3.02E-03	1.04E-02	2.07E-02
2,3'-DiCB	PCB-006	9.30E-06	1.97E-05	2.63E-05	3.41E-04	7.23E-04	9.64E-04	2.06E-06	4.36E-06	5.81E-06	1.64E-07	3.49E-07	4.65E-07	2.03E-03	4.31E-03	5.75E-03
2,2',3-TrCB	PCB-016	1.91E-05	3.37E-05	5.71E-05	6.99E-04	1.23E-03	2.09E-03	4.22E-06	7.45E-06	1.26E-05	3.37E-07	5.96E-07	1.01E-06	4.17E-03	7.36E-03	1.25E-02

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Port Gardner			San Juan Islands			Sinclair-Dyes Inlet			South Sound (East)			South Sound (West)		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
2,3',4',6-TeBDE	BDE-071	1.63E-03	2.04E-03	6.05E-03	1.15E-04	1.44E-04	4.27E-04	5.04E-04	6.31E-04	1.87E-03	9.87E-04	1.24E-03	3.66E-03	6.58E-04	8.24E-04	2.44E-03
2,2',3,4,4'-PeBDE	BDE-085	8.26E-03	1.14E-02	2.02E-02	5.83E-04	8.02E-04	1.43E-03	2.55E-03	3.51E-03	6.25E-03	5.00E-03	6.88E-03	1.22E-02	3.33E-03	4.58E-03	8.16E-03
2,2',4,4',5-PeBDE	BDE-099	2.03E-01	2.80E-01	6.21E-01	1.43E-02	1.97E-02	4.38E-02	6.27E-02	8.64E-02	1.92E-01	1.23E-01	1.69E-01	3.75E-01	8.18E-02	1.13E-01	2.50E-01
2,2',4,4',6-PeBDE	BDE-100	4.46E-02	5.69E-02	1.12E-01	3.14E-03	4.01E-03	7.87E-03	1.38E-02	1.76E-02	3.44E-02	2.69E-02	3.44E-02	6.74E-02	1.80E-02	2.29E-02	4.50E-02
2,2',4,4',5,5'-HxBDE	BDE-153	1.59E-02	2.41E-02	6.11E-02	1.12E-03	1.70E-03	4.31E-03	4.90E-03	7.45E-03	1.89E-02	9.60E-03	1.46E-02	3.69E-02	6.40E-03	9.72E-03	2.46E-02
2,2',4,4',5,6'-HxBDE	BDE-154	1.39E-02	1.79E-02	3.80E-02	9.79E-04	1.27E-03	2.68E-03	4.28E-03	5.54E-03	1.17E-02	8.39E-03	1.09E-02	2.29E-02	5.59E-03	7.24E-03	1.53E-02
2,2',3,4,4',5',6-HpBDE	BDE-183	6.16E-04	1.95E-03	4.85E-03	4.35E-05	1.38E-04	3.42E-04	1.90E-04	6.03E-04	1.50E-03	3.73E-04	1.18E-03	2.93E-03	2.48E-04	7.87E-04	1.96E-03
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	4.05E-03	1.18E-02	2.91E-02	2.86E-04	8.31E-04	2.05E-03	1.25E-03	3.64E-03	8.98E-03	2.45E-03	7.12E-03	1.76E-02	1.63E-03	4.75E-03	1.17E-02
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	4.95E-03	1.12E-02	2.60E-02	3.49E-04	7.91E-04	1.83E-03	1.53E-03	3.46E-03	8.03E-03	2.99E-03	6.78E-03	1.57E-02	1.99E-03	4.52E-03	1.05E-02
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208	2.04E-03	5.46E-03	1.89E-02	1.44E-04	3.86E-04	1.34E-03	6.29E-04	1.69E-03	5.84E-03	1.23E-03	3.30E-03	1.14E-02	8.21E-04	2.20E-03	7.63E-03
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	8.64E-02	1.42E-01	4.13E-01	6.10E-03	1.00E-02	2.92E-02	2.67E-02	4.39E-02	1.28E-01	5.23E-02	8.60E-02	2.50E-01	3.48E-02	5.73E-02	1.67E-01
Entire Chemical Class:		6.64E-01	1.00E+00	1.96E+00	4.68E-02	7.07E-02	1.38E-01	2.05E-01	3.09E-01	6.05E-01	4.01E-01	6.06E-01	1.18E+00	2.67E-01	4.04E-01	7.90E-01
Polybrominated Diphenyl Ethers (Homologs) (kg/year)																
Decabromodiphenyl ether		8.64E-02	1.42E-01	4.13E-01	6.10E-03	1.00E-02	2.92E-02	2.67E-02	4.39E-02	1.28E-01	5.23E-02	8.60E-02	2.50E-01	3.48E-02	5.73E-02	1.67E-01
Dibromodiphenyl ethers		4.13E-04	6.93E-04	2.54E-03	2.91E-05	4.89E-05	1.79E-04	1.28E-04	2.14E-04	7.85E-04	2.50E-04	4.19E-04	1.54E-03	1.67E-04	2.79E-04	1.02E-03
Heptabromodiphenyl ethers		6.03E-04	1.97E-03	4.85E-03	4.25E-05	1.39E-04	3.42E-04	1.86E-04	6.08E-04	1.50E-03	3.65E-04	1.19E-03	2.93E-03	2.43E-04	7.94E-04	1.96E-03
Hexabromodiphenyl ethers		2.87E-02	4.55E-02	1.07E-01	2.03E-03	3.21E-03	7.51E-03	8.88E-03	1.40E-02	3.29E-02	1.74E-02	2.75E-02	6.44E-02	1.16E-02	1.83E-02	4.29E-02
Nonabromodiphenyl ethers		6.28E-03	2.78E-02	7.26E-02	4.43E-04	1.96E-03	5.12E-03	1.94E-03	8.59E-03	2.24E-02	3.80E-03	1.68E-02	4.39E-02	2.53E-03	1.12E-02	2.93E-02
Pentabromodiphenyl ethers		2.64E-01	3.51E-01	7.64E-01	1.86E-02	2.48E-02	5.39E-02	8.16E-02	1.08E-01	2.36E-01	1.60E-01	2.12E-01	4.62E-01	1.07E-01	1.42E-01	3.08E-01
Tetrabromodiphenyl ethers		2.45E-01	3.20E-01	5.00E-01	1.73E-02	2.26E-02	3.53E-02	7.57E-02	9.88E-02	1.54E-01	1.48E-01	1.94E-01	3.02E-01	9.88E-02	1.29E-01	2.02E-01
Tribromodiphenyl ethers		6.77E-03	1.26E-02	2.95E-02	4.78E-04	8.89E-04	2.08E-03	2.09E-03	3.89E-03	9.12E-03	4.10E-03	7.62E-03	1.79E-02	2.73E-03	5.08E-03	1.19E-02
Perfluorinated Compounds (kg/year)																
Perfluorobutanoate	PFBA	3.91E-02	6.13E-02	1.15E-01	2.76E-03	4.33E-03	8.12E-03	1.21E-02	1.89E-02	3.55E-02	2.36E-02	3.71E-02	6.96E-02	1.58E-02	2.47E-02	4.64E-02
Perfluorodecanoate	PFDA	1.16E-01	1.61E-01	2.53E-01	8.16E-03	1.13E-02	1.78E-02	3.57E-02	4.96E-02	7.81E-02	6.99E-02	9.71E-02	1.53E-01	4.66E-02	6.47E-02	1.02E-01
Perfluoroheptanoate	PFHpA	1.64E-01	2.08E-01	2.72E-01	1.16E-02	1.47E-02	1.92E-02	5.06E-02	6.43E-02	8.40E-02	9.91E-02	1.26E-01	1.64E-01	6.60E-02	8.40E-02	1.10E-01
Perfluorohexane sulfonate	PFHxS	5.66E-02	1.16E-01	1.61E-01	3.99E-03	8.18E-03	1.14E-02	1.75E-02	3.58E-02	4.97E-02	3.42E-02	7.01E-02	9.74E-02	2.28E-02	4.67E-02	6.49E-02
Perfluorohexanoate	PFHxA	5.74E-01	7.40E-01	1.19E+00	4.05E-02	5.22E-02	8.42E-02	1.77E-01	2.28E-01	3.68E-01	3.47E-01	4.47E-01	7.21E-01	2.31E-01	2.98E-01	4.81E-01
Perfluorononanoate	PFNA	1.63E-01	2.69E-01	5.55E-01	1.15E-02	1.90E-02	3.92E-02	5.04E-02	8.30E-02	1.71E-01	9.88E-02	1.63E-01	3.36E-01	6.59E-02	1.08E-01	2.24E-01
Perfluorooctane sulfonate	PFOS	1.80E-01	2.65E-01	4.35E-01	1.27E-02	1.87E-02	3.07E-02	5.56E-02	8.17E-02	1.34E-01	1.09E-01	1.60E-01	2.63E-01	7.25E-02	1.07E-01	1.75E-01
Perfluorooctanoate	PFOA	5.79E-01	1.04E+00	1.53E+00	4.08E-02	7.35E-02	1.08E-01	1.79E-01	3.22E-01	4.74E-01	3.50E-01	6.30E-01	9.28E-01	2.33E-01	4.20E-01	6.19E-01
Perfluoropentanoate	PFPeA	8.37E-02	1.16E-01	4.22E-01	5.91E-03	8.20E-03	2.98E-02	2.59E-02	3.59E-02	1.30E-01	5.06E-02	7.03E-02	2.55E-01	3.38E-02	4.68E-02	1.70E-01
Entire Chemical Class:		2.97E+00	4.02E+00	5.56E+00	2.10E-01	2.84E-01	3.93E-01	9.18E-01	1.24E+00	1.72E+00	1.80E+00	2.43E+00	3.36E+00	1.20E+00	1.62E+00	2.24E+00
Polychlorinated Biphenyls (Congeners) (kg/year)																
2-MoCB	PCB-001	2.79E-04	6.49E-04	1.59E-03	1.97E-05	4.58E-05	1.12E-04	8.61E-05	2.00E-04	4.91E-04	1.69E-04	3.92E-04	9.62E-04	1.12E-04	2.61E-04	6.42E-04
2,2'-DiCB	PCB-004	4.89E-04	1.69E-03	3.35E-03	3.45E-05	1.19E-04	2.36E-04	1.51E-04	5.21E-04	1.03E-03	2.96E-04	1.02E-03	2.02E-03	1.97E-04	6.80E-04	1.35E-03
2,3'-DiCB	PCB-006	3.29E-04	6.97E-04	9.30E-04	2.32E-05	4.92E-05	6.56E-05	1.02E-04	2.15E-04	2.87E-04	1.99E-04	4.22E-04	5.62E-04	1.33E-04	2.81E-04	3.75E-04
2,2',3-TrCB	PCB-016	6.74E-04	1.19E-03	2.02E-03	4.76E-05	8.40E-05	1.42E-04	2.08E-04	3.68E-04	6.23E-04	4.08E-04	7.20E-04	1.22E-03	2.72E-04	4.80E-04	8.13E-04

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Strait of Georgia			Strait of Juan de Fuca			Whidbey Basin			Total Puget Sound		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
2,3',4',6-TeBDE	BDE-071	8.44E-04	1.06E-03	3.13E-03	1.54E-04	1.93E-04	5.72E-04	5.32E-04	6.66E-04	1.97E-03	1.73E-02	2.16E-02	6.40E-02
2,2',3,4,4'-PeBDE	BDE-085	4.27E-03	5.88E-03	1.05E-02	7.82E-04	1.08E-03	1.91E-03	2.69E-03	3.71E-03	6.60E-03	8.74E-02	1.20E-01	2.14E-01
2,2',4,4',5-PeBDE	BDE-099	1.05E-01	1.45E-01	3.21E-01	1.92E-02	2.65E-02	5.87E-02	6.62E-02	9.12E-02	2.02E-01	2.15E+00	2.96E+00	6.57E+00
2,2',4,4',6-PeBDE	BDE-100	2.30E-02	2.94E-02	5.77E-02	4.21E-03	5.38E-03	1.05E-02	1.45E-02	1.85E-02	3.63E-02	4.71E-01	6.02E-01	1.18E+00
2,2',4,4',5,5'-HxBDE	BDE-153	8.21E-03	1.25E-02	3.16E-02	1.50E-03	2.28E-03	5.78E-03	5.17E-03	7.86E-03	1.99E-02	1.68E-01	2.55E-01	6.46E-01
2,2',4,4',5,6'-HxBDE	BDE-154	7.17E-03	9.28E-03	1.96E-02	1.31E-03	1.70E-03	3.59E-03	4.52E-03	5.85E-03	1.24E-02	1.47E-01	1.90E-01	4.01E-01
2,2',3,4,4',5',6-HpBDE	BDE-183	3.19E-04	1.01E-03	2.51E-03	5.83E-05	1.85E-04	4.59E-04	2.01E-04	6.36E-04	1.58E-03	6.52E-03	2.06E-02	5.13E-02
2,2',3,3',4,4',5,5',6-NoBDE	BDE-206	2.09E-03	6.09E-03	1.50E-02	3.83E-04	1.11E-03	2.75E-03	1.32E-03	3.84E-03	9.48E-03	4.29E-02	1.25E-01	3.08E-01
2,2',3,3',4,4',5,6,6'-NoBDE	BDE-207	2.56E-03	5.80E-03	1.34E-02	4.68E-04	1.06E-03	2.46E-03	1.61E-03	3.66E-03	8.47E-03	5.23E-02	1.19E-01	2.75E-01
2,2',3,3',4,5,5',6,6'-NoBDE	BDE-208	1.05E-03	2.83E-03	9.79E-03	1.93E-04	5.17E-04	1.79E-03	6.64E-04	1.78E-03	6.17E-03	2.16E-02	5.78E-02	2.00E-01
2,2',3,3',4,4',5,5',6,6'-DeBDE	BDE-209	4.47E-02	7.35E-02	2.14E-01	8.17E-03	1.34E-02	3.91E-02	2.82E-02	4.63E-02	1.35E-01	9.14E-01	1.50E+00	4.37E+00
Entire Chemical Class:		3.43E-01	5.18E-01	1.01E+00	6.28E-02	9.47E-02	1.85E-01	2.16E-01	3.26E-01	6.38E-01	7.02E+00	1.06E+01	2.07E+01
Polybrominated Diphenyl Ethers (Homologs) (kg/year)													
Decabromodiphenyl ether		4.47E-02	7.35E-02	2.14E-01	8.17E-03	1.34E-02	3.91E-02	2.82E-02	4.63E-02	1.35E-01	9.14E-01	1.50E+00	4.37E+00
Dibromodiphenyl ethers		2.14E-04	3.58E-04	1.31E-03	3.91E-05	6.55E-05	2.40E-04	1.35E-04	2.26E-04	8.28E-04	4.37E-03	7.33E-03	2.69E-02
Heptabromodiphenyl ethers		3.12E-04	1.02E-03	2.51E-03	5.70E-05	1.86E-04	4.59E-04	1.97E-04	6.42E-04	1.58E-03	6.38E-03	2.08E-02	5.13E-02
Hexabromodiphenyl ethers		1.49E-02	2.35E-02	5.51E-02	2.72E-03	4.30E-03	1.01E-02	9.37E-03	1.48E-02	3.47E-02	3.04E-01	4.81E-01	1.13E+00
Nonabromodiphenyl ethers		3.25E-03	1.44E-02	3.76E-02	5.94E-04	2.63E-03	6.87E-03	2.05E-03	9.06E-03	2.37E-02	6.65E-02	2.94E-01	7.68E-01
Pentabromodiphenyl ethers		1.37E-01	1.82E-01	3.95E-01	2.50E-02	3.32E-02	7.23E-02	8.62E-02	1.14E-01	2.49E-01	2.80E+00	3.71E+00	8.08E+00
Tetrabromodiphenyl ethers		1.27E-01	1.65E-01	2.59E-01	2.32E-02	3.03E-02	4.73E-02	7.99E-02	1.04E-01	1.63E-01	2.59E+00	3.39E+00	5.29E+00
Tribromodiphenyl ethers		3.50E-03	6.51E-03	1.53E-02	6.41E-04	1.19E-03	2.79E-03	2.21E-03	4.10E-03	9.62E-03	7.17E-02	1.33E-01	3.12E-01
Perfluorinated Compounds (kg/year)													
Perfluorobutanoate	PFBA	2.02E-02	3.17E-02	5.95E-02	3.70E-03	5.80E-03	1.09E-02	1.27E-02	2.00E-02	3.75E-02	4.14E-01	6.49E-01	1.22E+00
Perfluorodecanoate	PFDA	5.98E-02	8.30E-02	1.31E-01	1.09E-02	1.52E-02	2.39E-02	3.77E-02	5.23E-02	8.24E-02	1.22E+00	1.70E+00	2.67E+00
Perfluoroheptanoate	PFHpA	8.47E-02	1.08E-01	1.41E-01	1.55E-02	1.97E-02	2.57E-02	5.34E-02	6.79E-02	8.86E-02	1.73E+00	2.20E+00	2.88E+00
Perfluorohexane sulfonate	PFHxS	2.93E-02	6.00E-02	8.33E-02	5.35E-03	1.10E-02	1.52E-02	1.84E-02	3.78E-02	5.25E-02	5.99E-01	1.23E+00	1.70E+00
Perfluorohexanoate	PFHxA	2.97E-01	3.82E-01	6.17E-01	5.43E-02	7.00E-02	1.13E-01	1.87E-01	2.41E-01	3.89E-01	6.07E+00	7.82E+00	1.26E+01
Perfluorononanoate	PFNA	8.45E-02	1.39E-01	2.87E-01	1.55E-02	2.54E-02	5.25E-02	5.32E-02	8.76E-02	1.81E-01	1.73E+00	2.84E+00	5.87E+00
Perfluorooctane sulfonate	PFOS	9.30E-02	1.37E-01	2.25E-01	1.70E-02	2.50E-02	4.11E-02	5.86E-02	8.62E-02	1.42E-01	1.90E+00	2.80E+00	4.60E+00
Perfluorooctanoate	PFOA	2.99E-01	5.39E-01	7.94E-01	5.47E-02	9.85E-02	1.45E-01	1.89E-01	3.40E-01	5.00E-01	6.12E+00	1.10E+01	1.62E+01
Perfluoropentanoate	PFPeA	4.33E-02	6.01E-02	2.18E-01	7.92E-03	1.10E-02	3.99E-02	2.73E-02	3.79E-02	1.38E-01	8.86E-01	1.23E+00	4.47E+00
Entire Chemical Class:		1.54E+00	2.08E+00	2.88E+00	2.81E-01	3.80E-01	5.26E-01	9.69E-01	1.31E+00	1.81E+00	3.15E+01	4.25E+01	5.89E+01
Polychlorinated Biphenyls (Congeners) (kg/year)													
2-MoCB	PCB-001	1.44E-04	3.35E-04	8.23E-04	2.64E-05	6.13E-05	1.51E-04	9.09E-05	2.11E-04	5.19E-04	2.95E-03	6.86E-03	1.68E-02
2,2'-DiCB	PCB-004	2.53E-04	8.72E-04	1.73E-03	4.62E-05	1.59E-04	3.17E-04	1.59E-04	5.49E-04	1.09E-03	5.17E-03	1.78E-02	3.54E-02
2,3'-DiCB	PCB-006	1.70E-04	3.61E-04	4.81E-04	3.11E-05	6.60E-05	8.79E-05	1.07E-04	2.27E-04	3.03E-04	3.48E-03	7.38E-03	9.83E-03
2,2',3-TrCB	PCB-016	3.49E-04	6.16E-04	1.04E-03	6.38E-05	1.13E-04	1.91E-04	2.20E-04	3.88E-04	6.57E-04	7.13E-03	1.26E-02	2.13E-02

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Admiralty Inlet			Commencement Bay			Hood Canal (North)			Hood Canal (South)			Main Basin		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
2,2',4-TrCB	PCB-017	8.89E-06	2.19E-05	5.15E-05	3.26E-04	8.02E-04	1.89E-03	1.97E-06	4.83E-06	1.14E-05	1.57E-07	3.87E-07	9.11E-07	1.94E-03	4.78E-03	1.13E-02
2,2',5-TrCB	PCB-018	2.13E-05	6.96E-05	1.50E-04	7.81E-04	2.55E-03	5.51E-03	4.71E-06	1.54E-05	3.32E-05	3.77E-07	1.23E-06	2.66E-06	4.66E-03	1.52E-02	3.29E-02
2,3,3'/2,3',4'-TriCB	PCB-020/033	1.84E-05	3.20E-05	9.96E-05	6.76E-04	1.17E-03	3.65E-03	4.08E-06	7.07E-06	2.20E-05	3.26E-07	5.66E-07	1.76E-06	4.03E-03	6.99E-03	2.18E-02
2,3,4'-TrCB	PCB-022	8.64E-06	2.04E-05	5.74E-05	3.17E-04	7.49E-04	2.10E-03	1.91E-06	4.52E-06	1.27E-05	1.53E-07	3.61E-07	1.01E-06	1.89E-03	4.46E-03	1.25E-02
2,4,4'-TrCB	PCB-028	2.15E-05	3.99E-05	1.22E-04	7.89E-04	1.46E-03	4.49E-03	4.76E-06	8.82E-06	2.71E-05	3.81E-07	7.05E-07	2.17E-06	4.70E-03	8.72E-03	2.68E-02
2,4',5-TrCB	PCB-031	2.49E-05	5.00E-05	1.31E-04	9.12E-04	1.83E-03	4.82E-03	5.50E-06	1.11E-05	2.91E-05	4.40E-07	8.84E-07	2.32E-06	5.44E-03	1.09E-02	2.87E-02
3,4,4'-TrCB	PCB-037	9.46E-06	2.27E-05	4.04E-05	3.47E-04	8.34E-04	1.48E-03	2.09E-06	5.03E-06	8.93E-06	1.67E-07	4.02E-07	7.14E-07	2.07E-03	4.97E-03	8.82E-03
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049	2.00E-05	3.60E-05	1.01E-04	7.34E-04	1.32E-03	3.69E-03	4.42E-06	7.96E-06	2.23E-05	3.54E-07	6.37E-07	1.78E-06	4.37E-03	7.87E-03	2.20E-02
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069	2.68E-05	8.39E-05	1.70E-04	9.81E-04	3.07E-03	6.22E-03	5.91E-06	1.85E-05	3.75E-05	4.73E-07	1.48E-06	3.00E-06	5.85E-03	1.83E-02	3.71E-02
2,3',4,4'-TeCB	PCB-066	1.35E-05	2.61E-05	9.64E-05	4.94E-04	9.58E-04	3.53E-03	2.98E-06	5.78E-06	2.13E-05	2.38E-07	4.62E-07	1.70E-06	2.95E-03	5.71E-03	2.11E-02
2,2',3,4',6-PeCB	PCB-091	8.23E-06	1.45E-05	2.64E-05	3.02E-04	5.32E-04	9.66E-04	1.82E-06	3.21E-06	5.83E-06	1.45E-07	2.57E-07	4.66E-07	1.80E-03	3.17E-03	5.76E-03
2,2',3,5,5'-PeCB	PCB-092	1.48E-05	2.57E-05	5.07E-05	5.44E-04	9.41E-04	1.86E-03	3.28E-06	5.68E-06	1.12E-05	2.63E-07	4.54E-07	8.96E-07	3.24E-03	5.61E-03	1.11E-02
2,3,3',4,4'-PeCB	PCB-105	8.89E-06	2.70E-05	6.26E-05	3.26E-04	9.90E-04	2.29E-03	1.97E-06	5.97E-06	1.38E-05	1.57E-07	4.78E-07	1.11E-06	1.94E-03	5.90E-03	1.37E-02
2,2',3,5,5',6-HxCB	PCB-151	9.05E-06	2.13E-05	5.78E-05	3.32E-04	7.81E-04	2.12E-03	2.00E-06	4.71E-06	1.28E-05	1.60E-07	3.77E-07	1.02E-06	1.98E-03	4.65E-03	1.26E-02
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164	1.42E-05	2.08E-05	6.50E-05	5.19E-04	7.62E-04	2.38E-03	3.13E-06	4.60E-06	1.44E-05	2.50E-07	3.68E-07	1.15E-06	3.10E-03	4.54E-03	1.42E-02
2,2',3,4,4',5,5'-HpCB	PCB-180	2.56E-05	4.35E-05	1.45E-04	9.40E-04	1.59E-03	5.31E-03	5.67E-06	9.61E-06	3.20E-05	4.53E-07	7.69E-07	2.56E-06	5.60E-03	9.50E-03	3.17E-02
2,2',3,4,4',5,6'/2,2',3,4',5,5',6-HpCB	PCB-182/187	1.57E-05	2.68E-05	7.86E-05	5.76E-04	9.83E-04	2.88E-03	3.48E-06	5.93E-06	1.74E-05	2.78E-07	4.74E-07	1.39E-06	3.44E-03	5.86E-03	1.72E-02
Entire Chemical Class:		3.39E-04	9.17E-04	4.69E-03	1.24E-02	3.36E-02	1.72E-01	7.49E-05	2.03E-04	1.04E-03	5.99E-06	1.62E-05	8.29E-05	7.40E-02	2.00E-01	1.02E+00
Polychlorinated Biphenyls (Homologs) (kg/year)																
Dichlorobiphenyls		9.74E-05	2.86E-04	4.29E-04	3.57E-03	1.05E-02	1.57E-02	2.15E-05	6.32E-05	9.49E-05	1.72E-06	5.05E-06	7.59E-06	2.13E-02	6.25E-02	9.38E-02
Heptachlorobiphenyls		3.14E-05	7.03E-05	4.50E-04	1.15E-03	2.58E-03	1.65E-02	6.93E-06	1.55E-05	9.95E-05	5.54E-07	1.24E-06	7.96E-06	6.85E-03	1.54E-02	9.83E-02
Monochlorobiphenyls		1.20E-05	3.50E-05	5.81E-05	4.39E-04	1.28E-03	2.13E-03	2.65E-06	7.74E-06	1.29E-05	2.12E-07	6.19E-07	1.03E-06	2.62E-03	7.65E-03	1.27E-02
Tetrachlorobiphenyls		1.13E-04	3.06E-04	9.89E-04	4.12E-03	1.12E-02	3.62E-02	2.49E-05	6.76E-05	2.19E-04	1.99E-06	5.40E-06	1.75E-05	2.46E-02	6.68E-02	2.16E-01
Trichlorobiphenyls		1.25E-04	2.90E-04	7.94E-04	4.59E-03	1.06E-02	2.91E-02	2.77E-05	6.42E-05	1.76E-04	2.22E-06	5.13E-06	1.40E-05	2.74E-02	6.34E-02	1.74E-01
Metals (kg/year)																
Copper		6.69E+00	1.16E+01	1.47E+01	2.45E+02	4.25E+02	5.40E+02	1.48E+00	2.56E+00	3.26E+00	1.18E-01	2.05E-01	2.61E-01	1.46E+03	2.53E+03	3.22E+03
Lead		3.74E-01	4.96E-01	6.79E-01	1.37E+01	1.82E+01	2.49E+01	8.27E-02	1.10E-01	1.50E-01	6.61E-03	8.78E-03	1.20E-02	8.17E+01	1.08E+02	1.48E+02
Zinc		4.29E+01	5.08E+01	6.37E+01	1.57E+03	1.86E+03	2.33E+03	9.48E+00	1.12E+01	1.41E+01	7.58E-01	8.98E-01	1.13E+00	9.37E+03	1.11E+04	1.39E+04

Key:

The units of measure are kilograms per year (kg/year).

The precision of the data in this table is only two significant figures.

The loadings from POTWs to the Elliott Bay Study Area were zero because this area of Puget Sound had no POTWs discharging to it.

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Port Gardner			San Juan Islands			Sinclair-Dyes Inlet			South Sound (East)			South Sound (West)		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
2,2',4-TrCB	PCB-017	3.14E-04	7.73E-04	1.82E-03	2.22E-05	5.45E-05	1.29E-04	9.71E-05	2.39E-04	5.62E-04	1.90E-04	4.67E-04	1.10E-03	1.27E-04	3.12E-04	7.34E-04
2,2',5-TrCB	PCB-018	7.54E-04	2.46E-03	5.32E-03	5.32E-05	1.73E-04	3.75E-04	2.33E-04	7.59E-04	1.64E-03	4.56E-04	1.49E-03	3.21E-03	3.04E-04	9.91E-04	2.14E-03
2,3,3'/2,3',4'-TriCB	PCB-020/033	6.52E-04	1.13E-03	3.52E-03	4.60E-05	7.98E-05	2.48E-04	2.01E-04	3.49E-04	1.09E-03	3.94E-04	6.84E-04	2.13E-03	2.63E-04	4.56E-04	1.42E-03
2,3,4'-TrCB	PCB-022	3.05E-04	7.22E-04	2.03E-03	2.15E-05	5.09E-05	1.43E-04	9.43E-05	2.23E-04	6.26E-04	1.85E-04	4.37E-04	1.23E-03	1.23E-04	2.91E-04	8.18E-04
2,4,4'-TrCB	PCB-028	7.61E-04	1.41E-03	4.33E-03	5.37E-05	9.95E-05	3.05E-04	2.35E-04	4.36E-04	1.34E-03	4.60E-04	8.53E-04	2.62E-03	3.07E-04	5.69E-04	1.75E-03
2,4',5-TrCB	PCB-031	8.80E-04	1.77E-03	4.65E-03	6.21E-05	1.25E-04	3.28E-04	2.72E-04	5.46E-04	1.43E-03	5.32E-04	1.07E-03	2.81E-03	3.55E-04	7.13E-04	1.87E-03
3,4,4'-TrCB	PCB-037	3.34E-04	8.04E-04	1.43E-03	2.36E-05	5.67E-05	1.01E-04	1.03E-04	2.48E-04	4.41E-04	2.02E-04	4.86E-04	8.63E-04	1.35E-04	3.24E-04	5.75E-04
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049	7.07E-04	1.27E-03	3.56E-03	4.99E-05	8.98E-05	2.51E-04	2.18E-04	3.93E-04	1.10E-03	4.28E-04	7.70E-04	2.15E-03	2.85E-04	5.13E-04	1.44E-03
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069	9.46E-04	2.97E-03	6.00E-03	6.67E-05	2.09E-04	4.23E-04	2.92E-04	9.16E-04	1.85E-03	5.72E-04	1.79E-03	3.63E-03	3.81E-04	1.20E-03	2.42E-03
2,3',4,4'-TeCB	PCB-066	4.76E-04	9.24E-04	3.41E-03	3.36E-05	6.52E-05	2.40E-04	1.47E-04	2.85E-04	1.05E-03	2.88E-04	5.59E-04	2.06E-03	1.92E-04	3.73E-04	1.37E-03
2,2',3,4',6-PeCB	PCB-091	2.91E-04	5.13E-04	9.32E-04	2.05E-05	3.62E-05	6.57E-05	8.98E-05	1.58E-04	2.88E-04	1.76E-04	3.10E-04	5.63E-04	1.17E-04	2.07E-04	3.76E-04
2,2',3,5,5'-PeCB	PCB-092	5.25E-04	9.08E-04	1.79E-03	3.70E-05	6.40E-05	1.26E-04	1.62E-04	2.80E-04	5.53E-04	3.17E-04	5.49E-04	1.08E-03	2.12E-04	3.66E-04	7.22E-04
2,3,3',4,4'-PeCB	PCB-105	3.14E-04	9.55E-04	2.21E-03	2.22E-05	6.74E-05	1.56E-04	9.71E-05	2.95E-04	6.83E-04	1.90E-04	5.78E-04	1.34E-03	1.27E-04	3.85E-04	8.92E-04
2,2',3,5,5',6-HxCB	PCB-151	3.20E-04	7.53E-04	2.04E-03	2.26E-05	5.31E-05	1.44E-04	9.88E-05	2.33E-04	6.31E-04	1.93E-04	4.55E-04	1.24E-03	1.29E-04	3.04E-04	8.23E-04
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164	5.01E-04	7.35E-04	2.30E-03	3.53E-05	5.19E-05	1.62E-04	1.55E-04	2.27E-04	7.10E-04	3.03E-04	4.44E-04	1.39E-03	2.02E-04	2.96E-04	9.27E-04
2,2',3,4,4',5,5'-HpCB	PCB-180	9.06E-04	1.54E-03	5.12E-03	6.39E-05	1.08E-04	3.61E-04	2.80E-04	4.75E-04	1.58E-03	5.48E-04	9.30E-04	3.10E-03	3.65E-04	6.20E-04	2.07E-03
2,2',3,4,4',5,6'/2,2',3,4',5,5',6-HpCB	PCB-182/187	5.56E-04	9.48E-04	2.78E-03	3.92E-05	6.69E-05	1.96E-04	1.72E-04	2.93E-04	8.58E-04	3.36E-04	5.74E-04	1.68E-03	2.24E-04	3.82E-04	1.12E-03
Entire Chemical Class:		1.20E-02	3.24E-02	1.66E-01	8.44E-04	2.29E-03	1.17E-02	3.70E-03	1.00E-02	5.12E-02	7.24E-03	1.96E-02	1.00E-01	4.82E-03	1.31E-02	6.68E-02
Polychlorinated Biphenyls (Homologs) (kg/year)																
Dichlorobiphenyls		3.44E-03	1.01E-02	1.52E-02	2.43E-04	7.13E-04	1.07E-03	1.06E-03	3.12E-03	4.68E-03	2.08E-03	6.11E-03	9.17E-03	1.39E-03	4.07E-03	6.12E-03
Heptachlorobiphenyls		1.11E-03	2.49E-03	1.59E-02	7.82E-05	1.75E-04	1.12E-03	3.42E-04	7.68E-04	4.91E-03	6.70E-04	1.50E-03	9.62E-03	4.47E-04	1.00E-03	6.41E-03
Monochlorobiphenyls		4.23E-04	1.24E-03	2.05E-03	2.99E-05	8.73E-05	1.45E-04	1.31E-04	3.82E-04	6.34E-04	2.56E-04	7.48E-04	1.24E-03	1.71E-04	4.99E-04	8.28E-04
Tetrachlorobiphenyls		3.98E-03	1.08E-02	3.50E-02	2.81E-04	7.62E-04	2.47E-03	1.23E-03	3.34E-03	1.08E-02	2.41E-03	6.53E-03	2.11E-02	1.60E-03	4.36E-03	1.41E-02
Trichlorobiphenyls		4.43E-03	1.03E-02	2.81E-02	3.12E-04	7.24E-04	1.98E-03	1.37E-03	3.17E-03	8.67E-03	2.68E-03	6.20E-03	1.70E-02	1.79E-03	4.14E-03	1.13E-02
Metals (kg/year)																
Copper		2.36E+02	4.10E+02	5.21E+02	1.67E+01	2.89E+01	3.67E+01	7.30E+01	1.26E+02	1.61E+02	1.43E+02	2.48E+02	3.15E+02	9.53E+01	1.65E+02	2.10E+02
Lead		1.32E+01	1.75E+01	2.40E+01	9.32E-01	1.24E+00	1.69E+00	4.08E+00	5.42E+00	7.41E+00	7.99E+00	1.06E+01	1.45E+01	5.33E+00	7.07E+00	9.67E+00
Zinc		1.52E+03	1.79E+03	2.25E+03	1.07E+02	1.27E+02	1.59E+02	4.68E+02	5.54E+02	6.95E+02	9.17E+02	1.09E+03	1.36E+03	6.11E+02	7.24E+02	9.07E+02

Key:

The units of measure are kilograms per year (kg/year).

The precision of the data in this table is only two significant figures.

The loadings from POTWs to the Elliott Bay Study Area were zero because this area of Puget Sound had no POTWs discharging to it.

Appendix H. Estimated Loadings to Puget Sound

Chemical of Concern	Alternate Name	Strait of Georgia			Strait of Juan de Fuca			Whidbey Basin			Total Puget Sound		
		25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile	25th Percentile	50th Percentile	75th Percentile
2,2',4-TrCB	PCB-017	1.63E-04	4.00E-04	9.42E-04	2.97E-05	7.31E-05	1.72E-04	1.02E-04	2.52E-04	5.94E-04	3.32E-03	8.18E-03	1.93E-02
2,2',5-TrCB	PCB-018	3.90E-04	1.27E-03	2.75E-03	7.13E-05	2.33E-04	5.03E-04	2.46E-04	8.01E-04	1.73E-03	7.97E-03	2.60E-02	5.62E-02
2,3,3'/2,3',4'-TriCB	PCB-020/033	3.37E-04	5.85E-04	1.82E-03	6.17E-05	1.07E-04	3.33E-04	2.12E-04	3.68E-04	1.15E-03	6.90E-03	1.20E-02	3.73E-02
2,3,4'-TrCB	PCB-022	1.58E-04	3.73E-04	1.05E-03	2.89E-05	6.83E-05	1.92E-04	9.95E-05	2.35E-04	6.61E-04	3.23E-03	7.64E-03	2.15E-02
2,4,4'-TrCB	PCB-028	3.93E-04	7.29E-04	2.24E-03	7.20E-05	1.33E-04	4.09E-04	2.48E-04	4.60E-04	1.41E-03	8.05E-03	1.49E-02	4.58E-02
2,4',5-TrCB	PCB-031	4.55E-04	9.14E-04	2.40E-03	8.32E-05	1.67E-04	4.39E-04	2.87E-04	5.76E-04	1.51E-03	9.30E-03	1.87E-02	4.91E-02
3,4,4'-TrCB	PCB-037	1.73E-04	4.16E-04	7.38E-04	3.16E-05	7.61E-05	1.35E-04	1.09E-04	2.62E-04	4.65E-04	3.54E-03	8.51E-03	1.51E-02
2,2',3,5/2,2',4,5'-TeCB	PCB-043/049	3.66E-04	6.58E-04	1.84E-03	6.69E-05	1.20E-04	3.37E-04	2.31E-04	4.15E-04	1.16E-03	7.48E-03	1.35E-02	3.77E-02
2,2',5,5'/2,3',4,6-TeCB	PCB-052/069	4.89E-04	1.53E-03	3.10E-03	8.94E-05	2.80E-04	5.67E-04	3.08E-04	9.66E-04	1.95E-03	1.00E-02	3.14E-02	6.34E-02
2,3',4,4'-TeCB	PCB-066	2.46E-04	4.78E-04	1.76E-03	4.51E-05	8.74E-05	3.22E-04	1.55E-04	3.01E-04	1.11E-03	5.04E-03	9.77E-03	3.60E-02
2,2',3,4',6-PeCB	PCB-091	1.50E-04	2.65E-04	4.82E-04	2.75E-05	4.85E-05	8.81E-05	9.48E-05	1.67E-04	3.04E-04	3.08E-03	5.43E-03	9.86E-03
2,2',3,5,5'-PeCB	PCB-092	2.71E-04	4.69E-04	9.26E-04	4.96E-05	8.58E-05	1.69E-04	1.71E-04	2.96E-04	5.84E-04	5.55E-03	9.60E-03	1.89E-02
2,3,3',4,4'-PeCB	PCB-105	1.63E-04	4.94E-04	1.14E-03	2.97E-05	9.03E-05	2.09E-04	1.02E-04	3.11E-04	7.21E-04	3.32E-03	1.01E-02	2.34E-02
2,2',3,5,5',6-HxCB	PCB-151	1.65E-04	3.89E-04	1.06E-03	3.03E-05	7.12E-05	1.93E-04	1.04E-04	2.45E-04	6.66E-04	3.38E-03	7.97E-03	2.16E-02
2,3,3',4',5,6/2,3,3',4',5',6-HxCB	PCB-163/164	2.59E-04	3.80E-04	1.19E-03	4.74E-05	6.95E-05	2.17E-04	1.63E-04	2.40E-04	7.49E-04	5.30E-03	7.77E-03	2.43E-02
2,2',3,4,4',5,5'-HpCB	PCB-180	4.69E-04	7.95E-04	2.65E-03	8.57E-05	1.45E-04	4.85E-04	2.95E-04	5.01E-04	1.67E-03	9.59E-03	1.63E-02	5.42E-02
2,2',3,4,4',5,6'/2,2',3,4',5,5',6-HpCB	PCB-182/187	2.87E-04	4.90E-04	1.44E-03	5.26E-05	8.97E-05	2.63E-04	1.81E-04	3.09E-04	9.06E-04	5.88E-03	1.00E-02	2.94E-02
Entire Chemical Class:		6.19E-03	1.68E-02	8.57E-02	1.13E-03	3.07E-03	1.57E-02	3.90E-03	1.06E-02	5.40E-02	1.27E-01	3.43E-01	1.75E+00
Polychlorinated Biphenyls (Homologs) (kg/year)													
Dichlorobiphenyls		1.78E-03	5.22E-03	7.84E-03	3.26E-04	9.56E-04	1.43E-03	1.12E-03	3.29E-03	4.94E-03	3.64E-02	1.07E-01	1.60E-01
Heptachlorobiphenyls		5.73E-04	1.29E-03	8.22E-03	1.05E-04	2.35E-04	1.50E-03	3.61E-04	8.10E-04	5.18E-03	1.17E-02	2.63E-02	1.68E-01
Monochlorobiphenyls		2.19E-04	6.40E-04	1.06E-03	4.00E-05	1.17E-04	1.94E-04	1.38E-04	4.03E-04	6.70E-04	4.48E-03	1.31E-02	2.17E-02
Tetrachlorobiphenyls		2.06E-03	5.59E-03	1.81E-02	3.76E-04	1.02E-03	3.31E-03	1.30E-03	3.52E-03	1.14E-02	4.21E-02	1.14E-01	3.70E-01
Trichlorobiphenyls		2.29E-03	5.30E-03	1.45E-02	4.19E-04	9.70E-04	2.66E-03	1.44E-03	3.34E-03	9.15E-03	4.69E-02	1.09E-01	2.97E-01
Metals (kg/year)													
Copper		1.22E+02	2.12E+02	2.69E+02	2.24E+01	3.87E+01	4.93E+01	7.71E+01	1.33E+02	1.70E+02	2.50E+03	4.33E+03	5.51E+03
Lead		6.83E+00	9.07E+00	1.24E+01	1.25E+00	1.66E+00	2.27E+00	4.31E+00	5.72E+00	7.82E+00	1.40E+02	1.86E+02	2.54E+02
Zinc		7.84E+02	9.28E+02	1.16E+03	1.43E+02	1.70E+02	2.13E+02	4.94E+02	5.85E+02	7.33E+02	1.60E+04	1.90E+04	2.38E+04

Key:

The units of measure are kilograms per year (kg/year).

The precision of the data in this table is only two significant figures.

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