EAST WATERWAY OPERABLE UNIT SUPPLEMENTAL REMEDIAL INVESTIGATION/ FEASIBILITY STUDY DATA REPORT: JUVENILE CHINOOK SALMON TISSUE COLLECTION

FINAL

For submittal to:

The US Environmental Protection Agency
Region 10
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Table of Contents

1 Introduction 1

2 Juvenile Chinook Salmon Collection and Sample Processing Methods 2

2.1 JUVENILE CHINOOK SALMON COLLECTION 2

2.1.1 Targeted species 4

2.1.2 Collection methods 4

2.1.3 Field sample processing 6

2.1.4 Catch results 7

2.2 SAMPLE IDENTIFICATION, COMPOSITING, AND PROCESSING 8

2.2.1 Sample identification 8

2.2.2 Compositing scheme 8

2.3 FIELD DEVIATIONS FROM THE QAPP 11

3 Analytical Methods 11

3.1 FISH TISSUE AND STOMACH CONTENTS ANALYTICAL METHODS 11

3.2 LABORATORY DEVIATIONS FROM THE QAPP 13

4 Results of Chemical Analyses 13

4.1 WHOLE-BODY TISSUE AND STOMACH CONTENTS CHEMISTRY RESULTS 13

4.1.1 Metals 13

4.1.2 Butyltins 14

4.1.3 Phthalates 15

4.1.4 PAHs 15

4.1.5 Other SVOCs 17

4.1.6 PCB Aroclors 19

4.1.7 Pesticides 20

4.1.8 Lipids and total solids 21

4.2 COMPARISON OF NON-DETECTED RESULTS WITH ANALYTICAL CONCENTRATION GOALS 22

4.3 DATA VALIDATION RESULTS 24

5 References 26

Appendix A – Chinook Compositing Memorandum

Appendix B – Data Management

Appendix C – Data Validation Report

Appendix D – Laboratory Report Forms

Appendix E – Field Collection Forms and Field Notes

Appendix F – Chain-of-Custody and Compositing Forms

Tables

Table 2-1.	Beach seine sampling locations	5
Table 2-2.	Numbers of individual specimens captured in the EW	7
Table 2-3.	Summary of Chinook salmon composite samples	9
Table 3-1.	Analytical methods for juvenile Chinook salmon whole-body tissue and stomach contents analyses	12
Table 4-1.	Metals concentrations in juvenile Chinook salmon composite samples	14
Table 4-2.	Butyltin concentrations in juvenile Chinook salmon composite samples	14
Table 4-3.	Phthalate concentrations in juvenile Chinook salmon composite samples	15
Table 4-4.	PAH concentrations in juvenile Chinook salmon composite samples	16
Table 4-5.	Alkylated PAH concentrations for the stomach contents sample	17
Table 4-6.	SVOC concentrations in juvenile Chinook salmon composite samples	18
Table 4-7.	PCB Aroclor concentrations in juvenile Chinook salmon composite samples	19
Table 4-8.	Pesticide concentrations in juvenile Chinook salmon composite samples	20
Table 4-9.	Lipids and solids concentrations in juvenile Chinook salmon composite samples	22
Table 4-10.	Number of RLs and MDLs above the ecological receptor ACGs for juvenile Chinook salmon composite samples	23
Table 4-11.	Data validation performed for each SDG	24

Maps

Map 2-1.	Juvenile Chinook salmon sampling location	3

Acronyms

Acronym	Definition
ARI	Analytical Resources, Inc.
ACG	analytical concentration goal
BEHP	bis(2-ethylhexyl) phthalate
BHC	benzene hexachloride
CAS	Columbia Analytical Services, Inc.
CFR	Code of Federal Regulations
COI	chemical of interest
CVAA	cold vapor atomic absorption
DCM	dichloromethane
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
EPA	US Environmental Protection Agency
ERA	ecological risk assessment
EW	East Waterway
GC/ECD	gas chromatography/electron capture detector
GC/MS	gas chromatography/mass spectrometry
GFAAS	graphite furnace atomic absorption spectrophotometry
GI	gastrointestinal
ICP/AES	inductively couple/plasma atomic emission spectrometry
ICP/MS	inductively coupled/plasma mass spectrometry
ICSA	interference check sample A
ID	identification
J-qualifier	estimated concentration
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MS	matrix spike
MSD	matrix spike duplicate
MDL	method detection limit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PSEP	Puget Sound Estuary Program
QA/QC	quality assurance/quality control

QAPP	quality assurance project plan
RL	reporting limit
ROC	receptor of concern
SDG	sample delivery group
SOP	standard operating procedure
SVOC	semivolatile organic compound
TBT	tributyltin
U-qualifier	not detected at given concentration
WDFW	Washington State Department of Fish and Wildlife
Windward	Windward Environmental LLC
ww	wet weight
Y-qualifier	elevated reporting limit

1 Introduction

This data report presents the results of chemical analyses of juvenile Chinook salmon (*Oncorhynchus tshawytscha)* tissue collected on June 10 and 11, 2009, as part of the supplemental remedial investigation for the East Waterway (EW). Sampling and analyses were conducted in accordance with the *Quality Assurance Project Plan: Juvenile Chinook Salmon Collection and Chemical Analysis* (Windward 2009), hereafter referred to as the Juvenile Chinook Salmon Quality Assurance Project Plan (QAPP). Field catch results and the results of the chemical analyses of juvenile Chinook salmon samples are provided in this report. Juvenile Chinook salmon whole-body tissue samples were analyzed for total metals, butyltins, polycyclic aromatic hydrocarbons (PAHs), phthalates, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs) as Aroclors, pesticides, lipids, and total solids. The stomach contents sample was analyzed for total metals, PAHs, and total solids.

The primary objectives for collecting the tissue data under the Juvenile Chinook Salmon QAPP (Windward 2009) were to:

- Characterize the chemical exposure for juvenile Chinook salmon, an ecological receptor of concern (ROC) in the ecological risk assessment (ERA), through all exposure routes by means of tissue-residue exposure analysis.[1]
- Characterize chemical exposure for juvenile Chinook salmon[2] and wildlife ROCs (birds and mammals that may consume juvenile salmon as prey) through the food chain by means of dietary exposure analysis.

This report is organized into sections that present collection and processing methods, analytical methods, chemical analysis results, and references. The text is supported by the following appendices:

- Appendix A – Chinook Compositing Memorandum
- Appendix B – Data Management
- Appendix C – Data Validation Report
- Appendix D – Laboratory Report Forms

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[1] A tissue-residue approach is not appropriate for estimating risk to juvenile Chinook salmon from PAHs or metals (other than tributyltin [TBT], mercury, or selenium) because fish actively regulate these chemicals of interest (COIs).

[2] For metals (other than TBT, mercury, or selenium) an exposure media (i.e., diet or water) approach is preferred. Stomach contents chemistry data will be used to assess dietary risk to juvenile Chinook salmon. Thus, stomach contents were only analyzed for PAHs and metals (other than TBT, mercury, or selenium).

- Appendix E – Field Collection Forms and Field Notes
- Appendix F – Chain-of-Custody and Compositing Forms

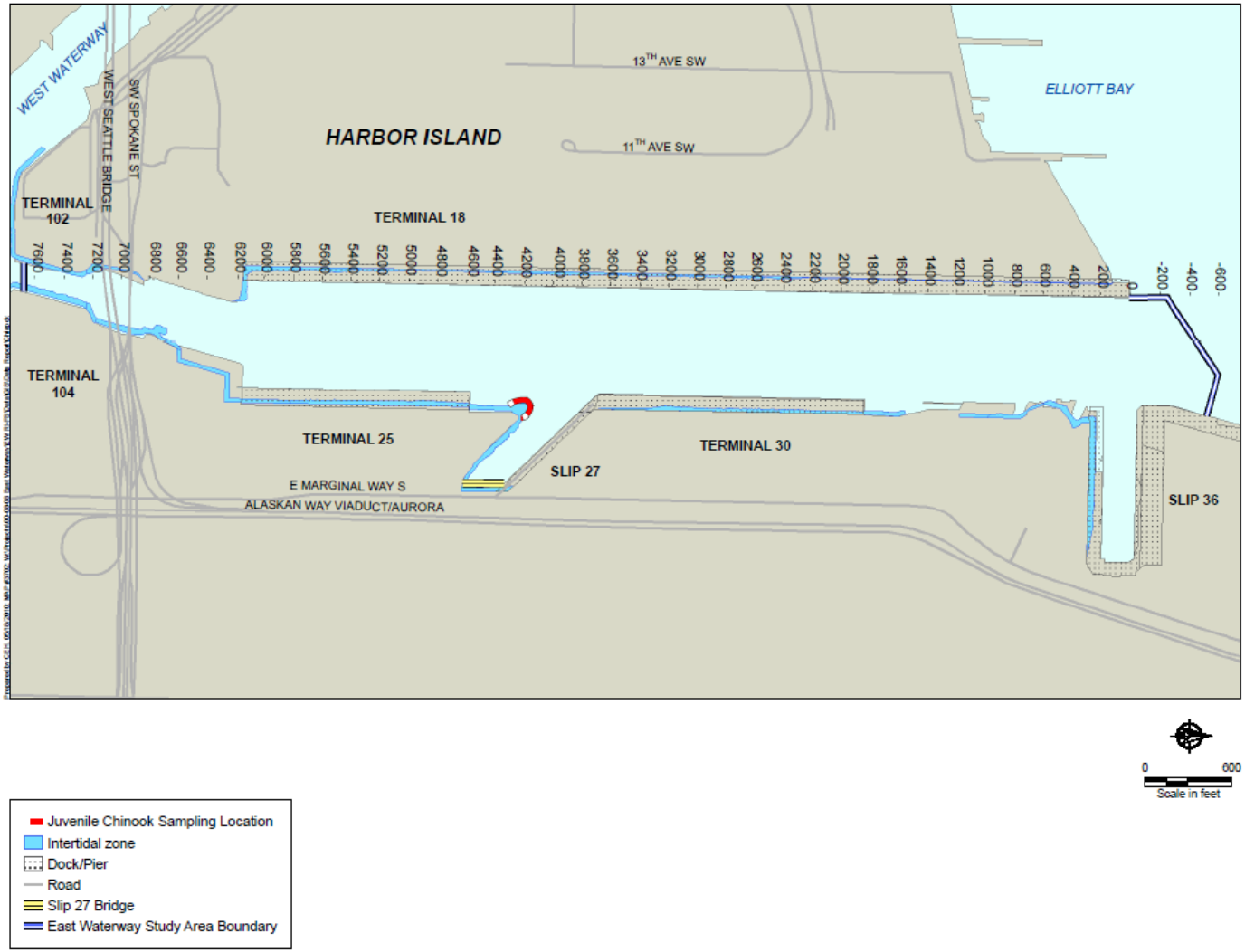
2 Juvenile Chinook Salmon Collection and Sample Processing Methods

This section summarizes the methods used to collect and process juvenile Chinook salmon. The field procedures used to collect these samples are described in detail in the Juvenile Chinook Salmon QAPP (Windward 2009). Section 2.1 presents the juvenile Chinook salmon sampling methods, Section 2.2 presents sample identification, compositing and processing methods; Section 2.3 describes field deviations from the QAPP.

2.1 JUVENILE CHINOOK SALMON COLLECTION

This section discusses the species targeted for collection, sampling methods, and catch results. Sampling locations are presented on Map 2-1. Juvenile Chinook salmon sampling was conducted on June 10 and 11, 2009.

In addition, it should be noted that juvenile chum salmon sampling was conducted on April 28, 2009. However, these samples were not used because sufficient juvenile Chinook salmon samples were collected during the June sampling event.



Map 2-1. Juvenile Chinook salmon sampling location

2.1.1 Targeted species

To meet the study objectives as presented in Section 2.2 of the Juvenile Chinook Salmon QAPP (Windward 2009), juvenile Chinook salmon were collected from the EW to estimate their chemical exposure during outmigration through the EW. As discussed in the Juvenile Chinook Salmon QAPP (Windward 2009), the Washington State Department of Fish and Wildlife (WDFW) describes the status of the federally threatened species Green River (Duwamish) Chinook salmon as "healthy" (WDFW 2002). In previous EW sampling events, juvenile Chinook salmon were caught in seine nets from April through September, with peak numbers found in April through July (Shannon 2006). Juvenile Chinook salmon are generally regarded as the most estuarine-dependant salmonid, with residence time for wild juvenile Chinook salmon in the 5-mile-long Lower Duwamish Waterway immediately upstream of the EW ranging from 2 weeks to 2 months (Ruggerone and Volk 2004).

Because the numbers of both wild and hatchery juvenile Chinook in EW can be limited, juvenile chum salmon were collected in April. These fish were to be used as a surrogate for whole-body and/or dietary analyses if insufficient numbers of juvenile Chinook salmon or mass of stomach contents were not collected for analysis during the June sampling event. As discussed in the QAPP (Windward 2009), juvenile chum salmon are also highly dependent on estuaries, feed on similar organisms, and have similar habitat use as juvenile Chinook salmon. Chum salmon specimens (and stomach contents) were archived until after Chinook sampling was completed and it was known that sufficient juvenile Chinook salmon were retained. The archived chum salmon were disposed of after it was known that sufficient Chinook were collected during the June 2009 sampling event.

2.1.2 Collection methods

Sampling for juvenile chum salmon occurred in April 2009, and sampling for juvenile Chinook salmon was conducted in June 2009 to coincide with the peak outmigration of each species. Both sampling events took place using a beach seine from the mouth of Slip 27 (Map 2-1). As discussed in the Juvenile Chinook Salmon QAPP (Windward 2009), fishing during both the April and June events began at Slip 27; fishing was also to occur at Slip 36, at the discretion of the field coordinator, if it was determined that sampling at Slip 36 might yield better results. However, no sampling at Slip 36 was conducted because sufficient numbers of juvenile Chinook and chum salmon were collected from the mouth of Slip 27.

The targeted fish were collected using a standard beach seine. The beach seine measured 37 m long and 3 m deep, with 6-mm mesh in the wings and 5-mm mesh in the center bag. The seine was equipped with floats, to minimize snagging of the lead line on submerged pilings, riprap, and other debris, and 30-m ropes to haul the net to shore. The net was deployed at low tide, as close to slack water as possible. Prior to each

deployment, the area, time of day, and weather conditions were recorded. To avoid contamination, the beach seine was cleaned of all debris before being deployed. The net was generally deployed 30 m from shore and parallel to the beach using an outboard motor-powered boat and three or four crew members, unless modifications were deemed necessary by the field crew.

One or two crew members stood onshore holding the 30-m rope attached to one end of the net until the boat, operating in reverse, pulled the rope taut. Once the rope was taut, another crew member fed the net from the bow of the boat into the water as the boat operator slowly motored in reverse to lay out all the net parallel to shore. The rope on the opposite end of the net was then brought to shore on the boat, and the crew member who had been in the bow of the boat deploying the net went ashore with the rope end to assist with net retrieval. Teams of one or two crew members stood at each end of the net, approximately 40 m apart, pulling the net toward shore at a steady rate. When the net was approximately 10 m from shore, the two teams moved together until they were about 10 m apart and then finished hauling the net up onto the shore.

Table 2-1 summarizes the beach seines set during both the April and June sampling events, along with the counts of target species collected for each seine attempt.

Table 2-1. Beach seine sampling locations

Sampling Location by Date	Set Number	Time	No. of Target Species Collected			
			Chum	Chinook, Wild	Chinook, Hatchery	Total
April 28, 2009						
Slip 27	001	1155	54	0	0	54
	002	1237	47	0	0	47
Daily total			**101**	**0**	**0**	**101**
June 10, 2009						
Slip 27	001	1003	0	0	2	2
	002	1033	0	4	5	9
	003	1104	0	0	6	6
	004	1122	0	0	0	0
	005	1136	0	2	14	16
	006	1156	0	4	21	25
	007	1226	0	3	42	45
	008	1304	0	11	16	27
	009	1342	0	6	0	6
	010	1407	0	4	0	4
	011	1432	0	1	0	1
Daily total			**0**	**35**	**106**	**141**
June 11, 2009						
Slip 27	012	1046	0	0	0	0
	013	1110	0	1	0	1

Sampling Location by Date	Set Number	Time	No. of Target Species Collected			
			Chum	Chinook, Wild	Chinook, Hatchery	Total
	014	1130	0	4	0	4
	015	1150	0	0	0	0
	016	1204	0	0	0	0
	017	1228	0	3	0	3
	018	1246	0	4	0	4
	019	1309	0	6	0	6
	020	1337	0	1	0	1
	021	1355	0	3	0	3
	022	1412	0	2	0	2
Daily total			**0**	**24**	**0**	**24**
Overall Total			**101**	**59**	**106**	**266**

2.1.3 Field sample processing

Fish were processed using a live sampling technique to minimize the mortality of non-target species through species sorting and processing prioritization. Upon completion of an individual beach seine set, the catch was immediately emptied into a large plastic tub or returned directly to the water, whichever was judged to be less stressful to the non-target species fish. Field crew then sorted the catch by species and size into numerous smaller tubs. Target species were separated from non-target species and processed. Non-target species were identified to the lowest practical taxon, the numbers of fish captured were estimated, and the fish were returned immediately to the location of capture.

The targeted number of individual juvenile Chinook salmon captured in the beach seines was checked for clipped adipose fins or presence of a coded wire tags to determine whether the fish were wild[3] or hatchery-raised. Fish were sorted and placed in a 5-gal. bucket filled with ice. All fish were carefully inspected to ensure that the sampling equipment did not damage their skin or fins. All individual specimens from each beach seine set were placed in one large ziplock bag, with the date, sampling location, and set number recorded on the outside of the bag in indelible ink, and then placed in a cooler with ice. The iced fish were transported in coolers to Analytical Resources, Inc. (ARI) for further processing of tissue samples and for stomach contents analysis.

[3] Non-marked fish were considered to be wild, although a small percentage of hatchery fish are not clipped or tagged prior to release.

The date, time, and location of each effort were recorded in the field notebook, the Stomach Contents Tally Form (see Section 2.2), and the Non--target Species Tally Form. Completed field forms are presented in Appendix E.

2.1.4 Catch results

A total of 165 juvenile Chinook salmon and 101 juvenile chum salmon were collected and retained for possible analysis. Target numbers specified in the QAPP (Windward 2009) were met or exceeded for juvenile Chinook salmon, and thus the juvenile chum salmon were not analyzed. Compositing information, including the specimen identification (ID), length, and weight for each target specimen included in a composite sample, are presented in Appendix A.

Non-target fish, crab, shrimp, and other invertebrate species captured in the EW were identified, recorded, and returned to the EW. A total of 11 fish species, including both target and non-target species and two types of invertebrates classified to the lowest taxonomic level practicable were collected from the EW. The names and numbers of each species captured, by sampling effort, are presented in Table 2-2.

Table 2-2. Numbers of individual specimens captured in the EW

Species	Scientific Name	Number of Specimens Captured		
		April 28, 2009	June 10 – 11, 2009	Total
Chinook salmon	*Oncorhynchus tshawytscha*	0	486	486[a]
Chum salmon	*Oncorhynchus keta*	223	627	850[b]
Coho salmon	*Oncorhynchus kisutch*	0	10	10
Comb jellies	*Ctenophora*	0	370[c]	370
Crescent gunnel	*Pholis laeta*	0	1	1
Dungeness crab	*Cancer magister*	1	0	1
Pacific herring	*Clupea pallasii marisalbi*	0	3	3
Pacific sand lance	*Ammodytes hexapterus*	1	3	4
Shiner surfperch	*Cymatogaster aggregata*	0	7	7
Striped perch	*Embiotoca lateralis*	0	3	3
Skate	*Rajidae* sp.	1	0	1
Smelt spp.	*Osmeridae* sp.	0	3	3
Threespine stickleback	*Gasterosteus aculeatus*	0	4	4
Unknown jellyfish sp.	unknown	0	68[c]	68
Total		**226**	**1,585**	**1,811**

[a] A total of 59 wild and 106 hatchery juvenile Chinook salmon were retained for processing during the June 2009 sampling event. All other juvenile Chinook salmon were released.

[b] A total of 101 juvenile chum salmon were archived after the April 2009 sampling event as a possible surrogate for juvenile Chinook salmon. All others were released.

[c] Number is approximate.

EW – East Waterway

2.2 SAMPLE IDENTIFICATION, COMPOSITING, AND PROCESSING

This section presents methods used to process fish following collection in the field. Specimen and sample ID numbers are described for individual fish and also for the composite tissue samples. In addition, the compositing scheme is described.

2.2.1 Sample identification

For whole-body tissue samples, unique alphanumeric sample numbers were assigned to each individual fish specimen and each composite sample. The first four characters for all samples were "EW09" to identify that the sample was collected from the East Waterway project area in 2009. The next characters identified the sampling location: S27 for Slip 27. The next three characters, a three-digit number, identified the effort number (e.g., the second beach seine effort after the start of sampling was 002). The next three characters identified the individual species type as Chinook salmon (CHN) or chum salmon (CHU). Following these identifiers, the letters "H" or "W" were used to designate the specimen as a hatchery or wild fish. The final identifier was a sample number. For example, the sample ID EW09-S27-003-CHN-W-001 represented the first wild Chinook salmon sample collected from Slip 27 during the third East Waterway 2009 sampling effort. All relevant information for each individually wrapped and labeled target specimen, including sample ID, length, weight, external abnormalities, sample date, time, and location number, was recorded on the Stomach Contents Tally Form (Appendix E).

Once whole-body samples had been composited in the laboratory, a unique ID number was assigned to the composite. The compositing scheme was determined in consultation with EPA and specified which individual fish were included in each composite (see Section 2.1.4.3 and Appendix A) and the resulting composite ID. The whole-body composite samples included "EW09-CHN" followed by the letters "H" or "W" to designate hatchery or wild fish, the letters "comp" to indicate a composite sample, and a sequential two-digit number to identify the sample number. For example, the first Chinook hatchery salmon whole-body composite sample composed of fish collected from the East Waterway in 2009 was identified as EW09-CHN-H-comp01.

Stomach contents composite samples were identified with "EW09-CHN" followed by "SC" to indicate stomach contents, the letters "comp" to indicate a composite sample, and a two-digit sequential number. Stomach contents composite subsamples also included the letters "H" or "W" to identify the sample being composed of the stomach contents of hatchery or wild fish. The single final stomach contents composite sample, which included both hatchery and wild fish, was identified as EW09-CHN-SC-comp01.

2.2.2 Compositing scheme

All juvenile Chinook salmon tissue samples were chemically analyzed as composite samples, which were created by homogenizing individual specimens together. The compositing plan was developed in coordination with EPA, and the final plan was

approved by EPA (Appendix A). The plan detailed the compositing strategy for the 59 wild and 106 hatchery fish. As specified in the Juvenile Chinook Salmon QAPP (Windward 2009), the compositing of whole-body fish did not mix wild and hatchery fish. The compositing strategy for stomach contents and whole-body fish is described below.

- **Stomach contents samples –** Stomach contents samples were composited as they were collected, with two composite samples created from the wild fish (2.4 g) and two other composite samples created from the hatchery fish (4.6 g). All four of these composites were combined into a single stomach contents composite sample with a mass of 6.605 g. The stomach contents composite samples from the wild and hatchery fish were combined into a single composite sample in order to have sufficient sample mass for PAHs and metals analyses. Total solids were determined during the freeze-drying process for metals analysis.
- **Wild Chinook salmon whole-body samples –** The 59 wild Chinook salmon whole-body samples were sorted to create three composite samples. Composite 1 contained the four yearling fish that were collected. These fish were substantially bigger than all the other fish. Yearling Chinook salmon are older and larger than sub-yearling fish. They are capable of feeding over a large area, including both marine and freshwater regimes. The sub-yearling wild Chinook salmon were sorted to create two composites.
- **Hatchery Chinook salmon whole-body samples –** The 105 hatchery Chinook salmon were sorted to create three composite samples. No yearling fish were identified as hatchery-released fish.

Details regarding the composite samples that were chemically analyzed are presented in Table 2-3.

Table 2-3. Summary of Chinook salmon composite samples

Composite Type	Composite ID	No. of Specimens/ Composite	Total Composite Mass (g)	Fish Length (mm)		Fish Weight (g ww)	
				Range	Mean	Range	Mean
Stomach Contents							
Hatchery and wild combined	EW09-CHN-SC-comp01	165	6.605	60–130	75	2.40–19.50	4.49
Whole-Body							
Wild (yearlings)	EW09-CHN-W-comp01	4	66.33	110–130	121	13.86–19.50	16.58
Wild	EW09-CHN-W-comp02	28	112.57	64–90	73	2.48–6.64	4.02
	EW09-CHN-W-comp03	27	107.20	62–83	73	2.53–6.43	3.97
Hatchery	EW09-CHN-H-comp01	36	154.46	61–85	74	2.40–7.14	4.29
	EW09-CHN-H-comp02	35	150.43	60–87	74	2.55–6.60	4.30
	EW09-CHN-H-comp03	34	142.85	62–84	73	2.51–6.57	4.20

ID – identification ww – wet weight

2.2.3 Laboratory sample processing

Prior to freezing the fish and stomach contents for storage, the stomachs were surgically removed at ARI by Windward Environmental LLC (Windward) staff. During the processing, hatchery and wild specimens from each beach seine set were kept separate from one another and processed one at a time to ensure that individual specimens were tracked properly. Each individual specimen of the target species was weighed using an analytical scale accurate to 0.5 g wet weight (ww). Fish were cut from the anal vent to the head and the entire gastrointestinal (GI) tract was removed.

Fish were checked for the presence of coded wire tags, but none were found during processing. Gut contents were squeezed out of the stomachs by hand or, if this was infeasible, the gut was cut open with scissors and gut contents were scraped out. Fullness of the gut and distinguishable prey contents were noted. Gut contents were weighed to the nearest 0.01 g and composited using a sufficient number of randomly selected fish to generate a suitable composite sample. A composite was considered complete when the accumulated gut contents weighed at least 18 g and included the gut contents from at least 20 fish. Composite samples were collected in pre-cleaned, tared, 4-oz jars, and identification labels were attached to indicate the sample number and date sampled. After the removal of gut contents, the GI tract was returned to the fish and the fish were reweighed. The fish were then placed individually in pre-cleaned glass jars, along with all liquid from the fish, and labeled with the label taped to the outside of the jar. Samples were stored frozen at the laboratory.

The final homogenization and compositing scheme for the juvenile Chinook salmon tissue samples was determined in discussions between the East Waterway Group and EPA. Samples were kept frozen at ARI until the fish compositing scheme was approved by EPA. After the final compositing scheme was approved by EPA, all specimens were thawed and homogenized using a blender, chopper, and/or meat grinder. Tissue dissection and homogenization was performed by qualified laboratory technicians following ARI's standard operating procedures (SOPs) under Windward's oversight. All equipment used for fish processing was completely disassembled and cleaned prior to initial use and after each composite sample, in accordance with the laboratory's SOP, to ensure that no cross-contamination occurred.

Individual Chinook salmon specimens were homogenized into whole-body tissue composite samples at ARI; the stomach contents were initially separated into four composite samples by Windward staff at ARI. These stomach contents composite sub-samples were further composited into a single stomach contents composite sample at Columbia Analytical Services, Inc., (CAS). Compositing was performed according to the compositing scheme presented in the Chinook compositing memorandum (Appendix A). A list of individual specimens used in each whole-body tissue composite sample is presented in Appendix A and discussed further in Section 2.2.2.

2.3 FIELD DEVIATIONS FROM THE QAPP

Field deviations from the Juvenile Chinook Salmon QAPP (Windward 2009) included minor modifications to collection and/or processing methods. These field deviations did not affect the data quality and are discussed in detail below.

- Length and weight data were recorded on the Stomach Contents Tally Form, rather than on the Target Species Tally Form. Target Species Tally Forms were not completed because of the redundancy in these forms (see Appendix E).
- A total of 165 juvenile Chinook salmon were collected during the June 2009 sampling effort. This was slightly more than the 160 juvenile Chinook salmon allowed under the WDFW scientific collection permit. There were no violations of the National Marine Fisheries Service permit, which specified the number of wild juvenile Chinook salmon that could be collected.
- Sample EW09-S27-006-CHN-H-008 could not be located at the laboratory at the time of sample compositing and was therefore not included in the composite sample EW09-CHN-H-comp03, as noted in the Chinook compositing memorandum (Appendix A).

3 Analytical Methods

The methods and procedures used to prepare and chemically analyze the tissue and stomach contents composite samples are described briefly in this section and in detail in the Juvenile Chinook Salmon Tissue QAPP (Windward 2009). This section also summarizes any laboratory deviations from the QAPP. Analytical testing adhered to the most recent EPA quality assurance/quality control (QA/QC) guidelines and analysis protocols (EPA 2002a; PSEP 1997).

3.1 FISH TISSUE AND STOMACH CONTENTS ANALYTICAL METHODS

Whole-body composite tissue composite samples were analyzed for total metals, total mercury, butyltins, SVOCs, PCBs as Aroclors, pesticides, lipids, and total solids. The stomach contents composite sample was analyzed for PAHs, including alkylated PAHs, metals, and total solids.

The analytical methods followed by ARI and CAS adhered to the most recent EPA QA/QC guidelines and standard analysis protocols (EPA 2002b; PSEP 1997). All methods selected represent standard methods used for the analysis of these chemicals in tissue. The analytical methods used are identified in Table 3-1.

Table 3-1. Analytical methods for juvenile Chinook salmon whole-body tissue and stomach contents analyses

Parameter	Method	Reference	Laboratory	Maximum Sample Holding Time
PCBs as Aroclors	GC/ECD	EPA 8082	ARI	1 year to extract, 40 days to analyze
Organochlorine pesticides[a]	GC/ECD	EPA 8081B	ARI	1 year to extract, 40 days to analyze
SVOCs including PAHs[b]	GC/MS	EPA 8270D	ARI	1 year to extract, 40 days to analyze
PAHs and alkylated homologs	GC/MS-SIM	EPA 8270C-SIM	CAS	1 year to extract, 40 days to analyze
Mercury	CVAA	EPA 7471	ARI	60 days
Total metals[c]	ICP/MS, ICP/AES, and GFAAS	EPA 6020, 6010B, and 7740	ARI and CAS	6 months
Tributyltin, dibutyltin, monobutyltin (as ions)	GC/MS-SIM	Krone (1989)	ARI	1 year to extract, 40 days to analyze
Lipids	DCM: acetone extraction gravimetric	NOAA (1993)	ARI	1 year
Total solids	freeze-dried or oven-dried	PSEP (1997) or EPA 160.3	ARI and CAS	6 months

[a] Target pesticides included 4,4′-DDT, 4,4′-DDE, 4,4′-DDD, 2,4′-DDT, 2,4′-DDE, 2,4′-DDD, aldrin, alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, oxychlordane, alpha- and gamma-chlordane, cis- and trans-nonachlor, dieldrin, endosulfan, endosulfan sulfate, endrin, heptachlor, heptachlor epoxide, methoxychlor, mirex, and toxaphene.

[b] Target PAHs included anthracene, pyrene, dibenzofuran, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, fluoranthene, benzo(k)fluoranthene, acenaphthylene, chrysene, benzo(a)pyrene, dibenz(a,h)anthracene, benzo(a)anthracene, acenaphthene, phenanthrene, fluorene, 1-methylnaphthalene, naphthalene, 2-methylnaphthalene.

[c] Target metals included arsenic, antimony, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

ARI – Analytical Resources, Inc.
BHC – benzene hexachloride
CAS – Columbia Analytical Services
CVAA – cold vapor atomic absorption
DCM – dichloromethane
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
EPA – US Environmental Protection Agency
GC/ECD – gas chromatography/electron capture detector
GC/MS – gas chromatography/mass spectrometry
GFAAS – graphite furnace atomic absorption spectrophotometry
ICP/AES – inductively couple/plasma atomic emission spectrometry
ICP/MS – inductively coupled/plasma mass spectrometry
NOAA – National Oceanic and Atmospheric Administration
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
PSEP – Puget Sound Estuary Program
SIM – select ion monitoring
SVOC – semivolatile organic carbon

3.2 LABORATORY DEVIATIONS FROM THE QAPP

The laboratories followed the methods and procedures described in the QAPP with the following exceptions:

- Insufficient sample mass was available to analyze all of the whole-body composite samples for all parameters. Specifically, butyltins could not be analyzed in sample EW09-CHN-W-comp01; and total solids could not be analyzed in samples EW09-CHN-W-comp01, EW09-CHN-W-comp02, and EW09-CHN-W-comp03.
- In consultation with the EPA QA office, total metals and total solids in the stomach contents composite sample were analyzed by CAS instead of ARI as specified in the QAPP (Windward 2009).
- Butyltins were analyzed using gas chromatography/mass spectrometry with selective ion monitoring using Krone et al (1989). The QAPP (Windward 2009) specified butyltin analysis using gas chromatography/flame photometric detection by Stallard et al. (1988) in error. The quality of the data was not affected by this deviation.

4 Results of Chemical Analyses

This section presents the results of the chemical analyses and data validation of the juvenile Chinook salmon whole-body and stomach contents composite samples. Laboratory report forms are presented in Appendix D. The approach used to average laboratory replicates and the methods used to calculate concentrations of total PCBs and PAHs are presented in Appendix B.

The QA review of the chemistry data was conducted in accordance with the QA/QC requirements and technical specifications of the methods and the national functional guidelines for organic and inorganic data review (EPA 1999, 2002b, 2004). EcoChem, Inc., conducted the data review and summary validation. The results of the data validation are summarized in Section 4.3 and presented in full in Appendix C.

4.1 WHOLE-BODY TISSUE AND STOMACH CONTENTS CHEMISTRY RESULTS

This section presents the analytical chemistry results for total metals, butyltins, PAHs, phthalates, other SVOCs, PCBs as Aroclors, pesticides, lipids, and total solids.

4.1.1 Metals

All metals were detected in the stomach contents composite sample, with the exception of selenium (Table 4-1). Concentrations of metals were generally higher in the stomach contents composite sample than in the whole-body tissue composite samples. Antimony, cadmium, lead, nickel, silver, and thallium were detected only in the stomach contents composite sample.

Table 4-1. Metals concentrations in juvenile Chinook salmon composite samples

Metals	Concentration by Sample Type(mg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
Antimony	0.004 U	0.004 U	0.004 U	0.008 U	0.004 U	0.004 U	0.072
Arsenic	0.552	0.504	0.500	0.203	0.463	0.424	5.18
Cadmium	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.712
Chromium	0.2	0.2	0.2	0.3	0.4	0.3	2.32
Cobalt	0.10	0.12	0.11	0.06 U	0.09	0.08	0.563
Copper	1.00	1.46	1.01	2.02	1.08	1.29	25.2
Lead	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	2.93
Mercury	0.012 J	0.010 J	0.012 J	0.043 J	0.014 J	0.015 J	na
Molybdenum	0.2	0.2	0.2	0.2 J	0.2	0.2	0.60
Nickel	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.96
Selenium	0.37	0.35	0.37	0.36	0.35	0.35	1.73 U
Silver	0.06 U	0.06 U	0.06 U	0.06 U	0.07 U	0.06 U	0.139 J
Thallium	0.004 U	0.004 U	0.004 U	0.008 U	0.004 U	0.004 U	0.008 J
Vanadium	0.08	0.06 U	0.06	0.06 U	0.07 U	0.06 U	2.15
Zinc	38.2	39.2	37.8	46.2	36.7	35.4	122

na – not analyzed U – not detected at given concentration ww – wet weight

4.1.2 Butyltins

Butyltins were analyzed in five of the six juvenile Chinook salmon whole-body tissue composite samples. No butyltins were detected in juvenile Chinook salmon whole-body tissue composite samples, with RLs ranging from 6.7 to 11 µg/kg ww (Table 4-2). The stomach contents composite sample was not analyzed for butyltins.

Table 4-2. Butyltin concentrations in juvenile Chinook salmon composite samples

Butyltin	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
Monobutyltin as ion	7.9 U	7.8 U	7.3 U	na	7.0 U	7.5 U	na
Dibutyltin as ion	11 U	11 U	10 U	na	9.9 U	11 U	na
Tributyltin as ion	7.4 U	7.4 U	6.9 U	na	6.7 U	7.1 U	na

na – not analyzed U – not detected at given concentration ww – wet weight

4.1.3 Phthalates

Phthalates were analyzed in the six juvenile Chinook salmon whole-body tissue composite samples. Of the six phthalates analyzed, none were detected in the juvenile Chinook salmon whole-body tissue composite samples, with RLs ranging from 100 to 150 µg/kg ww (Table 4-3). The stomach contents composite sample was not analyzed for phthalates.

Table 4-3. Phthalate concentrations in juvenile Chinook salmon composite samples

Phthalate	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
Bis(2-ethylhexyl) phthalate	120 U	120 U	120 U	100 U	120 U	150 U	na
Butyl benzyl phthalate	120 U	120 U	120 U	100 U	120 U	150 U	na
Diethyl phthalate	120 U	120 U	120 U	100 U	120 U	150 U	na
Dimethyl phthalate	120 U	120 U	120 U	100 U	120 U	150 U	na
Di-n-butyl phthalate	120 U	120 U	120 U	100 U	120 U	150 U	na
Di-n-octyl phthalate	120 U	120 U	120 U	100 U	120 U	150 U	na

na – not analyzed U – not detected at given concentration ww – wet weight

4.1.4 PAHs

Table 4-4 presents the concentrations of PAHs in juvenile Chinook salmon whole-body tissue and stomach contents composite samples. Both the whole-body tissue and the stomach contents composite samples were analyzed for PAHs. No PAHs were detected in the whole-body tissue composite samples with reporting limits ranging from 100 to 150 µg/kg ww. All PAHs were detected in the stomach contents composite sample (Table 4-4). It should be noted that a more sensitive analytical technique was used for the analysis of the stomach contents composite sample with much lower reporting limits for the individual PAH compounds. The analyte lists for the two methods differed slightly which resulted in the analysis of benzo(e)pyrene and perylene in the stomach contents composite sample and not in the whole-body tissue composite samples. Similarly, 2-chlorobenzene was analyzed for in the whole-body tissue composite samples and not in the stomach contents composite sample.

Table 4-4. PAH concentrations in juvenile Chinook salmon composite samples

PAH	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
1-Methylnaphthalene	120 U	120 U	120 U	100 U	120 U	150 U	3.5 J
2-Chloronaphthalene	120 U	120 U	120 U	100 U	120 U	150 U	na
2-Methylnaphthalene	120 U	120 U	120 U	100 U	120 U	150 U	3.9 J
Acenaphthene	120 U	120 U	120 U	100 U	120 U	150 U	16 J
Acenaphthylene	120 U	120 U	120 U	100 U	120 U	150 U	1.2 J
Anthracene	120 U	120 U	120 U	100 U	120 U	150 U	15 J
Benzo(a)anthracene	120 U	120 U	120 U	100 U	120 U	150 U	33
Benzo(a)pyrene	120 U	120 UJ	120 UJ	100 U	120 U	150 U	9.8 J
Benzo(b)fluoranthene	120 U	120 UJ	120 UJ	100 U	120 U	150 U	39
Benzo(e)pyrene	na	na	na	na	na	na	19
Benzo(g,h,i)perylene	120 U	120 UJ	120 UJ	100 U	120 U	150 U	7.7 J
Benzo(k)fluoranthene	120 U	120 UJ	120 UJ	100 U	120 U	150 U	13 J
Total benzofluoranthenes	120 U	120 UJ	120 UJ	100 U	120 U	150 U	52 J
Chrysene	120 U	120 U	120 U	100 U	120 U	150 U	77
Dibenzo(a,h)anthracene	120 U	120 UJ	120 UJ	100 U	120 U	150 U	1.8 J
Dibenzofuran	120 U	120 U	120 U	100 U	120 U	150 U	12 J
Fluoranthene	120 U	120 U	120 U	100 U	120 U	150 U	230
Fluorene	120 U	120 U	120 U	100 U	120 U	150 U	18
Indeno(1,2,3-cd)pyrene	120 U	120 UJ	120 UJ	100 U	120 U	150 U	10 J
Naphthalene	120 U	120 U	120 U	100 U	120 U	150 U	6.9 J
Perylene	na	na	na	na	na	na	2.4 J
Phenanthrene	120 U	120 U	120 U	100 U	120 U	150 U	200
Pyrene	120 U	120 U	120 U	100 U	120 U	150 U	120
Total HPAHs	120 U	120 UJ	120 UJ	100 U	120 U	150 U	540 J
Total LPAHs	120 U	120 U	120 U	100 U	120 U	150 U	260 J
Total PAHs	120 U	120 UJ	120 UJ	100 U	120 U	150 U	800 J

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon
J – estimated concentration
LPAH – low-molecular-weight polycyclic aromatic hydrocarbon
na – not analyzed
PAH – polycyclic aromatic hydrocarbon
U – not detected at given concentration
ww – wet weight

The stomach contents composite sample was also analyzed for alkylated PAH. Seven groups of alkylated PAH were detected in the stomach contents composite sample. RLs for the non-detected alkylated PAHs were equal to 16 µg/kg ww. Detected alkylated PAH concentrations ranged from 17 to 86 µg/kg ww (Table 4-5).

Table 4-5. Alkylated PAH concentrations for the stomach contents sample

Alkylated PAH	Concentration (µg/kg ww)
	EW09-CHN-SC-comp01
C1-Chrysenes	27
C1-Dibenzothiophenes	16 U
C1-Fluoranthene/pyrene	62
C1-Fluorenes	16 U
C1-Phenanthrenes/anthracenes	86
C2-Chrysenes	27
C2-Dibenzothiophenes	16 U
C2-Fluorenes	16 U
C2-Naphthalenes	16 U
C2-Phenanthrenes/anthracenes	38
C3-Chrysenes	16 U
C3-Dibenzothiophenes	16 U
C3-Fluorenes	17
C3-Naphthalenes	16 U
C3-Phenanthrenes/anthracenes	31
C4-Chrysenes	16 U
C4-Naphthalenes	16 U
C4-Phenanthrenes/anthracenes	16 U

PAH – polycyclic aromatic hydrocarbon

U – not detected at given concentration

ww – wet weight

4.1.5 Other SVOCs

SVOCs were analyzed in the six juvenile Chinook salmon whole-body tissue composite samples. No SVOCs were detected, with RLs that generally ranged from 100 to 750 µg/kg (ww) (Table 4-6). Two SVOCs (biphenyl and dibenzothiophene) were analyzed in the juvenile Chinook salmon stomach contents composite sample as a component of the PAH analysis but not in the whole-body tissue composite samples. Both of these SVOCs were detected in the stomach contents composite sample.

Table 4-6. SVOC concentrations in juvenile Chinook salmon composite samples

SVOC	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
1,2,4-Trichlorobenzene	120 U	120 U	120 U	100 U	120 U	150 U	na
1,2-Dichlorobenzene	120 U	120 U	120 U	100 U	120 U	150 U	na
1,3-Dichlorobenzene	120 U	120 U	120 U	100 U	120 U	150 U	na
1,4-Dichlorobenzene	120 U	120 U	120 U	100 U	120 U	150 U	na
2,4,5-Trichlorophenol	600 U	590 U	590 U	500 U	620 U	750 U	na
2,4,6-Trichlorophenol	600 U	590 U	590 U	500 U	620 U	750 U	na
2,4-Dichlorophenol	600 U	590 U	590 U	500 U	620 U	750 U	na
2,4-Dimethylphenol	120 U	120 U	120 U	100 U	120 U	150 U	na
2,4-Dinitrophenol	1,200 U	1,200 U	1,200 U	1,000 U	1,200 U	1,500 U	na
2,4-Dinitrotoluene	600 U	590 U	590 U	500 U	620 U	750 U	na
2,6-Dinitrotoluene	600 U	590 U	590 U	500 U	620 U	750 U	na
2-Chlorophenol	120 U	120 U	120 U	100 U	120 U	150 U	na
2-Methylphenol	120 U	120 U	120 U	100 U	120 U	150 U	na
2-Nitroaniline	600 U	590 U	590 U	500 U	620 U	750 U	na
2-Nitrophenol	600 U	590 U	590 U	500 U	620 U	750 U	na
3,3′-Dichlorobenzidine	600 U	590 U	590 U	500 U	620 U	750 U	na
3-Nitroaniline	600 U	590 U	590 U	500 U	620 U	750 U	na
4,6-Dinitro-o-cresol	1,200 U	1,200 U	1,200 U	1,000 U	1,200 U	1,500 U	na
4-Bromophenyl phenyl ether	120 U	120 U	120 U	100 U	120 U	150 U	na
4-Chloro-3-methylphenol	600 U	590 U	590 U	500 U	620 U	750 U	na
4-Chloroaniline	600 U	590 U	590 U	500 U	620 U	750 U	na
4-Chlorophenyl phenyl ether	120 U	120 U	120 U	100 U	120 U	150 U	na
4-Methylphenol	120 U	120 U	120 U	100 U	120 U	150 U	na
4-Nitroaniline	600 U	590 U	590 U	500 U	620 U	750 U	na
4-Nitrophenol	600 U	590 U	590 U	500 U	620 U	750 U	na
Aniline	120 U	120 U	120 U	100 U	120 U	150 U	na
Benzoic acid	1,200 U	1,200 U	1,200 U	1,000 U	1,200 U	1,500 U	na
Benzyl alcohol	600 U	590 U	590 U	500 U	620 U	750 U	na
Biphenyl	na	na	na	na	na	na	3.1 J
Bis(2-chloroethoxy) methane	120 U	120 U	120 U	100 U	120 U	150 U	na
Bis(2-chloroethyl)ether	120 U	120 U	120 U	100 U	120 U	150 U	na
Bis(2-chloroisopropyl) ether	120 U	120 U	120 U	100 U	120 U	150 U	na
Carbazole	120 U	120 U	120 U	100 U	120 U	150 U	na

SVOC	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
Dibenzothiophene	na	na	na	na	na	na	9.4 J
Hexachlorobenzene	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
Hexachlorobutadiene	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
Hexachloro-cyclopentadiene	600 UJ	590 UJ	590 UJ	500 U	620 UJ	750 UJ	na
Hexachloroethane	120 U	120 U	120 U	100 U	120 U	150 U	na
Isophorone	120 U	120 U	120 U	100 U	120 U	150 U	na
n-Nitroso-di-n-propylamine	600 U	590 U	590 U	500 U	620 U	750 U	na
n-Nitrosodimethylamine	600 U	590 U	590 U	500 U	620 U	750 U	na
n-Nitrosodiphenylamine	120 U	120 U	120 U	100 U	120 U	150 U	na
Nitrobenzene	120 U	120 U	120 U	100 U	120 U	150 U	na
Pentachlorophenol	600 U	590 U	590 U	500 U	620 U	750 U	na
Phenol	120 U	120 U	120 U	100 U	120 U	150 U	na

na – not analyzed
J – estimated concentration
SVOC – semivolatile organic chemical
U – not detected at given concentration

4.1.6 PCB Aroclors

Table 4-7 presents the results for PCB Aroclors for juvenile Chinook salmon whole-body tissue composite samples. Aroclors 1248, 1254, and 1260 were the only Aroclors detected in juvenile Chinook salmon whole-body tissue composite samples: Aroclor 1248 was detected in five of the six samples, Aroclor 1254 was detected in three of the six samples, and Aroclor 1260 was detected in all six samples. Total PCBs were calculated as the sum of the detected Aroclors. The concentrations of total PCBs in juvenile Chinook salmon whole-body tissue composite samples ranged from 7.4 to 72 µg/kg ww. PCBs were not analyzed in the stomach contents composite sample (Table 4-7).

Table 4-7. PCB Aroclor concentrations in juvenile Chinook salmon composite samples

PCB	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
Aroclor 1016	4.0 U	4.0 U	3.9 U	4.0 U	4.0 U	4.0 U	na
Aroclor 1221	4.0 U	4.0 U	3.9 U	4.0 U	4.0 U	4.0 U	na
Aroclor 1232	4.0 U	4.0 U	3.9 U	4.0 U	4.0 U	4.0 U	na

PCB	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
Aroclor 1242	4.0 U	4.0 U	3.9 U	4.0 U	4.0 U	4.0 U	na
Aroclor 1248	19	21	22	4.0 U	17	13	na
Aroclor 1254	21	21	22	12 U	40 U	20 U	na
Aroclor 1260	10	9.5	9.8	7.4	55	11	na
Aroclor 1262	4.0 U	4.0 U	3.9 U	4.0 U	4.0 U	4.0 U	na
Aroclor 1268	4.0 U	4.0 U	3.9 U	4.0 U	4.0 U	4.0 U	na
Total PCBs[a]	50	52	54	7.4	72	24	na

[a] The method for calculating total PCBs is presented in Appendix B.

na – not analyzed

PCB – polychlorinated biphenyl

U – not detected at given concentration

4.1.7 Pesticides

Pesticides were analyzed in the six juvenile Chinook salmon whole-body tissue composite samples (Table 4-8). No pesticides were detected in any of the juvenile Chinook salmon whole-body tissue composite samples, with reporting limits that generally ranged from 1.8 to 4.0 µg/kg ww. The stomach contents composite sample was not analyzed for pesticides.

Table 4-8. Pesticide concentrations in juvenile Chinook salmon composite samples

Pesticide	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
2,4′-DDD	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
2,4′-DDE	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
2,4′-DDT	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
4,4′-DDD	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
4,4′-DDE	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
4,4′-DDT	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Total DDTs	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Aldrin	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
Dieldrin	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Total aldrin/dieldrin	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
alpha-BHC	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na

Pesticide	Concentration by Sample Type (µg/kg ww)						
	Whole Body						Stomach Contents
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
beta-BHC	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
gamma-BHC	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
delta-BHC	1.9 U	3.3 U	1.8 U	2.0 U	2.0 U	2.0 U	na
alpha-Chlordane	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
gamma-Chlordane	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
Total chlordane	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
alpha-Endosulfan	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
beta-Endosulfan	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Endosulfan sulfate	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Endrin	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Endrin aldehyde	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Heptachlor	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
Heptachlor epoxide	1.9 U	1.8 U	1.8 U	2.0 U	2.0 U	2.0 U	na
Methoxychlor	19 U	18 U	18 U	20 U	20 U	20 U	na
Mirex	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
cis-Nonachlor	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Oxychlordane	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na
Toxaphene	750 U	720 U	710 U	800 U	790 U	800 U	na
trans-Nonachlor	3.8 U	3.6 U	3.6 U	4.0 U	4.0 U	4.0 U	na

BHC – benzene hexachloride
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
na – not analyzed
U – not detected at given concentration
ww – wet weight

4.1.8 Lipids and total solids

Table 4-9 presents the lipid and total solids percentages in juvenile Chinook salmon whole-body tissue composite samples. In whole-body tissue composite samples, lipids ranged from 0.758 to 1.78%, and total solids ranged from 19.96 to 20.28% in the hatchery juvenile Chinook salmon whole-body tissue composite samples. The wild juvenile Chinook salmon whole-body tissue composite samples had insufficient sample mass for the analysis of total solids. In the stomach contents composite sample, the total solids was 68.8%; lipids were not analyzed.

Table 4-9. Lipids and solids concentrations in juvenile Chinook salmon composite samples

Chemical	Whole-Body Tissue (% ww)						Stomach Contents (% ww)
	EW09-CHN-H-comp01	EW09-CHN-H-comp02	EW09-CHN-H-comp03	EW09-CHN-W-comp01	EW09-CHN-W-comp02	EW09-CHN-W-comp03	EW09-CHN-SC-comp01
Lipids	1.54	1.68	1.64	0.758	1.78	1.44	na
Total solids	19.96	20.14	20.28	na	na	na	68.8

na – not analyzed

ww – wet weight

4.2 Comparison of Non-Detected Results with Analytical Concentration Goals

This section compares RLs and method detection limits (MDLs) for non-detected concentrations in tissue samples to site-specific analytical concentration goals (ACGs) for ecological receptors that were presented in Appendix D of the *East Waterway Operable Unit Supplemental Remedial Investigation/Feasibility Study, Quality Assurance Project Plan: Fish and Shellfish Tissue Collection and Chemical Analysis* (Windward 2008), hereafter referred to as the Fish and Shellfish Tissue Collection QAPP. The target detection limits for the analyses were also identified in the QAPP appendix and are presented in this section.

Actual MDLs and RLs may differ from the target detection limits as a result of sample dilutions because of analytical interferences (i.e., lipid content of the sample extracts). When sample extracts were diluted, RLs from an original, undiluted extract were reported for chemicals other than the target chemicals that required dilution, when available. The sample-specific RL was based on the lowest point of the calibration curve associated with each analysis, whereas the MDL was statistically derived following EPA methods (40 CFR 136). Detected concentrations between the MDL and RL were reported by the laboratories and are flagged with a J-qualifier to indicate that the reported concentration is an estimate. Non-detect results were reported at the RL.

The RLs and MDLs for juvenile Chinook salmon samples are compared with risk-based ACGs for all chemicals in Table 4-10. Chemicals with RLs greater than ACGs included selenium, naphthalene, alpha-endosulfan, beta-endosulfan, endrin, endrin aldehyde, and methychlor. All of these chemicals also had one or more samples with MDLs that exceeded ACGs, with the exception of methoxychlor.

Table 4-10. Number of RLs and MDLs above the ecological receptor ACGs for juvenile Chinook salmon composite samples

Chemical	Unit	No. of Detects	Detected Conc.	No. of Non-Detects	RLs for Non-Detects	No. of RLs > ACGs	MDLs for Non-Detects	No. of MDLs > ACGs	Minimum Ecological ACG[a]	Target MDL	Target RL
Metals											
Selenium	mg/kg ww	6	0.35 – 0.37	1	1.73	1	0.21	1	0.33	0.028	0.04
PAHs											
Naphthalene	µg/kg ww	1	6.9 J	6	100 – 150	6	73 – 110	6	5.0	15	67
Pesticides											
alpha-Endosulfan[b]	µg/kg ww	0	nd	6	1.8 – 2.0	6	0.54 – 0.60	6	0.62	11	20
beta-Endosulfan[b]	µg/kg ww	0	nd	6	3.6 – 4.0	6	3.6 – 4.0	6	0.62	11	20
Endrin	µg/kg ww	0	nd	6	3.6 – 4.0	6	3.6 – 4.0	6	1.2	15	20
Endrin aldehyde[c]	µg/kg ww	0	nd	6	3.6 – 4.0	6	3.6 – 4.0	6	1.2	15	20
Methoxychlor	µg/kg ww	0	nd	6	18 – 20	6	9.0 – 10	0	15	63	10

[a] The lowest of the available ACGs for ecological receptors as presented in Appendix D of the Fish and Shellfish Tissue Collection QAPP (Windward 2008) was used to evaluate the RLs and MDLs.

[b] The ACG, target MDL, and target RL for endosulfan were used to evaluate this chemical.

[c] The ACG, target MDL, and target RL for endrin were used to evaluate this chemical.

ACG – analytical concentration goal

MDL – maximum detection limit

nd – not detected

PAH – polycyclic aromatic hydrocarbon

RL – reporting limit

ww – wet weight

The chemicals with RLs above ACGs were identified in Appendix D of the Fish and Shellfish Tissue Collection QAPP (Windward 2008) as having target MDLs and/or RLs above the lowest ecological ACGs, with the exception of selenium in the stomach contents composite sample. The selenium concentration in this sample was originally detected but was reclassified as a non-detect during data validation because of method blank contamination.

4.3 DATA VALIDATION RESULTS

Independent data validation of all results was performed by EcoChem in accordance with the QA/QC requirements and technical specifications of the methods and the national functional guidance for organic and inorganic data review (EPA 1999, 2004, 1994). EcoChem conducted full-level data validation on the majority of results. All sample results that were not selected for full validation underwent a summary validation. The percentage of samples submitted for full validation for each analysis is consistent with Juvenile Chinook Salmon QAPP (Windward 2009) requirements. Table 4-11 provides a summary of the number of samples in each sample delivery group (SDG) and the level of data validation.

Table 4-11. Data validation performed for each SDG

Laboratory	SDG	Validation Level	Number of Composite Samples	Analyses
ARI	QC62	full	6	SVOCs, PCBs, pesticides, butyltins, total metals including mercury, lipids, total solids
ARI	QF82	summary	1	SVOCs, total mercury
CAS	K1000029	full	1	PAHs including alkylated PAHs, total metals, total solids

ARI – Analytical Resources, Inc.

CAS – Columbia Analytical Services, Inc.

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

SDG – sample delivery group

SVOC – semivolatile organic compound

The data validation involved a review of all QC summary forms, including initial calibration, continuing calibration verification, internal standard, surrogate, laboratory control sample (LCS), laboratory control sample duplicate (LCSD), matrix spike (MS), matrix spike duplicate (MSD), and interference check sample A (ICSA) summary forms. The majority of the data did not require qualification or were qualified with a J, indicating that the concentration was an estimated value. No results were rejected as a consequence of data validation. Based on the information reviewed, the overall data quality is considered acceptable for all uses, as qualified. Issues that resulted in the

qualification of data are summarized below. Detailed information regarding every qualified sample is presented in Appendix C.

- Concentrations for various chemicals were qualified as estimated (J- or UJ-qualified) because internal standard, LCS/LCSD, ICSA, or contract-required detection limit standard recoveries were outside of control limits. Results qualified as estimated include the following: five results for hexachlorocyclopentadiene; two results each for benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene; and one result each for thallium, molybdenum, and silver.
- The concentration for selenium in sample EW09-CHN-SC-COMP-01 was re-qualified as a non-detect because of method blank contamination at a concentration of 1.73 mg/kg ww
- All mercury concentrations were J-qualified as estimated because samples were analyzed beyond holding time: 6 months and 20 days after sample collection.
- Non-detected concentrations for two chemicals were Y-qualified by ARI as non-detected at elevated RLs because chromatographic interference in the sample prevented adequate resolution of the compound at the standard RLs. Qualified results included four concentrations for Aroclor 1254 and one concentration for delta-BHC.

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APPENDIX A

Chinook Compositing Memorandum

MEMORANDUM

To: Ravi Sanga, USEPA

From: Susan McGroddy, Windward Environmental on behalf of the Port of Seattle

Subject: Proposed juvenile Chinook salmon compositing scheme

Date: August 25, 2009

This memo provides the proposed compositing strategy for the juvenile Chinook salmon that were collected June 10 -11, 2009 in EW. Juvenile chum salmon were collected on April 28, 2009. The juvenile chum salmon were collected to be analyzed in the event that insufficient juvenile Chinook salmon were collected. There were sufficient juvenile Chinook collected so the juvenile chum salmon will not be analyzed.

The juvenile Chinook salmon will be analyzed as whole body samples and stomach content samples. Juvenile Chinook salmon samples are presently stored frozen, as per the QAPP for their collection (Windward 2009).Table 1 provides a summary of the proposed data uses for the juvenile Chinook tissue samples.

Table 1. Proposed data uses for the EW juvenile Chinook tissue samples

TARGET SPECIES	SIZE (cm)	TISSUE TYPE	ROC CONSUMING OR REPRESENTED BY TARGET SPECIES	ROC EXPOSURE AREA	DATA USE
juvenile Chinook salmon	≥ 20	whole body	brown rockfish	localized areas	compare UCL to dietary TRV
			pigeon guillemot	site-wide	compare UCL to dietary TRV/human consumption of fish-shellfish scenario
			osprey		
			river otter		
			harbor seal		
		stomach contents	juvenile Chinook Salmon	site-wide	compare concentration to dietary TRV

TRV – toxicity reference value

UCL – 95% upper confidence limit on the mean

NA – not applicable

Prepared by Windward environmental LLC

HOMOGENIZATION METHOD

The homogenization method as described in the QAPP (Windward 2009) will be consistent with the method utilized for the LDW tissue collection efforts. Thawed or partially thawed whole fish (minus stomach contents) will be homogenized as composite samples. The stomach contents, which were removed from the fish prior to freezing the fish, will be homogenized separately.

PROPOSED COMPOSITING STRATEGIES

The juvenile Chinook salmon were identified as either wild salmon or hatchery-released salmon as they were collected. Fifty-nine wild fish and 106 hatchery-released fish were collected from Slip 27 in EW for a total of 165 juvenile Chinook salmon. As specified in the QAPP (Windward 2009), compositing of whole body fish will not mix wild and hatchery fish to the extent possible. The proposed compositing strategy for stomach contents and whole body fish is described below.

Stomach Contents sample

Stomach contents samples were composited as they were collected with one composite created from the wild fish (2.4 g) and a second composite created from the hatchery fish (4.6 g). The two composites will be combined into one stomach content composite sample with a mass of 7 g. The stomach contents sample was composited from all fish in order to have sufficient sample mass for PAH and metal analyses.

Whole Body samples

The 59 wild Chinook were sorted into three composite samples. Composite 1 contains the four yearling fish that were collected. These fish were substantially bigger than all the other fish. Yearling Chinook are older and larger than the sub-yearling fish. They are capable of feeding over a large area, including both marine and freshwater regimes. The sub-yearling wild Chinook were sorted into two composites.

Table 2. Wild Chinook whole body composites

SAMPLE ID	LENGTH (MM)	WEIGHT (G WW)	COMMENTS
Wild Composite 1			
EW09-S27-011-CHN-W-001	130	19.50	yearling
EW09-S27-008-CHN-W-011	120	16.80	yearling
EW09-S27-002-CHN-W-003	122	16.17	yearling
EW09-S27-002-CHN-W-004	110	13.86	yearling
Wild Composite 2			
EW09-S27-014-CHN-W-003	90	6.64	sub-yearling

Sample ID	Length (mm)	Weight (g ww)	Comments
EW09-S27-019-CHN-W-003	85	6.28	sub-yearling
EW09-S27-009-CHN-W-001	78	5.21	sub-yearling
EW09-S27-005-CHN-W-002	84	5.03	sub-yearling
EW09-S27-019-CHN-W-001	76	4.94	sub-yearling
EW09-S27-009-CHN-W-003	76	4.71	sub-yearling
EW09-S27-008-CHN-W-003	71	4.70	sub-yearling
EW09-S27-008-CHN-W-008	72	4.60	sub-yearling
EW09-S27-019-CHN-W-004	76	4.53	sub-yearling
EW09-S27-008-CHN-W-005	68	4.47	sub-yearling
EW09-S27-008-CHN-W-007	78	4.24	sub-yearling
EW09-S27-018-CHN-W-003	77	4.16	sub-yearling
EW09-S27-008-CHN-W-006	73	4.13	sub-yearling
EW09-S27-002-CHN-W-002	69	3.92	sub-yearling
EW09-S27-018-CHN-W-002	70	3.88	sub-yearling
EW09-S27-009-CHN-W-002	72	3.81	sub-yearling
EW09-S27-013-CHN-W-001	77	3.76	sub-yearling
EW09-S27-006-CHN-W-004	69	3.60	sub-yearling
EW09-S27-008-CHN-W-002	67	3.51	sub-yearling
EW09-S27-018-CHN-W-004	71	3.31	sub-yearling
EW09-S27-009-CHN-W-004	70	3.29	sub-yearling
EW09-S27-017-CHN-W-002	67	3.20	sub-yearling
EW09-S27-019-CHN-W-006	69	3.01	sub-yearling
EW09-S27-019-CHN-W-005	69	2.92	sub-yearling
EW09-S27-010-CHN-W-001	66	2.85	sub-yearling
EW09-S27-009-CHN-W-006	64	2.74	sub-yearling
EW09-S27-019-CHN-W-002	65	2.65	sub-yearling
EW09-S27-014-CHN-W-002	68	2.48	sub-yearling
Wild Composite 3			
EW09-S27-014-CHN-W-001	81	6.43	sub-yearling
EW09-S27-002-CHN-W-001	78	5.25	sub-yearling
EW09-S27-021-CHN-W-001	78	5.18	sub-yearling
EW09-S27-005-CHN-W-001	83	5.00	sub-yearling
EW09-S27-010-CHN-W-002	77	4.76	sub-yearling
EW09-S27-017-CHN-W-001	71	4.71	sub-yearling

Sample ID	Length (mm)	Weight (g ww)	Comments
EW09-S27-008-CHN-W-001	82	4.67	sub-yearling
EW09-S27-022-CHN-W-002	82	4.57	sub-yearling
EW09-S27-010-CHN-W-004	77	4.50	sub-yearling
EW09-S27-018-CHN-W-001	76	4.25	sub-yearling
EW09-S27-008-CHN-W-009	71	4.23	sub-yearling
EW09-S27-006-CHN-W-003	79	4.13	sub-yearling
EW09-S27-022-CHN-W-001	74	3.98	sub-yearling
EW09-S27-020-CHN-W-001	75	3.88	sub-yearling
EW09-S27-008-CHN-W-004	69	3.83	sub-yearling
EW09-S27-008-CHN-W-010	71	3.80	sub-yearling
EW09-S27-021-CHN-W-002	74	3.68	sub-yearling
EW09-S27-007-CHN-W-003	72	3.55	sub-yearling
EW09-S27-006-CHN-W-002	66	3.34	sub-yearling
EW09-S27-010-CHN-W-003	69	3.3	sub-yearling
EW09-S27-007-CHN-W-001	66	3.21	sub-yearling
EW09-S27-009-CHN-W-005	71	3.10	sub-yearling
EW09-S27-014-CHN-W-004	71	2.95	sub-yearling
EW09-S27-017-CHN-W-003	64	2.89	sub-yearling
EW09-S27-006-CHN-W-001	68	2.78	sub-yearling
EW09-S27-007-CHN-W-002	62	2.70	sub-yearling
EW09-S27-021-CHN-W-003	73	2.53	sub-yearling

The hatchery Chinook salmon were sorted into 3 composites. No yearling fish were identified as hatchery-released fish.

Table 3. Hatchery Chinook composites

SAMPLE ID	LENGTH (MM)	WEIGHT (G WW)
Hatchery Composite 1		
EW09-S27-008-CHN-H-015	85	7.14
EW09-S27-006-CHN-H-001	83	6.49
EW09-S27-008-CHN-H-002	83	6.00
EW09-S27-007-CHN-H-041	82	5.71
EW09-S27-007-CHN-H-027	74	5.66
EW09-S27-006-CHN-H-007	80	5.36
EW09-S27-002-CHN-H-001	80	5.26
EW09-S27-006-CHN-H-013	78	5.08
EW09-S27-006-CHN-H-010	84	4.99
EW09-S27-003-CHN-H-006	82	4.88
EW09-S27-007-CHN-H-042	75	4.82
EW09-S27-002-CHN-H-004	79	4.79
EW09-S27-007-CHN-H-038	74	4.62
EW09-S27-007-CHN-H-039	72	4.50
EW09-S27-007-CHN-H-013	78	4.48
EW09-S27-007-CHN-H-010	77	4.44
EW09-S27-007-CHN-H-017	76	4.26
EW09-S27-007-CHN-H-024	75	4.13
EW09-S27-007-CHN-H-030	74	4.06
EW09-S27-007-CHN-H-029	73	4.01
EW09-S27-007-CHN-H-016	76	4.00
EW09-S27-007-CHN-H-004	71	3.97
EW09-S27-007-CHN-H-012	74	3.91
EW09-S27-008-CHN-H-001	67	3.86
EW09-S27-007-CHN-H-009	70	3.81
EW09-S27-007-CHN-H-040	72	3.67
EW09-S27-007-CHN-H-037	68	3.49
EW09-S27-002-CHN-H-003	70	3.42
EW09-S27-006-CHN-H-011	68	3.34
EW09-S27-007-CHN-H-028	65	3.22

SAMPLE ID	LENGTH (MM)	WEIGHT (G WW)
EW09-S27-007-CHN-H-018	65	3.14
EW09-S27-002-CHN-H-002	67	3.13
EW09-S27-007-CHN-H-036	70	3.00
EW09-S27-005-CHN-H-003	61	2.85
EW09-S27-006-CHN-H-012	69	2.57
EW09-S27-006-CHN-H-016	68	2.40
EW09-S27-008-CHN-H-015	68	3.34
EW09-S27-006-CHN-H-001	65	3.22
EW09-S27-008-CHN-H-002	65	3.14
EW09-S27-007-CHN-H-041	67	3.13
EW09-S27-007-CHN-H-027	70	3.00
EW09-S27-006-CHN-H-007	61	2.85
EW09-S27-002-CHN-H-001	69	2.57
EW09-S27-006-CHN-H-013	68	2.40
EW09-S27-006-CHN-H-010	68	3.34
EW09-S27-003-CHN-H-006	65	3.22
EW09-S27-007-CHN-H-042	65	3.14
EW09-S27-002-CHN-H-004	67	3.13
EW09-S27-007-CHN-H-038	70	3.00
EW09-S27-007-CHN-H-039	61	2.85
EW09-S27-007-CHN-H-013	69	2.57
EW09-S27-007-CHN-H-010	68	2.40
Hatchery Composite 2		
EW09-S27-006-CHN-H-005	83	6.60
EW09-S27-005-CHN-H-006	87	6.39
EW09-S27-008-CHN-H-010	80	5.93
EW09-S27-008-CHN-H-006	79	5.68
EW09-S27-007-CHN-H-026	82	5.55
EW09-S27-007-CHN-H-021	80	5.34
EW09-S27-005-CHN-H-001	78	5.26
EW09-S27-003-CHN-H-001	78	5.04
EW09-S27-003-CHN-H-002	74	4.99
EW09-S27-005-CHN-H-002	77	4.86
EW09-S27-006-CHN-H-018	78	4.80

SAMPLE ID	LENGTH (MM)	WEIGHT (G WW)
EW09-S27-007-CHN-H-034	77	4.77
EW09-S27-007-CHN-H-006	71	4.62
EW09-S27-007-CHN-H-007	75	4.49
EW09-S27-006-CHN-H-006	76	4.48
EW09-S27-007-CHN-H-008	73	4.32
EW09-S27-002-CHN-H-005	76	4.20
EW09-S27-005-CHN-H-005	69	4.13
EW09-S27-005-CHN-H-010	75	4.04
EW09-S27-005-CHN-H-004	71	4.01
EW09-S27-008-CHN-H-008	76	4.00
EW09-S27-006-CHN-H-019	64	3.97
EW09-S27-007-CHN-H-031	75	3.87
EW09-S27-008-CHN-H-007	73	3.84
EW09-S27-003-CHN-H-004	72	3.79
EW09-S27-008-CHN-H-012	70	3.66
EW09-S27-006-CHN-H-020	74	3.46
EW09-S27-006-CHN-H-009	74	3.40
EW09-S27-001-CHN-H-001	69	3.28
EW09-S27-006-CHN-H-004	68	3.15
EW09-S27-008-CHN-H-003	79	3.13
EW09-S27-008-CHN-H-004	64	3.05
EW09-S27-007-CHN-H-022	66	2.94
EW09-S27-007-CHN-H-001	60	2.84
EW09-S27-007-CHN-H-033	61	2.55
Hatchery Composite 3		
EW09-S27-003-CHN-H-003	83	6.57
EW09-S27-006-CHN-H-008	81	6.23
EW09-S27-007-CHN-H-011	84	5.76
EW09-S27-008-CHN-H-009	77	5.68
EW09-S27-007-CHN-H-025	81	5.48
EW09-S27-006-CHN-H-014	82	5.30
EW09-S27-006-CHN-H-003	80	5.24
EW09-S27-007-CHN-H-032	77	5.04
EW09-S27-007-CHN-H-023	81	4.90

SAMPLE ID	LENGTH (MM)	WEIGHT (G WW)
EW09-S27-008-CHN-H-014	75	4.84
EW09-S27-007-CHN-H-014	75	4.80
EW09-S27-008-CHN-H-016	73	4.65
EW09-S27-007-CHN-H-020	70	4.52
EW09-S27-007-CHN-H-003	70	4.49
EW09-S27-007-CHN-H-015	77	4.47
EW09-S27-008-CHN-H-005	77	4.29
EW09-S27-005-CHN-H-009	73	4.19
EW09-S27-008-CHN-H-013	69	4.09
EW09-S27-007-CHN-H-005	71	4.03
EW09-S27-007-CHN-H-019	69	4.01
EW09-S27-007-CHN-H-035	73	3.99
EW09-S27-005-CHN-H-011	75	3.92
EW09-S27-005-CHN-H-007	73	3.87
EW09-S27-006-CHN-H-015	68	3.83
EW09-S27-001-CHN-H-002	74	3.75
EW09-S27-005-CHN-H-012	70	3.59
EW09-S27-005-CHN-H-008	70	3.46
EW09-S27-006-CHN-H-002	66	3.39
EW09-S27-008-CHN-H-017	68	3.26
EW09-S27-006-CHN-H-021	67	3.14
EW09-S27-003-CHN-H-005	68	3.13
EW09-S27-006-CHN-H-017	67	3.02
EW09-S27-005-CHN-H-014	62	2.88
EW09-S27-007-CHN-H-002	62	2.76
EW09-S27-005-CHN-H-013	62	2.51

ANALYTICAL METHODS

The specific analytical methods are detailed in the QAPP (Windward 2009). The stomach content sample will be analyzed for PAHs (including alkylated homologs) and metals. The whole body samples will be analyzed for PCBs, organochlorine pesticides, SVOCs, mercury, metals, TBT, lipids and total solids. The required mass for each analysis is provided in Table 4. The stomach content composite sample mass 7 g is less than the targeted mass of 18 g so the sample will be analyzed with reduced sample mass for PAHs and metals (Table 4). The stomach content sample will be analyzed by

CAS rather than ARI for both PAHs and metals to avoid splitting the small sample between two labs.

Table 4. Tissue mass (wet weight) required per sample

Analyte	Method	Tissue Mass (g)		
		Whole Body	Stomach Contents (proposed)	Stomach Contents (actual)
PCB congeners and dioxins and furans	EPA 1668	25	na	na
PCB Aroclors	EPA 8082	25	na	na
Organochlorine pesticides	EPA 8081			na
SVOCs (including PAHs, and phthalates)	EPA 8270D	20	na	na
PAHs (including alkylated homologs)	EPA 8270SIM	na	10[a]	5[a]
Mercury	EPA 7471A	2	na	na
Metals[b]	EPA 6010B or EPA 6020	3	3	2
Tributyltin	Krone et al. 1989	10	na	na
Lipids		5	na	na
Total solids	PSEP or EPA 160.2	5	5	0[c]
Total Mass		**90**	**18**	**7**

[a] The stomach contents will be analyzed for PAH and alkylated homologs by EPA 8270SIM.

[b] Antimony, arsenic, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc.

[c] Total solids will be determined from the weight of tissue after it is freeze-dried prior to metals analysis.

EPA – US Environmental Protection Agency

na not applicable

NOAA – National Oceanic and Atmospheric Administration

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

PSEP – Puget Sound Estuary Program

SVOC – semivolatile organic compound

SUMMARY

The number of proposed composite samples is summarized in Table 5. The number of composites for both the stomach contents and the whole body tissue are less than specified in the QAPP due to the size of the tissue samples. Five of the six whole body composite samples have sufficient mass for all analytes, including PCB congeners and dioxins and furans. One whole body sample, Composite 1 of the yearling wild Chinook does not have sufficient sample mass to analyze for PCB congeners or dioxins and furans. The masses of the composited samples will be reviewed to ensure that there is sufficient mass for all proposed analyses. If the final mass is limited then, further adjustments to the proposed analytical scheme will be considered including the use of the pesticide extract for lipids analysis and reducing the required mass for SVOC and PCB Aroclor analyses.

Table 5. Summary of proposed compositing scheme

Hatchery or Wild Chinook	Tissue Type	Composite Number	No. of Specimens/ Sample	Composite Mass (g)	Analytes
Hatchery and wild combined	Stomach contents	1	165	7.00	PAHs (including alkylated homologs), metals[a]
Wild (yearlings)	Whole Body	1	4	66.33	PCBs (Aroclors), organochlorine pesticides,SVOCs, mercury, metals, TBT, lipids and total solids
Wild	Whole Body	2	28	112.57	PCBs (Aroclors), PCB congeners, dioxins and furans, organochlorine pesticides, SVOCs, mercury, metals, TBT, lipids and total solids
Wild	Whole Body	3	27	107.20	
Hatchery	Whole Body	1	36	154.46	
Hatchery	Whole Body	2	35	150.43	
Hatchery	Whole body	3	35	149.08	

[a] Antimony, arsenic, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc.

References

Windward. 2009. Quality assurance project plan: juvenile Chinook salmon collection and chemical analysis. East Waterway Operable Unit supplemental remedial investigation/feasibility study. Windward Environmental LLC, Seattle, WA.

APPENDIX B

Data Management

Appendix B Data Management

AVERAGING LABORATORY REPLICATE SAMPLES

Chemical concentrations obtained from the analysis of laboratory replicate samples (two or more analyses of the same sample) will be averaged for a closer representation of the "true" concentration as compared to the result of a single analysis. Averaging rules are dependent on whether the individual results are detected concentrations or reporting limits (RLs) for undetected chemicals. If all concentrations are detected for a single chemical, the values are simply averaged arithmetically for the sample and its associate laboratory replicate sample(s). If all concentrations are undetected for a given parameter, the minimum RL is selected. If the concentrations are a mixture of detected concentrations and RLs, any two or more detected concentrations are averaged arithmetically and RLs ignored. If there is a single detected concentration and one or more RLs, the detected concentration is reported. The latter two rules are applied regardless of whether the RLs are higher or lower than the detected concentration.

LOCATION AVERAGING

Results of chemical concentrations of discrete samples collected at a single sampling location that are submitted to the laboratory as individual samples and analyzed separately will be averaged for the purposes of mapping a single concentration per location. The averaging rules used for location averaging are the same as for laboratory replicate samples described above. This type of averaging is performed when multiple sediment samples are collected from the same location at the same time. For example: a sample and its field duplicate sample, often referred to as a split sample (PSEP 1997).

SIGNIFICANT FIGURES AND CALCULATIONS

Analytical laboratories report results with various numbers of significant figures depending on the laboratory's standard operating procedures, the instrument, the chemical, and the reported chemical concentration relative to the RL. The reported (or assessed) precision of each result is explicitly stored in the project database by recording the number of significant figures. Tracking of significant figures is used when calculating analyte sums and performing other data summaries. When a calculation involves addition, such as totaling PCBs, the calculation can only be as precise as the least precise number that went into the calculation. For example:

> 210 + 19 = 229 would be reported as 230 because although 19 is reported to 2 significant digits, the trailing zero in the number 210 is not significant.

When a calculation involves multiplication or division, the final result is rounded at the end of the calculation to reflect the value used in the calculation with the fewest significant figures. For example:

> 59.9 × 1.2 = 71.88 would be reported as 72 because there are two significant figures in the number 1.2.

When rounding, if the number following the last significant figure is less than 5, the digit is left unchanged. If the number following the last significant figure is equal to or greater than 5, the digit is increased by 1.

Many of the Washington State Sediment Management Standards (SMS) chemical criteria are in units normalized to the TOC content in the sediment sample (i.e., milligrams per kilogram organic carbon [mg/kg OC]). Only samples with TOC concentrations greater than or equal to 0.5% or less than or equal to 4.0% are considered appropriate for OC normalization. Samples with TOC concentrations less than 0.5% or greater than 4.0% are compared to dry weight chemical criteria. Chemical concentrations originally in units of micrograms per kilogram (µg/kg) dry weight were converted to mg/kg OC using the following equation:

$$\frac{(C_{\mu g/kg\ dry\ weight}) \times (0.001\ mg/\mu g)}{TOC}$$

Where:

C	=	the chemical concentration
TOC	=	the percent total organic carbon on a dry weight basis, expressed as a decimal (e.g., 1% = 0.01)

BEST RESULT SELECTION FOR MULTIPLE RESULTS

In some instances, the laboratory generates more than one result for a chemical for a given sample. Multiple results can occur for several reasons, including: 1) the original result did not meet the laboratory's internal quality control (QC) guidelines, and a reanalysis was performed; 2) the original result did not meet other project data quality objectives, such as a sufficiently low RL, and a reanalysis was performed; or 3) two different analytical methods were used for that chemical. In each case, a single best result is selected for use. The procedures for selecting the best result differ depending on whether a single or multiple analytical methods are used for that chemical.

For the same analytical method, if the results are:

- Detected and not qualified, then the result from the lowest dilution is selected, unless multiple results from the same dilution are available, in which case, the result with the highest concentration is selected.

- A combination of estimated and unqualified detected results, then the unqualified result is selected. This situation most commonly occurs when the original result is outside of calibration range, thus requiring a dilution.
- All estimated, then the "best result" is selected using best professional judgment in consideration of the rationale for qualification. For example, a result qualified based on laboratory replicate results outside of QC objectives for precision would be preferred to a qualified result that is outside the calibration range.
- A combination of detected and undetected results, then the detected result is selected. If there is more than one detected result, the applicable rules for multiple results (as discussed above) are followed.
- All undetected results, then the lowest RL is selected.

If the multiple results are from different analytical methods, then the result from the preferred method specified in the quality assurance project plan (QAPP) or based on the consensus of the professional opinions of project chemists was selected.

The following rules are applied to multiple results from different analytical methods:

- For detected concentrations analyzed by the SVOC full-scan and selective ion monitoring (SIM) methods (i.e., PAHs), the highest detected concentration is selected. If the result by one method is detected and the result by the other method is not detected, then the detected result is selected for reporting, regardless of the method. If results are reported as non-detected by both methods, the undetected result with the lowest RL is selected. The SIM method is more analytically sensitive than the full-scan SVOC method, and the undetected results are generally reported at a lower RL by the SIM method than by the full-scan method. Therefore, the SIM method is selected for non-detected results unless an analytical dilution or analytical interferences elevated the SIM RL above the SVOC full-scan RL.
- Hexachlorobenzene and hexachlorocyclopentadiene are analyzed by EPA Methods 8081A, 8270, and/or 8270-SIM. The result from the method with the greatest sensitivity (i.e., lowest RL) is selected if all results are undetected. EPA Method 8081A results are generally selected, when available, because the standard laboratory RLs from this analysis are significantly lower than those from EPA Methods 8270 and 8270-SIM. When chemicals are detected, the detected result with the highest concentration is selected unless the detected concentration is qualified as estimated or tentatively identified, in which case the rule designating treatment of qualified and unqualified data would apply.

CALCULATED TOTALS

Total PCBs, total dichloro-diphenyl-trichloroethane (DDTs), total PAHs, and total chlordane are calculated by summing the detected values for the individual components available for each sample. For individual samples in which none of the individual components is detected, the total value is given a value equal to the highest RL of an individual component, and assigned the same qualifier (U or UJ), indicating an undetected result. Concentrations for the analyte sums are calculated as follows:

- **Total PCBs** are calculated, in accordance with the methods of the SMS, using only detected values for seven Aroclor mixtures.[1] For individual samples in which none of the seven Aroclor mixtures is detected, total PCBs are given a value equal to the highest RL of the seven Aroclors and assigned a U-qualifier indicating the lack of detected concentrations.
- **Total low-molecular-weight PAHs (LPAHs), high-molecular-weight PAHs (HPAHs), PAHs, and benzofluoranthenes** are also calculated in accordance with the methods of the SMS. Total LPAHs are the sum of detected concentrations for naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene. Total HPAHs are the sum of detected concentrations for fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene. Total benzofluoranthenes are the sum of the b (i.e., benzo(b)fluoranthene), j, and k isomers. Because the j isomer is rarely quantified, this sum is typically calculated with only the b and k isomers. For samples in which all individual compounds within any of the three groups described above are undetected, the single highest RL for that sample represents the sum.
- **Total DDTs** are calculated using only detected values for the DDT isomers: 2,4′-DDD; 4,4′-DDD; 2,4′-DDE; 4,4′-DDE; 2,4′-DDT; and 4,4′-DDT. For individual samples in which none of the isomers are detected, total DDTs are given a value equal to the highest RL of the six isomers and assigned a U-qualifier, indicating the lack of detected concentrations.
- **Total chlordane** is calculated using only detected values for the following compounds: alpha-chlordane, gamma-chlordane, oxychlordane, cis-nonachlor, and trans-nonachlor. For individual samples in which none of these compounds is detected, total chlordane is given a value equal to the highest RL of the five compounds listed above and assigned a U-qualifier, indicating the lack of detected concentrations.

[1] Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

CALCULATION OF PCB CONGENER TEQS

PCB congener toxic equivalents (TEQs) are calculated using the World Health Organization (WHO) consensus toxic equivalency factor (TEF) values for fish, birds (Van den Berg et al. 1998), and mammals (Van den Berg et al. 2006) as presented in Table E-1. The TEQ is calculated as the sum of each congener concentration multiplied by the corresponding TEF value. When the congener concentration is reported as non-detected, then the TEF is multiplied by half the RL.

Table B-1. PCB congener TEF values

PCB Congener Number	TEF Value for Fish (unitless)	TEF Value for Birds (unitless)	TEF Value for Mammals (unitless)
77	0.0001	0.05	0.0001
81	0.0005	0.1	0.0003
105	<0.000005	0.0001	0.00003
114	<0.000005	0.0001	0.00003
118	<0.000005	0.00001	0.00003
123	<0.000005	0.00001	0.00003
126	0.005	0.1	0.1
156	<0.000005	0.0001	0.00003
157	<0.000005	0.0001	0.00003
167	<0.000005	0.00001	0.00003
169	0.00005	0.001	0.03
189	<0.000005	0.00001	0.00003

PCB – polychlorinated biphenyl
TEF – toxic equivalency factor

CALCULATION OF DIOXIN/FURAN CONGENER TEQS

Dioxin/furan congener TEQs are calculated using the WHO consensus TEF values (Van den Berg et al. 2006) for mammals as presented in Table E-2. The TEQ is calculated as the sum of each congener concentration multiplied by the corresponding TEF value. When the congener concentration is reported as undetected, then the TEF is multiplied by half the RL.

Table B-2. Dioxin/Furan congener TEF values for mammals

Dioxin/Furan Congener	TEF Value (unitless)
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.01
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin	0.01
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.01
1,2,3,4,7,8-Hexachlorodibenzofuran	0.1
1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin	0.1

Dioxin/Furan Congener	TEF Value (unitless)
1,2,3,6,7,8-Hexachlorodibenzofuran	0.1
1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin	0.1
1,2,3,7,8,9-Hexachlorodibenzofuran	0.1
1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin	0.1
1,2,3,7,8-Pentachlorodibenzofuran	0.03
1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin	1
2,3,4,6,7,8-Hexachlorodibenzofuran	0.1
2,3,4,7,8-Pentachlorodibenzofuran	0.3
2,3,7,8-Tetrachlorodibenzofuran	0.1
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1
Octachlorodibenzofuran	0.0003
Octachlorodibenzo-p-dioxin	0.0003

TEF – toxic equivalency factor

CALCULATION OF CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS

Carcinogenic polycyclic aromatic hydrocarbons (cPAH) values are calculated using TEF values (California EPA 1994; Ecology 2001) based on the individual PAH component's relative toxicity to benzo(a)pyrene. TEF values are presented in Table E-3. The cPAH is calculated as the sum of each individual PAH concentration multiplied by the corresponding TEF value. When the individual PAH component concentration is reported as non-detected, then the TEF is multiplied by half the RL.

Table B-3. cPAH TEF values

cPAH	TEF Value (unitless)
Benzo(a)pyrene	1
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Bibenz(a,h)anthracene	0.4
Indeno(1,2,3-cd)pyrene	0.1
Chrysene	0.01

cPAH – carcinogenic polycyclic aromatic hydrocarbon
TEF – toxic equivalency factor

REFERENCES

California EPA. 1994. Health effects of benzo(a)pyrene. Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Berkeley, CA.

Ecology. 2001. Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC. Publication No. 94-06. Toxics Cleanup Program, Washington State Department of Ecology, Olympia, WA.

PSEP. 1997. Recommended guidelines for sampling marine sediment, water column, and tissue in Puget Sound. Final report. Prepared for the US Environmental Protection Agency, Seattle, WA. Puget Sound Water Quality Action Team, Olympia, WA.

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APPENDIX C

Data Validation Report

EcoChem, INC.
Environmental Data Quality

DATA VALIDATION REPORT

East Waterway Chinook Sampling

Prepared for:

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EcoChem Project: C22018-1

May 04, 2010 (revised)

Approved for Release:

FOR

Chris Ransom
Project Manager
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PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of summary and full validation performed on tissue samples and quality control sample data for the East Waterway Chinook sampling. A complete list of samples is provided in the **SAMPLE INDEX**.

Samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington and Columbia Analytical Services, Kelso, Washington. The analytical methods and EcoChem project chemists are listed below.

Analysis	Method	Primary Review	Secondary Review
Semivolatile Organic Compounds	EPA 8270D	Melissa Swanson	Chris Ransom
Alkylated Polycyclic Aromatic Hydrocarbons	EPA 8270D-SIM	Lucy Panteleeff	
Polychlorinated Biphenyls	EPA 8082	Lucy Panteleeff	
Pesticides	EPA 8081	Melissa Swanson	
Organotins	Krone 1989-SIM	Lucy Panteleeff	
Metals	EPA 200.8, 6010B, 6020, 7740, 7471A	Megan Kilner	
Lipids	Bligh Dyer		

The data were reviewed using guidance and quality control criteria documented in the analytical methods; the quality assurance project plans (QAPP) from the *Fish and Shellfish Tissue Collection and Chemical Analysis* (December, 2008); *East Waterway Juvenile Chinook Salmon Tissue Collection and Chemical Analysis* (June, 2009); *National Functional Guidelines for Inorganic Data Review* (USEPA 1994 & 2004); and *National Functional Guidelines for Organic Data Review* (USEPA 1999).

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as **APPENDIX A**. A Qualified Data Summary Table is included in **APPENDIX B**. **APPENDIX C** contains project communications. Data Validation Worksheets will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) is also submitted with this report.

Sample Index
Windward - East Waterway Chinook Sampling

SDG	Sample ID	Lab ID	SVOC	PAH	PCB	PEST	TBT	Metals	Lipids
QC62	EW09-CHN-W-Comp01	09-31487-QC62A	✓	✓	✓	✓		✓	✓
QC62	EW09-CHN-W-Comp02	09-31488-QC62B	✓	✓	✓	✓	✓	✓	✓
QC62	EW09-CHN-W-Comp03	09-31489-QC62C	✓	✓	✓	✓	✓	✓	✓
QC62	EW09-CHN-H-Comp01	09-31490-QC62D	✓	✓	✓	✓	✓	✓	✓
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	✓	✓	✓	✓	✓	✓	✓
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	✓	✓	✓	✓	✓	✓	✓
QF82	EW09-CHN-W-Comp01	10-1036-QF82A	✓					✓	
K1000029	EW09-CHN-SC-Comp-01	K1000029-001		✓				✓	

DATA VALIDATION REPORT
East Waterway - Chinook Sampling
Semivolatile Compounds by Method 8270D

This report documents the review of analytical data from the analysis of Chinook tissue samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington. Refer to the **Sample Index** for a list of samples reviewed.

SDG	Number of Samples	Validation Level
QC62	5 Tissue	Full
QF82	1 Tissue	Summary

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables, with the exception noted below. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

The quantitation for the Standard 7 from the ICAL analyzed 1/4/10 was missing from the data package. This was requested from the lab and received 2/09/10.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Preservation and Holding Times	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	GC/MS Instrument Performance	2	Internal Standards
	Initial Calibration (ICAL)		Target Analyte List
1	Continuing Calibration (CCAL)	1	Reporting Limits
1	Laboratory Blanks		Compound Identification
	Surrogate Compounds	2	Reported Results
2	Laboratory Control Samples (LCS/LCSD)	1	Calculation Verification (full validation only)

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Preservation and Holding Times

The QAPP required preservation technique is to freeze at -20°C. The QAPP required holding time is one year to extraction and 40 days from extraction to analysis. All preservation and holding time requirements were met.

Continuing Calibration

SDG QF82: The percent difference (%D) value for pentachlorophenol was outside the ±25% control limit at 59.5%, and indicative of high bias. This analyte was not detected in the associated sample; therefore no qualifiers were applied.

Laboratory Blanks

SDG QC62: Bis (2-ethylhexyl) phthalate was detected in the method blank at a level greater than the method detection limit. This compound was not detected in the associated samples; therefore no qualification of data was necessary.

Laboratory Control Samples

Laboratory control sample/laboratory control sample duplicates (LCS/LCSD) were analyzed. The LCS/LCSD recovery values were within the laboratory control limits, with the exceptions noted below. No action was taken if only one of the LCS/LCSD recoveries was outside of the control limits. For LCS/LCSD recoveries greater than the upper control limit, positive results in the associated samples were estimated (J-10) to indicate a potential high bias. For recoveries less than the lower control limit, associated results were estimated (J/UJ-10) to indicate a potential low bias. For relative percent difference (RPD) outliers, only positive results in the associated samples were estimated (J-9).

The following outliers resulted in qualification of data:

SDG QC62: The LCS/LCSD recoveries for hexachlorocyclopentadiene were less than the lower control limit. This analyte was not detected in the associated samples; reporting limits were estimated (UJ-10) to indicate a potential low bias.

Matrix Spike/Matrix Spike Duplicate

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and LCS/LCSD recoveries. Precision was assessed using LCS/LCSD RPD values.

Internal Standards

SDG QC62: The recoveries for the internal standard perylene-d12 were less than the 50% lower control limit in Samples EW09-CHN-H-Comp02 and EW09-CHN-H-Comp03. Results for the five compounds associated with this internal standard were estimated (UJ-19).

Reporting Limits

All SDG: All samples were analyzed at dilution factors ranging from 3x to 5x. Reporting limits were elevated accordingly.

Reported Results

SDG QC62: Samples EW09-CHN-H-Comp02 and EW09-CHN-H-Comp03 were reanalyzed at dilution (5x) due to internal standard outliers in the original analyses. In order to achieve the lowest possible reporting limits, the results from the 5x dilutions were rejected (R-11) in favor of the initial analyses.

Calculation Verification

SDG QC62: Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD recoveries, with the exceptions noted above. Precision was also acceptable as demonstrated by the RPD values for the LCS/LCSD analyses.

Data were estimated due to LCS/LCSD and internal standard recovery outliers.

Data were rejected in order to indicate which result should be used from multiple reported analyses. A usable result remains for each analyte in every sample; therefore completeness is unaffected.

Data that has been rejected should not be used for any purpose. All other data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
East Waterway - Chinook Sampling
Alkylated Polycyclic Aromatic Hydrocarbons by Method 8270C-SIM

This report documents the review of analytical data from the analysis of tissue samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Columbia Analytical Services, Kelso, Washington. Refer to the **Sample Index** for a list of samples reviewed.

SDG	Number of Samples	Validation Level
K1000029	1 Tissue	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables, with the exception noted below. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Preservation and Holding Times	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	GC/MS Instrument Performance		Internal Standards
	Initial Calibration (ICAL)		Target Analyte List
	Continuing Calibration (CCAL)		Reporting Limits
1	Laboratory Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS/LCSD)	1	Calculation Verification (full validation only)

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Preservation and Holding Times

The QAPP required preservation technique is to freeze at -20°C. The QAPP required holding time is one year to extraction and 40 days from extraction to analysis. All preservation and holding time requirements were met.

Laboratory Blanks

Naphthalene, 2-methynapthalene, 1-methynapthalene, biphenyl, and acenaphthene were detected in the method blank at levels greater than the method detection limits (MDL). In order to establish the effect on the sample data, action levels were established at five times the blank concentrations. All associated results were greater than the action levels; therefore no qualification of data was necessary.

Matrix Spike/Matrix Spike Duplicate

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and LCS/LCSD recoveries. Precision was assessed using LCS/LCSD RPD values.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was also acceptable as demonstrated by the relative percent difference values for the LCS/LCSD analyses.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
East Waterway - Chinook Sampling
Organochlorine Pesticides by EPA Method 8081B

This report documents the review of analytical data from the analyses of Chinook tissue samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington. Refer to the **Sample Index** for a list of samples reviewed.

SDG	Number of Samples	Validation Level
QC62	6 Tissue	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables, with the exception noted below. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Preservation and Holding Times		Internal Standards
	Initial Calibration (ICAL)		Target Analyte List
	Continuing Calibration (CCAL)	2	Reporting Limits
1	Laboratory Blanks		Compound Identification
	Surrogate Compounds		Reported Results
	Laboratory Control Samples (LCS/LCSD)	1	Calculation Verification (full validation only)
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Holding Times and Sample Preservation

The QAPP required preservation technique is to freeze at -20°C. The QAPP required holding time is one year to extraction and 40 days from extraction to analysis. All preservation and holding time requirements were met.

Laboratory Blanks

Heptachlor and heptachlor epoxide were detected in the method blank at levels greater than the method detection limit (MDL). These analytes were not detected in the associated samples; therefore no qualification of data was necessary.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicates (MS/MSD) were not analyzed. Laboratory accuracy was evaluated using the surrogate and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries. Precision was assessed using LCS/LCSD relative percent difference values.

Reporting Limits

The delta-BHC result for Sample EW09-CHN-H-Comp02 was flagged "Y" by the laboratory to indicate the presence of non-target background interferences. This delta-BHC result was qualified (U-22) to indicate it was not-detected at an elevated reporting limit.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD recoveries. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

One result for delta-BHC was qualified as not-detected at an elevated reporting limit due to matrix interferences.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
East Waterway - Chinook Sampling
PCB Aroclors by EPA Method 8082

This report documents the review of analytical data from the analyses of tissue samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc., Tukwila, Washington.

SDG	Number of Samples	Validation Level
QC62	6 Tissue	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Preservation and Holding Times
	Initial Calibration (ICAL)
	Continuing Calibration (CCAL)
	Laboratory Blanks
1	Surrogate Compounds
	Laboratory Control Samples (LCS/LCSD)
1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	Target Analyte List
2	Reporting Limits
	Compound Identification
1	Calculation Verification (full validation only)

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Preservation and Holding Times

The QAPP required preservation technique is to freeze at -20°C. The QAPP required holding time is one year to extraction and 40 days from extraction to analysis. All preservation and holding time requirements were met.

Surrogate Compounds

The recovery for the surrogate compound tetrachlorometaxylene (TCMX) was greater than the upper control limit in Sample EW09-CHN-H-Comp02. The decachlorobiphenyl (DCB) recovery was acceptable; therefore no action was taken.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and LCS/LCSD recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

Reporting Limits

The samples were analyzed at a 5x dilution due to matrix interferences; reporting limits were elevated accordingly.

The chromatograms for Samples EW09-CHN-W-Comp01, EW09-CHN-W-Comp02, and EW09-CHN-W-Comp03 indicated non-target background interferences. The Aroclor 1254 result for these samples were "Y" flagged by the laboratory. These "Y" flagged results were qualified as not-detected (U-22) to indicate that the analyte was not-detected at an elevated reporting limit.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD percent recoveries. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

Reporting limits were elevated based on matrix interferences.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
East Waterway - Chinook Sampling
Tributyl Tins by Krone, 1989-SIM

This report documents the review of analytical data from the analyses of tissue samples and the associated laboratory quality control (QC) samples. Samples were analyzed by Analytical Resources, Inc. (ARI), Tukwila, Washington. Refer to the **Sample Index** for a list of samples reviewed.

SDG	Number of Samples	Validation Level
QC62	5 Tissue	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

There was insufficient sample to analyze Sample EW09-CHN-W-Comp01.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%).

III. TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are summarized in the following table:

1	Sample Preservation and Holding Times	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
	GC/MS Instrument Performance Check		Internal Standards
	Initial Calibration (ICAL)		Reported Results
	Continuing Calibration (CCAL)		Compound Identification
	Laboratory Blanks		Reporting Limits
	Surrogate Compounds	1	Calculation Verification (full validation only)
	Laboratory Control Samples (LCS/LCSD)		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Preservation and Holding Times

The QAPP required preservation technique is to freeze at -20°C. The QAPP required holding time is one year to extraction and 40 days from extraction to analysis. All preservation and holding time requirements were met.

Matrix Spike/Matrix Spike Duplicates

Due to insufficient sample volume, matrix spike/matrix spike duplicate (MS/MSD) samples were not analyzed. Laboratory accuracy was evaluated using the surrogate and LCS/LCSD recoveries. Precision was assessed using LCS/LCSD relative percent difference (RPD) values.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable as demonstrated by the surrogate and LCS/LCSD recoveries. Precision was also acceptable as demonstrated by the LCS/LCSD RPD values.

No data was qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
East Waterway - Chinook Sampling
Metals Analyses by 200.8, 6010B, 6020, and 7740
Mercury by 7471A

This report documents the review of analytical data from the analysis of tissue samples and the associated laboratory quality control (QC) samples. Analytical Resources, Incorporated, Tukwila, Washington, and Columbia Analytical Services, Kelso, Washington analyzed the samples. Refer to the **Sample Index** for a list of the individual samples.

SDG	Number of Samples	Validation Level
QC62	6 Tissue	Full
QF82	1 Tissue	Summary
K1000029	1 Tissue	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG K1000029: The laboratory was contacted to supply the ICP-MS tuning information for the analysis date of 2/2/10. The sample was initially reported on a dry weight basis; the lab resubmitted summary forms and EDDs with wet weight concentrations as requested by Windward.

II. EDD TO HARDCOPY VERIFICATION

A verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. All sample results and 10% of the QC results were verified. No errors were found.

III. TECHNICAL DATA VALIDATION

The QC requirements for review are listed below.

2 Sample Preservation and Holding Times
2 Contract Required Detection Limit Standard
Initial Calibration (ICAL)
Initial and Continuing Calibration Verification (ICV/CCV)
2 Laboratory Blanks
1 Laboratory Control Samples (LCS/LCSD)
1 Standard Reference Materials
1 Matrix Spikes (MS)
1 Laboratory Duplicates
GFAA Post-Digestion Spikes
2 Interference Check Samples
Serial Dilutions
ICPMS Internal Standards
1 Reported Results
1 Calculation Verification (Full validation only)

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Preservation and Holding Times

The QAPP required preservation technique is to freeze at -20°C. The QAPP required holding time are 6 months for metals and 60 days for mercury; however the metals holding time is typically extended to one year for samples that are stored at -20°C. The holding time of one year was used to evaluate the field samples. All preservation requirements were met. Holding time outliers are noted below.

SDG QC62: All samples were analyzed for mercury six months and 20 days after sample collection, beyond the QAPP specified holding time of 60 days for mercury and 6 months for all other analyses. Due to the potential low bias, all mercury results were estimated (J-1).

Contract Required Detection Limit Standard

Contract required detection limit (CRDL) standards were analyzed at the beginning of each analytical sequence. For recoveries greater than upper control limit of 130%, positive results less than two times (<2x) the CRDL were estimated (J) to indicate a potential high bias. For recoveries less than the lower control limit of 70%, positive results less than twice (<2x) the CRDL and non-detects were estimated (J/UJ) to indicate a potential low bias. Outliers for the following analytes resulted in qualification of data:

SDG K1000029: The CRDL standard recovery for thallium was less than the lower control limit. The thallium result for Sample EW09-CHN-SC-Comp-01 was estimated (J-14) to indicate a potential low bias.

Laboratory Blanks

Various analytes were detected in the method and instrument blanks at levels greater than the method detection limits (MDL). To evaluate the effect on the sample data, action levels of five times (5x) the blank concentrations were established. Positive results less than the action levels in the associated samples were qualified as not detected (U) at the reported concentration. No action was taken for non-detects. The following outliers resulted in qualification of data:

SDG K1000029: Selenium was detected in the method blank and instrument blanks at levels greater than the MDL. The selenium result for Sample EW09-CHN-SC-Comp-01 was qualified as not detected (U-7).

Laboratory Control Samples

SDG QC62: The laboratory prepared the Laboratory Control Sample (LCS) with twice the spiking level of the Laboratory Control Sample Duplicate (LCSD); the lab did not report any precision measurement. The only measure of precision was the recalculation of the LCS/LCSD using the percent recovery values. No RPD or %R outliers were noted.

Standard Reference Materials

SDG K1000029: The standard reference materials (SRM) NRCC DORM-3 and NRCC TORT-2 were analyzed. All recoveries were within the certified ranges.

Matrix Spikes

All SDGs: Due to insufficient sample volume, matrix spike (MS) samples were not analyzed. Laboratory accuracy was evaluated using the LCS/LCSD recoveries.

Laboratory Duplicates

All SDGs: Due to insufficient sample volume, laboratory duplicates were not analyzed. Precision was assessed using the LCS/LCSD relative percent difference (RPD) values.

Interference Check Samples

SDG QF82: The value for molybdenum in the unspiked interference check sample (ICSA) was greater than the reporting limit. The concentration of the interfering element calcium was greater than the ICS level in the sample. The molybdenum result for Sample EW09-CHN-W-Comp01 was estimated (J-17) to indicate a potential high bias.

SDG K1000029: The ICSAB recovery for silver was less than the lower control limit of 80%. The result for sample EW09-CHN-SC-Comp-01 was estimated (J-17) to indicate a potential low bias.

Reported Results

SDG K1000029: Several results were reported with too many significant figures, for example, 2.93000 mg/Kg instead of 2.93 mg/Kg. All results were truncated as necessary to report only three significant figures.

Calculation Verification

SDG QC62: Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

SDG K1000029: Several results were verified by recalculation from the raw data. No calculation or transcription errors were noted.

IV. OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the standard reference material and LCS/LCSD %R values. The LCS/LCSD relative percent difference values indicated acceptable precision.

Detection limits were elevated based on blank contamination. Data were estimated due to exceeded holding times, interference check sample outliers, and reporting limit standard %R outliers.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
East Waterway - Chinook Sampling
Lipids by Bligh Dyer modified

This report documents the review of analytical data from the analysis of tissue samples and the associated laboratory quality control (QC) samples. Analytical Resources, Incorporated, Tukwila, Washington, analyzed the samples. Refer to the **SAMPLE INDEX** for a list of the individual samples.

SDG	Number of Samples	Validation Level
QC62	6 Tissue	Full

I. DATA PACKAGE COMPLETENESS

The laboratory submitted all necessary deliverables for full validation. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

II. EDD TO HARDCOPY VERIFICATION

A complete (100%) verification of the electronic data deliverable (EDD) results was performed by comparison to the hardcopy laboratory data package. Laboratory QC results were also verified (10%). No errors were found.

III. TECHNICAL DATA VALIDATION

The quality control (QC) requirements that were reviewed are listed below.

	Holding Times and Sample Preservation		Reporting Limits
	Laboratory Blanks	1	Calculation Verification
1	Laboratory Replicates		

[1] ***Quality control results are discussed below, but no data were qualified.***
[2] ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Laboratory Replicates

No laboratory replicates were analyzed. Precision could not be evaluated.

Calculation Verification

Several results were verified by recalculation from the raw data. No calculation or transcription errors were found.

IV. OVERALL ASSESSMENT

As was determined by this evaluation, the laboratory followed the specified analytical method.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

EcoChem, INC.
Environmental Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
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 the approximate concentration.
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.
R	The sample results are 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.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

1	Holding Time/Sample Preservation
2	Chromatographic pattern in sample does not match pattern of calibration standard.
3	Compound Confirmation
4	Tentatively Identified Compound (TIC) (associated with NJ only)
5A	Calibration (initial)
5B	Calibration (continuing)
6	Field Blank Contamination
7	Lab Blank Contamination (e.g., method blank, instrument, etc.)
8	Matrix Spike(MS & MSD) Recoveries
9	Precision (all replicates)
10	Laboratory Control Sample Recoveries
11	A more appropriate result is reported (associated with “R” and “DNR” only)
12	Reference Material
13	Surrogate Spike Recoveries (a.k.a., labeled compounds & recovery standards)
14	Other (define in validation report)
15	GFAA Post Digestion Spike Recoveries
16	ICP Serial Dilution % Difference
17	ICP Interference Check Standard Recovery
18	Trip Blank Contamination
19	Internal Standard Performance (e.g., area, retention time, recovery)
20	Linear Range Exceeded
21	Potential False Positives
22	Elevated Detection Limit Due to Interference (i.e., laboratory, chemical and/or matrix)

EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS
(Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	Water: J(+)/UJ(-) if ext. > 7 and < 21 days J(+)/R(-) if ext > 21 days (EcoChem PJ) Solids/Wastes: J(+)/UJ(-) if ext. > 14 and < 42 days J(+)/R(-) if ext. > 42 days (EcoChem PJ) J(+)/UJ(-) if analysis >40 days	1
Tuning	DFTPP Beginning of each 12 hour period Method acceptance criteria	R(+/-) all analytes in all samples associated with the tune	5A
Initial Calibration (Minimum 5 stds.)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5A
	%RSD < 30%	(EcoChem PJ, see TM-06) J(+) if %RSD > 30%	5A
Continuing Calibration (Prior to each 12 hr. shift)	RRF > 0.05	(EcoChem PJ, see TM-06) If MDL= reporting limit: J(+)/R(-) if RRF < 0.05 If reporting limit > MDL: note in worksheet if RRF <0.05	5B
	%D <25%	(EcoChem PJ, see TM-06) If > +/-90%: J+/R- If -90% to -26%: J+ (high bias) If 26% to 90%: J+/UJ- (low bias)	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample (+) result is less than CRQL and less than appropriate 5X or 10X rule (raise sample value to CRQL)	7
		U(+) if sample (+) result is greater than or equal to CRQL and less than appropriate 5X and 10X rule (at reported sample value)	7
	No TICs present	R(+) TICs using 10X rule	7
Field Blanks (Not Required)	No results > CRQL	Apply 5X/10X rule; U(+) < action level	6

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EcoChem Validation Guidelines for Semivolatile Analysis by GC/MS
(Based on Organic NFG 1999)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One per matrix per batch Use method acceptance criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One per matrix per batch Use method acceptance criteria	J(+) in parent sample if RPD > CL	9
LCS low conc. H2O SVOA	One per lab batch Within method control limits	J(+) assoc. cmpd if > UCL J(+)/R(-) assoc. cmpd if < LCL J(+)/R(-) all cmpds if half are < LCL	10
LCS regular SVOA (H2O & solid)	One per lab batch Lab or method control limits	J(+) if %R > UCL J(+)/UJ(-) if %R <LCL J(+)/R(-) if %R < 10% (EcoChem PJ)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	Minimum of 3 acid and 3 base/neutral compounds Use method acceptance criteria	Do not qualify if only 1 acid and/or 1 B/N surrogate is out unless <10% J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) if %R < 10%	13
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	J(+) if > 200% J(+)/UJ(-) if < 50% J(+)/R(-) if < 25% RT>30 seconds, narrate and Notify PM	19
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate and qualify if required by project (EcoChem PJ)	9
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NJ the TIC unless: R(+) common laboratory contaminants See Technical Director for ID issues	4
Quantitation/ Identification	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	See Technical Director if outliers	14 21 (false +)

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EcoChem Validation Guidelines for Pesticides, PCBs, Herbicides, and Phenol by GC/ECD (Based on Organic NFG 1999 & EPA SW-846 Methods 8081/8082/8041/8151)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature	4°C ±2°	J(+)/UJ(-) if greater than 6 deg. C (EcoChem PJ)	1
Holding Time	Water: 7 days from collection Soil: 14 days from collection Analysis: 40 days from extraction	J(+)/UJ(-) if ext/analyzed > HT J(+)/R(-) if ext/analyzed > 3X HT (EcoChem PJ)	1
Resolution Check	Beginning of ICAL Sequence Within RTW Resolution >90%	Narrate (Use Professional Judgement to qualify)	14
Instrument Performance (Breakdown)	DDT Breakdown: < 20% Endrin Breakdown: <20% Combined Breakdown: <30% Compounds within RTW	J(+) DDT NJ(+) DDD and/or DDE R(-) DDT - If (+) for either DDE or DDD J(+) Endrin NJ(+) EK and/or EA R(-) Endrin - If (+) for either EK or EA	5A
Retention Times	Surrogates: TCX (+/- 0.05); DCB (+/- 0.10) Target compounds: elute before heptachlor epoxide (+/- 0.05) elute after heptachlor epoxide (+/- 0.07)	NJ(+)/R(-) results for analytes with RT shifts For full DV, use PJ based on examination of raw data	5B
Initial Calibration	Pesticides: Low=CRQL, Mid=4X, High=16X Multiresponse - one point Calibration %RSD<20% %RSD<30% for surr; two comp. may exceed if <30% Resolution in Mix A and Mix B >90%	J(+)/UJ(-)	5A
Continuing Calibration	Alternating PEM standard and INDA/INDB standards every 12 hours (each preceeded by an inst. Blank) %D < 25% Resolution >90% in IND mixes; 100% for PEM	J(+)/UJ(-) J(+)R(-) if %D > 90% PJ for resolution	5B
Method Blank	One per matrix per batch No results > CRQL	U(+) if sample result is < CRQL and < 5X rule (raise sample value to CRQL) U(+) if sample result is > or equal to CRQL and < 5X rule (at reported sample value)	7
Instrument Blanks	Analyzed at the beginning of every 12 hour sequence No analyte > 1/2 CRQL	Same as Method Blank	7
Field Blanks	Not addressed by NFG No results > CRQL	Apply 5X rule; U(+) < action level	6

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EcoChem Validation Guidelines for Pesticides, PCBs, Herbicides, and Phenol by GC/ECD
(Based on Organic NFG 1999 & EPA SW-846 Methods 8081/8082/8041/8151)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
MS/MSD (recovery)	One set per matrix per batch Method Acceptance Criteria	Qualify parent only unless other QC indicates systematic problems: J(+) if both %R > UCL J(+)/UJ(-) if both %R < LCL J(+)/R(-) if both %R < 10% PJ if only one %R outlier	8
MS/MSD (RPD)	One set per matrix per batch Method Acceptance Criteria	J(+) in parent sample if RPD > CL	9
LCS	One per SDG Method Acceptance Criteria	J(+) if %R > UCL J(+)/UJ(-) if %R < LCL J(+)/R(-) using PJ if %R <<LCL (< 10%)	10
LCS/LCSD *(if required)*	One set per matrix and batch of 20 samples RPD < 35%	J(+)/UJ(-) assoc. cmpd. in all samples	9
Surrogates	TCX and DCB added to every sample %R = 30-150%	J(+)/UJ(-) if both %R = 10 - 60% J(+) if both >150% J(+)/R(-) if any %R <10%	13
Quantitation/ Identification	Quantitated using ICAL calibration factor (CF) RPD between columns <40%	J(+) if RPD = 40 - 60% NJ(+) if RPD >60% EcoChem PJ - See TM-08	3
Two analyses for one sample	Report only one result per analyte	"DNR" results that should not be used to avoid reporting two results for one sample	11
Sample Clean-up	GPC required for soil samples Florisil required for all samples Sulfur is optional Clean-up standard check %R within CLP limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL	14
Field Duplicates	Use QAPP limits. If no QAPP: Solids: RPD <50% OR absolute diff. < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR absolute diff. < 1X RL (for results < 5X RL)	Narrate (Qualifiy if required by project QAPP)	9

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EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration Tissues: Frozen	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r > 0.995	J(+)/UJ(-) if r < 0.995 (multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blank (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		(Refer to TM-02 for additional information)
			7

Reporting Limit Standard	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Sb, Pb, Tl)	R(-)/J(+) < 2x RL if %R <50% (< 30% Sb, Pb, Tl) J(+) < 2x RL, UJ(-) if %R 50-69% (30-49% Sb, Pb,Tl) J(+) < 2x RL if %R 130-180% (150-200% Sb, Pb, Tl) R(+) < 2x RL if %R > 180% (200% Sb, Pb, Tl)	14
Interference Check Samples (ICSA/ICSAB)	ICSAB %R 80 - 120% for all spiked elements | ICSA | < MDL for all unspiked elements except: K, Na	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R= 50 to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch		10
	Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	

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EcoChem Validation Guidelines for Metals Analysis by ICP
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Matrix Spikes	One per matrix per batch 75-125% for samples less than 4x spike level	J(+) if %R > 125% J(+)/UJ(-) if %R < 75% J(+)/R(-) if %R < 30% or J(+)/UJ(-) if Post Spike %R 75-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, spike at twice the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples >RL and < 5x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL (2x RL for solids) qualify all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample conc. > 50x MDL	J(+)/UJ(-) if %D >10% qualify all samples in batch	16
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

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EcoChem Validation Guidelines for Metals Analysis by ICP-MS
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Tune	Prior to ICAL monitoring compounds analyzed 5 times wih Std Dev. ≤ 5% mass calibration <0.1 amu from True Value Resolution < 0.9 AMU @ 10% peak height or <0.75 amu @ 5% peak height	Use Professional Judgment to evaluate tune J(+)/UJ(-) if tune criteria not met	5A
Initial Calibration	Blank + minimum 1 standard If more than 1 standard, r>0.995	J(+)/UJ(-) if r<0.995 (for multi point cal)	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±10% of true value	J(+)/UJ(-) if %R 75-89% J(+) if %R = 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run ±10% of true value	J(+)/UJ(-) if %R = 75-89% J(+) if %R 111-125% R(+) if %R > 125% R(+/-) if %R < 75%	5B

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Reporting Limit Standard (CRI)	2x RL analyzed beginning of run Not required for Al, Ba, Ca, Fe, Mg, Na, K %R = 70%-130% (50%-150% Co,Mn, Zn)	R(-),(+) < 2x RL if %R < 50% (< 30% Co,Mn, Zn) J(+) < 2x RL, UJ(-) if %R 50-69% (30%-49% Co,Mn, Zn) J(+) < 2x RL if %R 130%-180% (150%-200% Co,Mn, Zn) R(+) < 2x RL if %R > 180% (200% Co, Mn, Zn)	14
Interference Check Samples (ICSA/ICSAB)	Required by SW 6020, but not 200.8 ICSAB %R 80% - 120% for all spiked elements | ICSA | < IDL (MDL) for all unspiked elements	For samples with Al, Ca, Fe, or Mg > ICS levels R(+/-) if %R < 50% J(+) if %R >120% J(+)/UJ(-) if %R = 50% to 79% Use Professional Judgment for ICSA to determine if bias is present see TM-09 for additional details	17
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7

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EcoChem Validation Guidelines for Metals Analysis by ICP-MS
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 80%-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% or J(+)/UJ(-) if Post Spike %R 75%-125% Qualify all samples in batch	8
Post-digestion Spike	If Matrix Spike is outside 75-125%, Spike parent sample at 2x the sample conc.	No qualifiers assigned based on this element	
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Serial Dilution	5x dilution one per matrix %D < 10% for original sample values > 50x MDL	J(+)/UJ(-) if %D >10% All samples in batch	16
Internal Standards	Every sample SW6020: 60%-125% of cal blank IS 200.8: 30%-120% of cal blank IS	J (+)/UJ (-) all analytes associated with IS outlier	19
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < AL in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff < RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must fall within range	J values over range	20

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EcoChem Validation Guidelines for Metals Analysis by GFAA
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Water: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	180 days from date sampled Frozen tissues - HT extended to 2 years	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + 3 standards, one at RL r>0.995	Use Professional Judgment if correct number of standards not analyzed J(+)/UJ(-) if r<0.995	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within +/- 10% of true value	J(+) if %R < 75% J(+)/UJ(-) if %R = 75%-89% J(+) if %R = 111-125% R(-) if %R<75% R(+) if %R>125%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run +/- 10% of true value	J(+) if %R < 75% J(+)/UJ(-) if %R 75%-89% J(+) if %R 111-125% R(-) if %R<75% R(+) if %R>125%	5B

Reporting Limit (CRQL) Standard (CRA)	conc at RL - analyzed beginning of run
	%R = 70%-130%
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			14

Initial and Continuing Calibration Blanks (ICB/CCB)	After each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch		10
	Blank Spike: %R within 80%-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spikes	One per matrix per batch 75-125% for samples where results do not exceed 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% all samples in batch	8

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EcoChem Validation Guidelines for Metals Analysis by GFAA
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9
Post-digestion Spike	Required for every sample %R 85-115%	J(+)/UJ(-) if %R 10-84%; J(+) if %R 115-200% R(+/-) if %R < 10% or >200%	15
Method of Standard Additions (MSA)	Run if post spike is outside of control limits and sample abs > 50% spike abs r> 0.995	J(+) if r<0.995 R(+) if r< 0.990	15
Duplicate Injection	Required for all analyses except MSA RSD<20% for values > CRDL	R(+/-) if duplicate injection not performed J(+)/UJ(-) if RSD> 20%	9
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5x RL: Water: Diff<RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must be less than 110% of high standard	J values over range	20

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EcoChem Validation Guidelines for Mercury Analysis by CVAA
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler temperature: 4°C ±2° Waters: Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	EcoChem Professional Judgment - no qualification based on cooler temperature outliers J(+)/UJ(-) if pH preservation requirements are not met	1
Holding Time	28 days from date sampled Frozen tissues: HT extended to 6 months	J(+)/UJ(-) if holding time exceeded	1
Initial Calibration	Blank + 4 standards, one at RL r > 0.995	J(+)/UJ(-) if r<0.995	5A
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ±20% of true value	J(+)/UJ(-) if %R = 65%-79% J(+) if %R = 121-135% R(+/-) if %R < 65% R(+) if %R > 135%	5A
Continuing Calibration Verification (CCV)	Every ten samples, immediately following ICV/ICB and at end of run %R within ±20% of true value	J(+)/UJ(-) if %R = 65%-79% J(+) if %R = 121-135% R(+/-) if %R < 65% R(+) if %R > 135%	5B

Initial and Continuing Calibration Blanks (ICB/CCB)	after each ICV and CCV
	every ten samples and end of run
	| blank | < IDL (MDL)
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Reporting Limit Standard (CRA)	conc at RL - analyzed beginning of run %R = 70-130%	R(-),(+)<2xRL if %R <50% J(+)<2x RL, UJ(-) if %R 50-69% J(+) <2x RL if %R 130-180% R(+)<2x RL if %R>180%	14
Method Blank	One per matrix per batch (batch not to exceed 20 samples) blank < MDL	Action level is 5x blank concentration U(+) results < action level	7
Laboratory Control Sample (LCS)	One per matrix per batch		10
	Blank Spike: %R within 80-120%	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	
	CRM: Result within manufacturer's certified acceptance range or project guidelines	J(+)/UJ(-) if < LCL, J(+) if > UCL	
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One per matrix per batch 5% frequency 75-125% for samples less than 4x spike level	J(+) if %R>125% J(+)/UJ(-) if %R <75% J(+)/R(-) if %R<30% all samples in batch	8
Laboratory Duplicate (or MS/MSD)	One per matrix per batch RPD < 20% for samples > 5x RL Diff < RL for samples > RL and < 5x RL (Diff < 2x RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

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EcoChem Validation Guidelines for Mercury Analysis by CVAA
(Based on Inorganic NFG 1994 & 2004)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	Blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5x RL: Water: RPD < 35% Solid: RPD < 50% For results < 5x RL: Water: Diff<RL Solid: Diff < 2x RL	J(+)/UJ(-) in parent samples only	9
Linear Range	Sample concentrations must be less than 110% of high standard	J values over range	20

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EcoChem Validation Guidelines for Conventional Chemistry Analysis (Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Cooler Temperature and Preservation	Cooler Temperature 4°C ±2°C Preservation: Method Specific	Use Professional Judgment to qualify based to qualify for coole temp outliers J(+)/UJ(-) if preservation requirements not met	1
Holding Time	Method Specific	Professional Judgment J(+)/UJ(-) if holding time exceeded J(+)/R(-) if HT exceeded by > 3X	1
Initial Calibration	Method specific r>0.995	Use professional judgment J(+)/UJ(-) for r < 0.995	5A
Initial Calibration Verification (ICV)	Where applicable to method Independent source analyzed immediately after calibration %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5A
Continuing Cal Verification (CCV)	Where applicable to method Every ten samples, immed. following ICV/ICB and end of run %R method specific, usually 90% - 110%	R(+/-) if %R significantly < LCL J(+)/UJ(-) if %R < LCL J(+) if %R > UCL R(+) if %R significantly > UCL	5B

Initial and Continuing Cal Blanks (ICB/CCB)	Where applicable to method
	After each ICV and CCV every ten samples and end of run
	| blank| < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blanks, U(+) results < action level
		For (-) blanks, J(+)/UJ(-) results < action level
		refer to TM-02 for additional details
			7

Method Blank	One per matrix per batch
	(not to exceed 20 samples)
	blank < MDL
		Action level is 5x absolute value of blank conc.
		For (+) blk value, U(+) results < action level
		For (-) blk value, J(+)/UJ(-) results < action level
			7

Laboratory Control Sample	Waters: One per matrix per batch %R (80-120%)	R(+/-) if %R < 50% J(+)/UJ(-) if %R = 50-79% J(+) if %R >120%	10
	Soils: One per matrix per batch Result within manufacturer's certified acceptance range	J(+)/UJ(-) if < LCL, J(+) if > UCL	10
Matrix Spike	One per matrix per batch; 5% frequency 75-125% for samples less than 4 x spike level	J(+) if %R > 125% or < 75% UJ(-) if %R = 30-74% R(+/-) results < IDL if %R < 30%	8
Laboratory Duplicate	One per matrix per batch RPD <20% for samples > 5x RL Diff <RL for samples >RL and <5 x RL (may use RPD < 35%, Diff < 2X RL for solids)	J(+)/UJ(-) if RPD > 20% or diff > RL all samples in batch	9

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EcoChem Validation Guidelines for Conventional Chemistry Analysis
(Based on EPA Standard Methods)

VALIDATION QC ELEMENT	ACCEPTANCE CRITERIA	ACTION	REASON CODE
Field Blank	blank < MDL	Action level is 5x blank conc. U(+) sample values < action level in associated field samples only	6
Field Duplicate	For results > 5X RL: Water: RPD < 35% Solid: RPD < 50% For results < 5 x RL: Water: Diff<RL Solid: Diff < 2X RL	J(+)/UJ(-) in parent samples only	9

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Environmental Data Quality

APPENDIX B
QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
WIndward - East Waterway Chinook Sampling

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	Val Qual	Val Reason
K1000029	EW09-CHN-SC-Comp-01	K1000029-001	EPA 6020	Silver	0.139	mg/kg		J	17
K1000029	EW09-CHN-SC-Comp-01	K1000029-001	EPA 6020	Thallium	0.008	mg/kg	J	J	14
K1000029	EW09-CHN-SC-Comp-01	K1000029-001	EPA 7740	Selenium	1.73	mg/kg		U	7
QC62	EW09-CHN-W-Comp01	09-31487-QC62A	EPA 7471A	Mercury	0.043	mg/kg		J	1
QC62	EW09-CHN-W-Comp02	09-31488-QC62B	EPA 7471A	Mercury	0.014	mg/kg		J	1
QC62	EW09-CHN-W-Comp03	09-31489-QC62C	EPA 7471A	Mercury	0.015	mg/kg		J	1
QC62	EW09-CHN-H-Comp01	09-31490-QC62D	EPA 7471A	Mercury	0.012	mg/kg		J	1
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 7471A	Mercury	0.010	mg/kg		J	1
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	EPA 7471A	Mercury	0.012	mg/kg		J	1
QF82	EW09-CHN-W-Comp01	10-1036-QF82A	EPA 6010B	Molybdenum	0.2	mg/kg		J	17
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 8081B	delta-BHC		ug/kg	Y	U	22
QC62	EW09-CHN-W-Comp01	09-31487-QC62A	EPA 8082	Aroclor 1254		ug/kg	Y	U	22
QC62	EW09-CHN-W-Comp02	09-31488-QC62B	EPA 8082	Aroclor 1254		ug/kg	Y	U	22
QC62	EW09-CHN-W-Comp03	09-31489-QC62C	EPA 8082	Aroclor 1254		ug/kg	Y	U	22
QC62	EW09-CHN-W-Comp02	09-31488-QC62B	EPA 8270D	Hexachlorocyclopentadiene		ug/kg	U	UJ	10
QC62	EW09-CHN-W-Comp03	09-31489-QC62C	EPA 8270D	Hexachlorocyclopentadiene		ug/kg	U	UJ	10
QC62	EW09-CHN-H-Comp01	09-31490-QC62D	EPA 8270D	Hexachlorocyclopentadiene		ug/kg	U	UJ	10
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 8270D	Benzo(a)pyrene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 8270D	Benzo(b)fluoranthene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 8270D	Benzo(g,h,i)perylene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 8270D	Benzo(k)fluoranthene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 8270D	Dibenz(a,h)anthracene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 8270D	Hexachlorocyclopentadiene		ug/kg	U	UJ	10
QC62	EW09-CHN-H-Comp02	09-31491-QC62E	EPA 8270D	Indeno(1,2,3-cd)pyrene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	1,2,4-Trichlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	1,2-Dichlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	1,3-Dichlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	1,4-Dichlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	1-Methylnaphthalene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2,2'-Oxybis(1-Chloropropane)		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2,4,5-Trichlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2,4,6-Trichlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2,4-Dichlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2,4-Dimethylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2,4-Dinitrophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2,4-Dinitrotoluene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2,6-Dinitrotoluene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2-Chloronaphthalene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2-Chlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2-Methylnaphthalene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2-Methylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2-Nitroaniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	2-Nitrophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	3,3'-Dichlorobenzidine		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	3-Nitroaniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	4,6-Dinitro-2-Methylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	4-Bromophenyl-phenylether		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	4-Chloro-3-methylphenol		ug/kg	U	R	11

Qualified Data Summary Table
WIndward - East Waterway Chinook Sampling

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	Val Qual	Val Reason
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	4-Chloroaniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	4-Chlorophenyl-phenylether		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	4-Methylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	4-Nitroaniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	4-Nitrophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Acenaphthene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Acenaphthylene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Aniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Anthracene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Benzo(a)anthracene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Benzo(a)pyrene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Benzo(b)fluoranthene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Benzo(g,h,i)perylene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Benzo(k)fluoranthene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Benzoic Acid		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Benzyl Alcohol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	bis(2-Chloroethoxy) Methane		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Bis-(2-Chloroethyl) Ether		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	bis(2-Ethylhexyl)phthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Butylbenzylphthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Carbazole		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Chrysene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Dibenz(a,h)anthracene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Dibenzofuran		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Diethylphthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Dimethylphthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Di-n-Butylphthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Di-n-Octyl phthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Fluoranthene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Fluorene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Hexachlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Hexachlorobutadiene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Hexachlorocyclopentadiene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Hexachloroethane		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Indeno(1,2,3-cd)pyrene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Isophorone		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Naphthalene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Nitrobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	N-Nitrosodimethylamine		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	N-Nitroso-Di-N-Propylamine		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	N-Nitrosodiphenylamine		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Pentachlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Phenanthrene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Phenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp02	09-31491-QC62EDL	EPA 8270D	Pyrene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	EPA 8270D	Benzo(a)pyrene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	EPA 8270D	Benzo(b)fluoranthene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	EPA 8270D	Benzo(g,h,i)perylene		ug/kg	U	UJ	19

Qualified Data Summary Table
WIndward - East Waterway Chinook Sampling

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	Val Qual	Val Reason
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	EPA 8270D	Benzo(k)fluoranthene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	EPA 8270D	Dibenz(a,h)anthracene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	EPA 8270D	Hexachlorocyclopentadiene		ug/kg	U	UJ	10
QC62	EW09-CHN-H-Comp03	09-31492-QC62F	EPA 8270D	Indeno(1,2,3-cd)pyrene		ug/kg	U	UJ	19
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	1,2,4-Trichlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	1,2-Dichlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	1,3-Dichlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	1,4-Dichlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	1-Methylnaphthalene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2,2'-Oxybis(1-Chloropropane)		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2,4,5-Trichlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2,4,6-Trichlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2,4-Dichlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2,4-Dimethylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2,4-Dinitrophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2,4-Dinitrotoluene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2,6-Dinitrotoluene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2-Chloronaphthalene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2-Chlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2-Methylnaphthalene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2-Methylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2-Nitroaniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	2-Nitrophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	3,3'-Dichlorobenzidine		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	3-Nitroaniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	4,6-Dinitro-2-Methylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	4-Bromophenyl-phenylether		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	4-Chloro-3-methylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	4-Chloroaniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	4-Chlorophenyl-phenylether		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	4-Methylphenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	4-Nitroaniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	4-Nitrophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Acenaphthene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Acenaphthylene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Aniline		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Anthracene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Benzo(a)anthracene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Benzo(a)pyrene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Benzo(b)fluoranthene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Benzo(g,h,i)perylene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Benzo(k)fluoranthene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Benzoic Acid		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Benzyl Alcohol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	bis(2-Chloroethoxy) Methane		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Bis-(2-Chloroethyl) Ether		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	bis(2-Ethylhexyl)phthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Butylbenzylphthalate		ug/kg	U	R	11

Qualified Data Summary Table
WIndward - East Waterway Chinook Sampling

SDG	Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qual	Val Qual	Val Reason
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Carbazole		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Chrysene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Dibenz(a,h)anthracene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Dibenzofuran		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Diethylphthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Dimethylphthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Di-n-Butylphthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Di-n-Octyl phthalate		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Fluoranthene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Fluorene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Hexachlorobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Hexachlorobutadiene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Hexachlorocyclopentadiene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Hexachloroethane		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Indeno(1,2,3-cd)pyrene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Isophorone		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Naphthalene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Nitrobenzene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	N-Nitrosodimethylamine		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	N-Nitroso-Di-N-Propylamine		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	N-Nitrosodiphenylamine		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Pentachlorophenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Phenanthrene		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Phenol		ug/kg	U	R	11
QC62	EW09-CHN-H-Comp03	09-31492-QC62FDL	EPA 8270D	Pyrene		ug/kg	U	R	11

EcoChem, INC.
Environmental Data Quality

APPENDIX C
COMMUNICATION RECORDS

Melissa Swanson

From: Chris Ransom
Sent: Tuesday, February 09, 2010 4:02 PM
To: Melissa Swanson
Subject: FW: Windward Chinook SDG QC62

Attachments: NT4 IC800104.pdf

NT4 IC800104.pdf
(354 KB)

-----Original Message-----
From: Sue Dunnihoo [mailto:sue@arilabs.com]
Sent: Tuesday, February 09, 2010 4:01 PM
To: Chris Ransom
Subject: Re: Windward Chinook SDG QC62

Here you go - Sue

Chris Ransom wrote:
> Hi Sue,
>
> The level 7 standard for the SVOC ICAL (80 ug/l 1/4/10, inst NT4) was
> not included in the data package. Could you send that over?
>
> Also, there wasn't a sample receipt log-in with the COC - do you have
> one of those you could send as well. Just out of curiosity, do you
> guys do any kind of special documentation when samples are placed in
> frozen archive? Like perhaps a freezer log-in form? The question
> seems to be coming up more often lately as to how we verify that
> samples have been kept frozen.
>
> Thanks
>
> Chris
>
>

--

Susan D. Dunnihoo
Director, Client Services
ANALYTICAL RESOURCES, INC.
206-695-6207
sue@arilabs.com
www.arilabs.com

This correspondence contains confidential information from Analytical Resources, Inc. The information contained herein is intended solely for the use of the individual(s) named above. If you are not the intended recipient, any copying, distribution, disclosure, or use of the text and/or attached document(s) is strictly prohibited.

If you have received this correspondence in error, please notify sender immediately. Thank you.

Analytical Resources, Inc.

Semivolatile Report SW846 Method 8270D

Data file : /chem3/nt4.i/20100104.b/01041007.d
Lab Smp Id: IC800104 — Client Smp ID: IC800104
Inj Date : 04-JAN-2010 19:52
Operator : JZ — Inst ID: nt4.i
Smp Info : IC800104
Misc Info : 10-
Comment : 1ul Injection
Method : /chem3/nt4.i/20100104.b/SW846100104.m
Meth Date : 09-Feb-2010 16:11 jianqing — Quant Type: ISTD
Cal Date : 04-JAN-2010 19:52 — Cal File: 01041007.d
Als bottle: 7 — Calibration Sample, Level: 7
Dil Factor: 1.00000
Integrator: HP RTE — Compound Sublist: ICAL.sub
Target Version: 3.50

02/09/10

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	AMOUNTS ON-COL (ug/mL)
$ 1 2-Fluorophenol	112	6.793	6.784	(0.776)	1636584	80.0000	70.16
$ 2 Phenol-d5	99	8.286	8.265	(0.946)	1541152	80.0000	66.61
3 Phenol	94	8.309	8.282	(0.949)	1688467	80.0000	57.35
$ 5 2-Chlorophenol-d4	132	8.450	8.441	(0.965)	1538329	80.0000	70.37
4 Bis(2-Chloroethyl)ether	93	8.409	8.294	(0.960)	1619223	80.0000	65.40
6 2-Chlorophenol	128	8.479	8.464	(0.968)	1746773	80.0000	68.65
7 1,3-Dichlorobenzene	146	8.697	8.770	(0.993)	1802691	80.0000	66.74
* 8 1,4-Dichlorobenzene-d4	152	8.755	8.746	(1.000)	392272	20.0000	
9 1,4-Dichlorobenzene	146	8.779	8.770	(1.003)	1764443	80.0000	64.80
$ 10 1,2-Dichlorobenzene-d4	152	9.055	9.046	(1.034)	1025601	80.0000	67.08
12 1,2-Dichlorobenzene	146	9.079	9.070	(1.037)	1615741	80.0000	63.74
11 Benzyl alcohol	108	9.026	9.005	(1.031)	1211008	80.0000	73.51
14 2,2'-oxybis(1-Chloropropane)	45	9.272	9.263	(1.059)	1714670	80.0000	52.14
13 2-Methylphenol	108	9.243	9.216	(1.056)	1557158	80.0000	70.92
17 Hexachloroethane	117	9.566	9.563	(1.093)	790930	80.0000	69.10
16 N-Nitroso-di-n-propylamine	70	9.507	9.475	(1.086)	1230575	80.0000	69.10
15 4-Methylphenol	108	9.472	9.445	(1.082)	1327344	80.0000	62.72
$ 18 Nitrobenzene-d5	82	9.690	9.669	(0.897)	1773895	80.0000	71.07
19 Nitrobenzene	77	9.719	9.698	(0.899)	1671025	80.0000	63.51
20 Isophorone	82	10.101	10.074	(0.935)	2926175	80.0000	68.79
21 2-Nitrophenol	139	10.230	10.215	(0.947)	990399	80.0000	84.15
22 2,4-Dimethylphenol	107	10.306	10.291	(0.954)	1648958	80.0000	66.42
23 Bis(2-Chloroethoxy)methane	93	10.459	10.444	(0.968)	1848521	80.0000	63.94
24 Benzoic acid	105	10.653	10.509	(0.986)	3374268	160.000	160.5(M)
25 2,4-Dichlorophenol	162	10.606	10.591	(0.982)	1308421	80.0000	72.04
26 1,2,4-Trichlorobenzene	180	10.741	10.732	(0.994)	1360297	80.0000	66.59
* 27 Naphthalene-d8	136	10.806	10.797	(1.000)	1458996	20.0000	

Compounds	QUANT SIO MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	AMOUNTS ON-COL (ug/mL)
28 Naphthalene	128	10.841	10.832	(1.003)	3427843	80.0000	77.49
29 4-Chloroaniline	127	10.964	10.949	(1.015)	2044611	80.0000	68.59
30 Hexachlorobutadiene	225	11.140	11.137	(1.031)	709464	80.0000	66.43
31 4-Chloro-3-methylphenol	107	11.751	11.736	(1.088)	1413716	80.0000	69.22
32 2-Methylnaphthalene	141	11.963	11.954	(1.107)	2274905	80.0000	61.52
33 Hexachlorocyclopentadiene	237	12.333	12.330	(0.901)	784745	80.0000	85.74
34 2,4,6-Trichlorophenol	196	12.468	12.453	(0.911)	941368	80.0000	78.32
35 2,4,5-Trichlorophenol	196	12.521	12.512	(0.915)	997946	80.0000	76.20
$ 36 2-Fluorobiphenyl	172	12.597	12.588	(0.921)	2736591	80.0000	61.27
37 2-Chloronaphthalene	162	12.756	12.741	(0.932)	2271518	80.0000	60.74
38 2-Nitroaniline	65	12.973	12.958	(0.948)	928205	80.0000	74.19
39 Dimethylphthalate	163	13.338	13.317	(0.975)	3002956	80.0000	64.51
40 Acenaphthylene	152	13.437	13.428	(0.982)	3388062	80.0000	52.15
41 2,6-Dinitrotoluene	165	13.437	13.417	(0.982)	655663	80.0000	72.50
* 42 Acenaphthene-d10	164	13.684	13.681	(1.000)	788037	20.0000	
43 3-Nitroaniline	138	12.979	12.958	(0.948)	1185520	80.0000	80.83
44 Acenaphthene	153	13.743	13.734	(1.004)	2486555	80.0000	58.03
45 2,4-Dinitrophenol	184	13.837	13.804	(1.011)	764445	160.000	156.9
46 Dibenzofuran	168	14.007	13.992	(1.024)	3421048	80.0000	59.25
47 4-Nitrophenol	109	13.943	13.910	(1.019)	569791	80.0000	86.34(M)
48 2,4-Dinitrotoluene	165	14.078	14.057	(1.029)	1047843	80.0000	83.63
50 Diethylphthalate	149	14.489	14.480	(1.059)	3283689	80.0000	64.37
49 Fluorene	166	14.571	14.556	(1.065)	2404087	80.0000	52.86
51 4-Chlorophenyl-phenylether	204	14.571	14.562	(1.065)	1117849	80.0000	56.67
52 4-Nitroaniline	138	14.694	14.644	(1.074)	1049038	80.0000	82.57
53 4,6-Dinitro-2-methylphenol	198	14.759	14.721	(0.917)	1164246	160.000	157.0
54 N-Nitrosodiphenylamine	169	14.789	14.762	(0.919)	1853780	80.0000	64.69
$ 55 2,4,6-Tribromophenol	330	14.994	14.979	(1.096)	334952	80.0000	82.01
56 4-Bromophenyl-phenylether	248	15.364	15.355	(0.955)	765328	80.0000	68.91
57 Hexachlorobenzene	284	15.605	15.596	(0.970)	739297	80.0000	65.72
58 Pentachlorophenol	266	15.899	15.884	(0.988)	540442	80.0000	87.08
* 59 Phenanthrene-d10	188	16.087	16.084	(1.000)	1211395	20.0000	
60 Phenanthrene	178	16.134	16.119	(1.003)	3556114	80.0000	54.76
61 Anthracene	178	16.210	16.189	(1.008)	3527990	80.0000	54.83
62 Carbazole	167	16.474	16.460	(1.024)	2401426	80.0000	64.17
63 Di-n-butylphthalate	149	17.150	17.141	(1.066)	4081191	80.0000	52.80
64 Fluoranthene	202	18.090	18.075	(1.125)	3646435	80.0000	57.53
65 Pyrene	202	18.454	18.439	(0.902)	3788639	80.0000	60.17
$ 66 Terphenyl-d14	244	18.730	18.721	(0.916)	2323726	80.0000	68.95
67 Butylbenzylphthalate	149	19.594	19.585	(0.958)	2276316	80.0000	68.20
68 Benzo(a)anthracene	228	20.428	20.413	(0.999)	3466874	80.0000	63.02
* 69 Chrysene-d12	240	20.451	20.436	(1.000)	967541	20.0000	
70 3,3'-Dichlorobenzidine	252	20.410	20.395	(0.998)	1369904	80.0000	71.77
71 Chrysene	228	20.504	20.478	(1.003)	3428743	80.0000	62.08
72 bis(2-Ethylhexyl)phthalate	149	20.575	20.566	(0.957)	3047818	80.0000	73.68
* 134 Di-n-octylphthalate-d4	153	21.509	21.506	(1.000)	1473432	20.0000	
73 Di-n-octylphthalate	149	21.526	21.517	(1.001)	4401193	80.0000	58.64

Compounds	QUANT SIG MASS	RT	EXP RT	REL RT	RESPONSE	AMOUNTS CAL-AMT (ug/mL)	AMOUNTS ON-COL (ug/mL)
74 Benzo(b)fluoranthene	252	22.108	22.081	(0.976)	4533551	80.0000	71.59
75 Benzo(k)fluoranthene	252	22.143	22.117	(0.977)	3395831	80.0000	70.12
76 Benzo(a)pyrene	252	22.584	22.557	(0.997)	3900337	80.0000	67.08
* 77 Perylene-d12	264	22.654	22.645	(1.000)	1073306	20.0000	
78 Indeno(1,2,3-cd)pyrene	276	24.569	24.519	(1.085)	4735325	80.0000	75.67(M)
79 Dibenzo(a,h)anthracene	278	24.593	24.543	(1.086)	3612168	80.0000	75.54(M)
80 Benzo(g,h,i)perylene	276	25.122	25.060	(1.109)	4190727	80.0000	75.37
90 N-Nitrosodimethylamine	74	4.373	4.335	(0.499)	1131543	80.0000	73.18
103 Pyridine	79	4.314	4.305	(0.493)	2115692	80.0000	75.78
91 Aniline	93	8.315	8.294	(0.950)	2089575	80.0000	60.11
105 1-methylnaphthalene	141	12.139	12.130	(1.123)	2229965	80.0000	60.22
93 Benzidine	184	18.313	18.298	(0.895)	1989949	80.0000	72.53
111 Azobenzene (1,2-DP-Hydrazine)	77	14.830	14.815	(1.084)	2367118	80.0000	53.74
143 1,4-Dioxane	88	3.592	3.571	(0.410)	767195	80.0000	73.04
$ 137 d8-1,4-Dioxane	96	3.527	3.501	(0.403)	755202	80.0000	73.99
151 1,2,4,5-Tetrachlorobenzene	216	12.298	12.289	(0.899)	1235476	80.0000	64.66
120 2,3,4,6-Tetrachlorophenol	232	14.277	14.268	(1.043)	741926	80.0000	79.11
144 alpha-Terpineol	59	10.847	10.832	(1.004)	551948	80.0000	51.23
98 Retone	219	18.995	18.985	(0.929)	1868467	80.0000	70.93
133 Butylatedhydroxytoluene	205	13.831	13.816	(1.011)	1862853	80.0000	51.81
115 Tributyl Phosphate	99	14.853	14.826	(0.923)	3033348	80.0000	51.02
116 Dibutyl Phenyl Phosphate	175	16.586	16.577	(1.031)	2526729	80.0000	65.19
117 Butyl Diphenyl Phosphate	94	18.296	18.286	(0.895)	804045	80.0000	61.15
118 Triphenyl Phosphate	326	19.923	19.914	(0.974)	718736	80.0000	78.26
123 Acetophenone	105	9.449	9.428	(0.874)	2648140	80.0000	58.15
179 n-Decane	57	8.556	8.547	(0.977)	1396130	80.0000	53.62
180 n-Octadecane	57	15.934	15.931	(0.990)	1425298	80.0000	47.40
168 Pentachlorobenzene	250	14.048	14.033	(1.027)	938248	80.0000	67.60
113 Diphenyl Oxide	170	12.920	12.911	(0.944)	1823829	80.0000	65.78
112 Biphenyl	154	12.738	12.729	(0.931)	2552941	80.0000	51.08

QC Flag Legend

M - Compound response manually integrated.

Melissa Swanson

From: Chris Ransom
Sent: Wednesday, February 10, 2010 12:29 PM
To: Melissa Swanson
Subject: FW: Windward Chinook SDG QC62

Attachments: PC42-COC.pdf

PC42-COC.pdf (1 MB)

-----Original Message-----
From: Sue Dunnihoo [mailto:sue@arilabs.com]
Sent: Wednesday, February 10, 2010 9:51 AM
To: Chris Ransom
Subject: Re: Windward Chinook SDG QC62

Here's the cooler receipt, and better copies of the COCs :)

Chris Ransom wrote:
> Hi Sue,
>
> The level 7 standard for the SVOC ICAL (80 ug/l 1/4/10, inst NT4) was
> not included in the data package. Could you send that over?
>
> Also, there wasn't a sample receipt log-in with the COC - do you have
> one of those you could send as well. Just out of curiosity, do you
> guys do any kind of special documentation when samples are placed in
> frozen archive? Like perhaps a freezer log-in form? The question
> seems to be coming up more often lately as to how we verify that
> samples have been kept frozen.
>
> Thanks
>
> Chris
>
>

--

Susan D. Dunnihoo
Director, Client Services
ANALYTICAL RESOURCES, INC.
206-695-6207
sue@arilabs.com
www.arilabs.com

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If you have received this correspondence in error, please notify sender immediately. Thank you.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Windward
COC No(s): 24816 -24819 (NA)
Assigned ARI Job No: PC42

Project Name: Windward Ew RI/FS Fish + Crab Sampl
Delivered by: Fed-Ex UPS Courier (Hand) Delivered Other:
Tracking No: (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... In Freezer
If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: N/A

Cooler Accepted by: JH Date: 6/11/09 Time: 1700

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	(NA)	YES	NO
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO

Samples Logged by: MM Date: 6/12/09 Time: 1131

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles < 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • • •	• • •

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

APPENDIX D

Laboratory Report Forms

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: EW09-CHN-H-Comp01
SAMPLE

Lab Sample ID: QC62D
LIMS ID: 09-31490
Matrix: Tissue
Data Release Authorized
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-as-rec	Q
3050B	12/29/09	200.8	01/05/10	7440-36-0	Antimony	0.004	0.004	U
3050B	12/29/09	200.8	01/05/10	**7440-38-2**	**Arsenic**	0.004	**0.552**	
3050B	12/29/09	6010B	12/31/09	7440-43-9	Cadmium	0.04	0.04	U
3050B	12/29/09	6010B	12/31/09	**7440-47-3**	**Chromium**	0.1	**0.2**	
3050B	12/29/09	6010B	12/31/09	**7440-48-4**	**Cobalt**	0.06	**0.10**	
3050B	12/29/09	6010B	12/31/09	**7440-50-8**	**Copper**	0.04	**1.00**	
3050B	12/29/09	6010B	12/31/09	7439-92-1	Lead	0.4	0.4	U
CLP-M	12/29/09	7471A	12/31/09	**7439-97-6**	**Mercury**	0.005	**0.012**	
3050B	12/29/09	6010B	12/31/09	**7439-98-7**	**Molybdenum**	0.1	**0.2**	
3050B	12/29/09	6010B	12/31/09	7440-02-0	Nickel	0.2	0.2	U
3050B	12/29/09	200.8	01/05/10	**7782-49-2**	**Selenium**	0.01	**0.37**	
3050B	12/29/09	6010B	12/31/09	7440-22-4	Silver	0.06	0.06	U
3050B	12/29/09	200.8	01/05/10	7440-28-0	Thallium	0.004	0.004	U
3050B	12/29/09	6010B	12/31/09	**7440-62-2**	**Vanadium**	0.06	**0.08**	
3050B	12/29/09	6010B	12/31/09	**7440-66-6**	**Zinc**	0.2	**38.2**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: EW09-CHN-H-Comp02
SAMPLE

Lab Sample ID: QC62E
LIMS ID: 09-31491
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-as-rec	Q
3050B	12/29/09	200.8	01/05/10	7440-36-0	Antimony	0.004	0.004	U
3050B	12/29/09	200.8	01/05/10	**7440-38-2**	**Arsenic**	0.004	**0.504**	
3050B	12/29/09	6010B	12/31/09	7440-43-9	Cadmium	0.04	0.04	U
3050B	12/29/09	6010B	12/31/09	**7440-47-3**	**Chromium**	0.1	**0.2**	
3050B	12/29/09	6010B	12/31/09	**7440-48-4**	**Cobalt**	0.06	**0.12**	
3050B	12/29/09	6010B	12/31/09	**7440-50-8**	**Copper**	0.04	**1.46**	
3050B	12/29/09	6010B	12/31/09	7439-92-1	Lead	0.4	0.4	U
CLP-M	12/29/09	7471A	12/31/09	**7439-97-6**	**Mercury**	0.005	**0.010**	
3050B	12/29/09	6010B	12/31/09	**7439-98-7**	**Molybdenum**	0.1	**0.2**	
3050B	12/29/09	6010B	12/31/09	7440-02-0	Nickel	0.2	0.2	U
3050B	12/29/09	200.8	01/05/10	**7782-49-2**	**Selenium**	0.01	**0.35**	
3050B	12/29/09	6010B	12/31/09	7440-22-4	Silver	0.06	0.06	U
3050B	12/29/09	200.8	01/05/10	7440-28-0	Thallium	0.004	0.004	U
3050B	12/29/09	6010B	12/31/09	7440-62-2	Vanadium	0.06	0.06	U
3050B	12/29/09	6010B	12/31/09	**7440-66-6**	**Zinc**	0.2	**39.2**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: EW09-CHN-H-Comp03
SAMPLE

Lab Sample ID: QC62F
LIMS ID: 09-31492
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-as-rec	Q
3050B	12/29/09	200.8	01/05/10	7440-36-0	Antimony	0.004	0.004	U
3050B	12/29/09	200.8	01/05/10	**7440-38-2**	**Arsenic**	0.004	**0.500**	
3050B	12/29/09	6010B	12/31/09	7440-43-9	Cadmium	0.04	0.04	U
3050B	12/29/09	6010B	12/31/09	**7440-47-3**	**Chromium**	0.1	**0.2**	
3050B	12/29/09	6010B	12/31/09	**7440-48-4**	**Cobalt**	0.06	**0.11**	
3050B	12/29/09	6010B	12/31/09	**7440-50-8**	**Copper**	0.04	**1.01**	
3050B	12/29/09	6010B	12/31/09	7439-92-1	Lead	0.4	0.4	U
CLP-M	12/29/09	7471A	12/31/09	**7439-97-6**	**Mercury**	0.005	**0.012**	
3050B	12/29/09	6010B	12/31/09	**7439-98-7**	**Molybdenum**	0.1	**0.2**	
3050B	12/29/09	6010B	12/31/09	7440-02-0	Nickel	0.2	0.2	U
3050B	12/29/09	200.8	01/05/10	**7782-49-2**	**Selenium**	0.01	**0.37**	
3050B	12/29/09	6010B	12/31/09	7440-22-4	Silver	0.06	0.06	U
3050B	12/29/09	200.8	01/05/10	7440-28-0	Thallium	0.004	0.004	U
3050B	12/29/09	6010B	12/31/09	**7440-62-2**	**Vanadium**	0.06	**0.06**	
3050B	12/29/09	6010B	12/31/09	**7440-66-6**	**Zinc**	0.2	**37.8**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: EW09-CHN-W-Comp01
SAMPLE

Lab Sample ID: QF82A
LIMS ID: 10-1036
Matrix: Tissue
Data Release Authorized:
Reported: 01/28/10

QC Report No: QF82-Windward Environmental, LLC
Project: EW RI/FS Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-as-rec	Q
3050B	01/21/10	200.8	01/27/10	7440-36-0	Antimony	0.008	0.008	U
3050B	01/21/10	200.8	01/25/10	**7440-38-2**	**Arsenic**	0.004	**0.203**	
3050B	01/21/10	6010B	01/22/10	7440-43-9	Cadmium	0.04	0.04	U
3050B	01/21/10	6010B	01/22/10	**7440-47-3**	**Chromium**	0.1	**0.3**	
3050B	01/21/10	6010B	01/22/10	7440-48-4	Cobalt	0.06	0.06	U
3050B	01/21/10	6010B	01/22/10	**7440-50-8**	**Copper**	0.04	**2.02**	
3050B	01/21/10	6010B	01/22/10	7439-92-1	Lead	0.4	0.4	U
3050B	01/21/10	6010B	01/22/10	**7439-98-7**	**Molybdenum**	0.1	**0.2**	
3050B	01/21/10	6010B	01/22/10	7440-02-0	Nickel	0.2	0.2	U
3050B	01/21/10	200.8	01/25/10	**7782-49-2**	**Selenium**	0.01	**0.36**	
3050B	01/21/10	6010B	01/22/10	7440-22-4	Silver	0.06	0.06	U
3050B	01/21/10	200.8	01/27/10	7440-28-0	Thallium	0.008	0.008	U
3050B	01/21/10	6010B	01/22/10	7440-62-2	Vanadium	0.06	0.06	U
3050B	01/21/10	6010B	01/22/10	**7440-66-6**	**Zinc**	0.2	**46.2**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: EW09-CHN-W-Comp01
SAMPLE

Lab Sample ID: QC62A
LIMS ID: 09-31487
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-as-rec	Q
CLP-M	12/29/09	7471A	12/31/09	**7439-97-6**	**Mercury**	0.005	**0.043**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: EW09-CHN-W-Comp02
SAMPLE

Lab Sample ID: QC62B
LIMS ID: 09-31488
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-as-rec	Q
3050B	12/29/09	200.8	01/05/10	7440-36-0	Antimony	0.004	0.004	U
3050B	12/29/09	200.8	01/05/10	**7440-38-2**	**Arsenic**	0.004	**0.463**	
3050B	12/29/09	6010B	12/31/09	7440-43-9	Cadmium	0.04	0.04	U
3050B	12/29/09	6010B	12/31/09	**7440-47-3**	**Chromium**	0.1	**0.4**	
3050B	12/29/09	6010B	12/31/09	**7440-48-4**	**Cobalt**	0.07	**0.09**	
3050B	12/29/09	6010B	12/31/09	**7440-50-8**	**Copper**	0.04	**1.08**	
3050B	12/29/09	6010B	12/31/09	7439-92-1	Lead	0.4	0.4	U
CLP-M	12/29/09	7471A	12/31/09	**7439-97-6**	**Mercury**	0.005	**0.014**	
3050B	12/29/09	6010B	12/31/09	**7439-98-7**	**Molybdenum**	0.1	**0.2**	
3050B	12/29/09	6010B	12/31/09	7440-02-0	Nickel	0.2	0.2	U
3050B	12/29/09	200.8	01/05/10	**7782-49-2**	**Selenium**	0.01	**0.35**	
3050B	12/29/09	6010B	12/31/09	7440-22-4	Silver	0.07	0.07	U
3050B	12/29/09	200.8	01/05/10	7440-28-0	Thallium	0.004	0.004	U
3050B	12/29/09	6010B	12/31/09	7440-62-2	Vanadium	0.07	0.07	U
3050B	12/29/09	6010B	12/31/09	**7440-66-6**	**Zinc**	0.2	**36.7**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: EW09-CHN-W-Comp03
SAMPLE

Lab Sample ID: QC62C
LIMS ID: 09-31489
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-as-rec	Q
3050B	12/29/09	200.8	01/05/10	7440-36-0	Antimony	0.004	0.004	U
3050B	12/29/09	200.8	01/05/10	**7440-38-2**	**Arsenic**	0.004	**0.424**	
3050B	12/29/09	6010B	12/31/09	7440-43-9	Cadmium	0.04	0.04	U
3050B	12/29/09	6010B	12/31/09	**7440-47-3**	**Chromium**	0.1	**0.3**	
3050B	12/29/09	6010B	12/31/09	**7440-48-4**	**Cobalt**	0.06	**0.08**	
3050B	12/29/09	6010B	12/31/09	**7440-50-8**	**Copper**	0.04	**1.29**	
3050B	12/29/09	6010B	12/31/09	7439-92-1	Lead	0.4	0.4	U
CLP-M	12/29/09	7471A	12/31/09	**7439-97-6**	**Mercury**	0.005	**0.015**	
3050B	12/29/09	6010B	12/31/09	**7439-98-7**	**Molybdenum**	0.1	**0.2**	
3050B	12/29/09	6010B	12/31/09	7440-02-0	Nickel	0.2	0.2	U
3050B	12/29/09	200.8	01/05/10	**7782-49-2**	**Selenium**	0.01	**0.35**	
3050B	12/29/09	6010B	12/31/09	7440-22-4	Silver	0.06	0.06	U
3050B	12/29/09	200.8	01/05/10	7440-28-0	Thallium	0.004	0.004	U
3050B	12/29/09	6010B	12/31/09	7440-62-2	Vanadium	0.06	0.06	U
3050B	12/29/09	6010B	12/31/09	**7440-66-6**	**Zinc**	0.2	**35.4**	

U-Analyte undetected at given RL
RL-Reporting Limit

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Anchor Environmental	**Service Request:**	K1000029
Project No.:	NA	**Date Collected:**	06/10/09
Project Name:	EW RI/FS Chinook Sampling	**Date Received:**	09/18/09
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	WET

Sample Name: EW09-CHN-SC-Comp-01 **Lab Code:** K1000029-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Antimony	6020	0.034	0.005	5.0	01/30/10	02/02/10	0.072		
Arsenic	6020	0.344	0.0413	5.0	01/30/10	02/02/10	5.1800		
Cadmium	6020	0.0138	0.0034	5.0	01/30/10	02/02/10	0.712		
Chromium	6010B	0.138	0.055	1.0	01/30/10	02/03/10	2.320		
Cobalt	6020	0.014	0.001	5.0	01/30/10	02/02/10	0.563		
Copper	6020	0.0688	0.0206	5.0	01/30/10	02/02/10	25.2		
Lead	6020	0.0138	0.0014	5.0	01/30/10	02/02/10	2.93000		
Molybdenum	6020	0.03	0.01	5.0	01/30/10	02/02/10	0.60		
Nickel	6020	0.138	0.0138	5.0	01/30/10	02/02/10	1.9600		
Selenium	7740	0.69	0.21	10.0	01/30/10	02/01/10	1.73		
Silver	6020	0.0138	0.0014	5.0	01/30/10	02/02/10	0.139		
Thallium	6020	0.014	0.001	5.0	01/30/10	02/02/10	0.008	J	
Vanadium	6020	0.138	0.021	5.0	01/30/10	02/02/10	2.150		
Zinc	6020	0.344	0.041	5.0	01/30/10	02/02/10	122		

Comments:

BUTYLTINS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by Krone 1988 SIM GC/MS

Sample ID: EW09-CHN-H-Comp01
SAMPLE

Lab Sample ID: QC62D
LIMS ID: 09-31490
Matrix: Tissue
Data Release Authorized: VTS
Reported: 01/02/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
Event: 08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 12/30/09 17:01
Instrument/Analyst: NT8/YZ
Silica Gel Cleanup: No

Sample Amount: 5.19 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	7.4	< 7.4	U
14488-53-0	Dibutyltin Ion	11	< 11	U
78763-54-9	Butyltin Ion	7.9	< 7.9	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	84.1%
Tripentyl Tin Chloride	55.7%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by Krone 1988 SIM GC/MS

Sample ID: EW09-CHN-H-Comp02
SAMPLE

Lab Sample ID: QC62E
LIMS ID: 09-31491
Matrix: Tissue
Data Release Authorized: VT
Reported: 01/02/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
Event: 08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 12/30/09 17:14
Instrument/Analyst: NT8/YZ
Silica Gel Cleanup: No

Sample Amount: 5.26 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	7.4	< 7.4	U
14488-53-0	Dibutyltin Ion	11	< 11	U
78763-54-9	Butyltin Ion	7.8	< 7.8	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	83.0%
Tripentyl Tin Chloride	55.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by Krone 1988 SIM GC/MS

Sample ID: EW09-CHN-H-Comp03
SAMPLE

Lab Sample ID: QC62F
LIMS ID: 09-31492
Matrix: Tissue
Data Release Authorized: VTS
Reported: 01/02/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
Event: 08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 12/30/09 17:27
Instrument/Analyst: NT8/YZ
Silica Gel Cleanup: No

Sample Amount: 5.63 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	6.9	< 6.9	U
14488-53-0	Dibutyltin Ion	10	< 10	U
78763-54-9	Butyltin Ion	7.3	< 7.3	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	81.5%
Tripentyl Tin Chloride	55.3%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by Krone 1988 SIM GC/MS

Sample ID: EW09-CHN-W-Comp02
SAMPLE

Lab Sample ID: QC62B
LIMS ID: 09-31488
Matrix: Tissue
Data Release Authorized: VT
Reported: 01/02/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
Event: 08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 12/30/09 16:35
Instrument/Analyst: NT8/YZ
Silica Gel Cleanup: No

Sample Amount: 5.81 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	6.7	< 6.7	U
14488-53-0	Dibutyltin Ion	9.9	< 9.9	U
78763-54-9	Butyltin Ion	7.0	< 7.0	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	90.9%
Tripentyl Tin Chloride	58.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Tributyl Tins by Krone 1988 SIM GC/MS

Sample ID: EW09-CHN-W-Comp03
SAMPLE

Lab Sample ID: QC62C
LIMS ID: 09-31489
Matrix: Tissue
Data Release Authorized: VT
Reported: 01/02/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
Event: 08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 12/30/09 16:48
Instrument/Analyst: NT8/YZ
Silica Gel Cleanup: No

Sample Amount: 5.46 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 1.00
Alumina Cleanup: Yes

CAS Number	Analyte	RL	Result	Q
36643-28-4	Tributyltin Ion	7.1	< 7.1	U
14488-53-0	Dibutyltin Ion	11	< 11	U
78763-54-9	Butyltin Ion	7.5	< 7.5	U

Reported in µg/kg (ppb)

TBT Surrogate Recovery

Tripropyl Tin Chloride	87.1%
Tripentyl Tin Chloride	57.4%

FORM I

SVOCs

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp01
SAMPLE

Lab Sample ID: QC62D
LIMS ID: 09-31490
Matrix: Tissue
Data Release Authorized:
Reported: 01/07/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 01/05/10 19:43
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 25.2 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: NA
Lipids: 1.54 %

CAS Number	Analyte	RL	Result
108-95-2	Phenol	120	< 120 U
111-44-4	Bis-(2-Chloroethyl) Ether	120	< 120 U
95-57-8	2-Chlorophenol	120	< 120 U
541-73-1	1,3-Dichlorobenzene	120	< 120 U
106-46-7	1,4-Dichlorobenzene	120	< 120 U
100-51-6	Benzyl Alcohol	600	< 600 U
95-50-1	1,2-Dichlorobenzene	120	< 120 U
95-48-7	2-Methylphenol	120	< 120 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	120	< 120 U
106-44-5	4-Methylphenol	120	< 120 U
621-64-7	N-Nitroso-Di-N-Propylamine	600	< 600 U
67-72-1	Hexachloroethane	120	< 120 U
98-95-3	Nitrobenzene	120	< 120 U
78-59-1	Isophorone	120	< 120 U
88-75-5	2-Nitrophenol	600	< 600 U
105-67-9	2,4-Dimethylphenol	120	< 120 U
65-85-0	Benzoic Acid	1,200	< 1,200 U
111-91-1	bis(2-Chloroethoxy) Methane	120	< 120 U
120-83-2	2,4-Dichlorophenol	600	< 600 U
120-82-1	1,2,4-Trichlorobenzene	120	< 120 U
91-20-3	Naphthalene	120	< 120 U
106-47-8	4-Chloroaniline	600	< 600 U
87-68-3	Hexachlorobutadiene	120	< 120 U
59-50-7	4-Chloro-3-methylphenol	600	< 600 U
91-57-6	2-Methylnaphthalene	120	< 120 U
77-47-4	Hexachlorocyclopentadiene	600	< 600 U
88-06-2	2,4,6-Trichlorophenol	600	< 600 U
95-95-4	2,4,5-Trichlorophenol	600	< 600 U
91-58-7	2-Chloronaphthalene	120	< 120 U
88-74-4	2-Nitroaniline	600	< 600 U
131-11-3	Dimethylphthalate	120	< 120 U
208-96-8	Acenaphthylene	120	< 120 U
99-09-2	3-Nitroaniline	600	< 600 U
83-32-9	Acenaphthene	120	< 120 U
51-28-5	2,4-Dinitrophenol	1,200	< 1,200 U
100-02-7	4-Nitrophenol	600	< 600 U
132-64-9	Dibenzofuran	120	< 120 U
606-20-2	2,6-Dinitrotoluene	600	< 600 U
121-14-2	2,4-Dinitrotoluene	600	< 600 U
84-66-2	Diethylphthalate	120	< 120 U
7005-72-3	4-Chlorophenyl-phenylether	120	< 120 U
86-73-7	Fluorene	120	< 120 U
100-01-6	4-Nitroaniline	600	< 600 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp01
SAMPLE

Lab Sample ID: QC62D
LIMS ID: 09-31490
Matrix: Tissue
Date Analyzed: 01/05/10 19:43

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

CAS Number	Analyte	RL	Result
534-52-1	4,6-Dinitro-2-Methylphenol	1,200	< 1,200 U
86-30-6	N-Nitrosodiphenylamine	120	< 120 U
101-55-3	4-Bromophenyl-phenylether	120	< 120 U
118-74-1	Hexachlorobenzene	120	< 120 U
87-86-5	Pentachlorophenol	600	< 600 U
85-01-8	Phenanthrene	120	< 120 U
86-74-8	Carbazole	120	< 120 U
120-12-7	Anthracene	120	< 120 U
84-74-2	Di-n-Butylphthalate	120	< 120 U
206-44-0	Fluoranthene	120	< 120 U
129-00-0	Pyrene	120	< 120 U
85-68-7	Butylbenzylphthalate	120	< 120 U
91-94-1	3,3'-Dichlorobenzidine	600	< 600 U
56-55-3	Benzo(a)anthracene	120	< 120 U
117-81-7	bis(2-Ethylhexyl)phthalate	120	< 120 U
218-01-9	Chrysene	120	< 120 U
117-84-0	Di-n-Octyl phthalate	120	< 120 U
205-99-2	Benzo(b)fluoranthene	120	< 120 U
207-08-9	Benzo(k)fluoranthene	120	< 120 U
50-32-8	Benzo(a)pyrene	120	< 120 U
193-39-5	Indeno(1,2,3-cd)pyrene	120	< 120 U
53-70-3	Dibenz(a,h)anthracene	120	< 120 U
191-24-2	Benzo(g,h,i)perylene	120	< 120 U
62-53-3	Aniline	120	< 120 U
62-75-9	N-Nitrosodimethylamine	600	< 600 U
90-12-0	1-Methylnaphthalene	120	< 120 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	72.7%	2-Fluorobiphenyl	85.7%
d14-p-Terphenyl	52.6%	d4-1,2-Dichlorobenzene	67.0%
d5-Phenol	85.3%	2-Fluorophenol	67.8%
2,4,6-Tribromophenol	103%	d4-2-Chlorophenol	69.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp02
SAMPLE

Lab Sample ID: QC62E
LIMS ID: 09-31491
Matrix: Tissue
Data Release Authorized:
Reported: 01/07/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 01/05/10 20:16
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 25.5 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: NA
Lipids: 1.68 %

CAS Number	Analyte	RL	Result
108-95-2	Phenol	120	< 120 U
111-44-4	Bis-(2-Chloroethyl) Ether	120	< 120 U
95-57-8	2-Chlorophenol	120	< 120 U
541-73-1	1,3-Dichlorobenzene	120	< 120 U
106-46-7	1,4-Dichlorobenzene	120	< 120 U
100-51-6	Benzyl Alcohol	590	< 590 U
95-50-1	1,2-Dichlorobenzene	120	< 120 U
95-48-7	2-Methylphenol	120	< 120 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	120	< 120 U
106-44-5	4-Methylphenol	120	< 120 U
621-64-7	N-Nitroso-Di-N-Propylamine	590	< 590 U
67-72-1	Hexachloroethane	120	< 120 U
98-95-3	Nitrobenzene	120	< 120 U
78-59-1	Isophorone	120	< 120 U
88-75-5	2-Nitrophenol	590	< 590 U
105-67-9	2,4-Dimethylphenol	120	< 120 U
65-85-0	Benzoic Acid	1,200	< 1,200 U
111-91-1	bis(2-Chloroethoxy) Methane	120	< 120 U
120-83-2	2,4-Dichlorophenol	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	120	< 120 U
91-20-3	Naphthalene	120	< 120 U
106-47-8	4-Chloroaniline	590	< 590 U
87-68-3	Hexachlorobutadiene	120	< 120 U
59-50-7	4-Chloro-3-methylphenol	590	< 590 U
91-57-6	2-Methylnaphthalene	120	< 120 U
77-47-4	Hexachlorocyclopentadiene	590	< 590 U
88-06-2	2,4,6-Trichlorophenol	590	< 590 U
95-95-4	2,4,5-Trichlorophenol	590	< 590 U
91-58-7	2-Chloronaphthalene	120	< 120 U
88-74-4	2-Nitroaniline	590	< 590 U
131-11-3	Dimethylphthalate	120	< 120 U
208-96-8	Acenaphthylene	120	< 120 U
99-09-2	3-Nitroaniline	590	< 590 U
83-32-9	Acenaphthene	120	< 120 U
51-28-5	2,4-Dinitrophenol	1,200	< 1,200 U
100-02-7	4-Nitrophenol	590	< 590 U
132-64-9	Dibenzofuran	120	< 120 U
606-20-2	2,6-Dinitrotoluene	590	< 590 U
121-14-2	2,4-Dinitrotoluene	590	< 590 U
84-66-2	Diethylphthalate	120	< 120 U
7005-72-3	4-Chlorophenyl-phenylether	120	< 120 U
86-73-7	Fluorene	120	< 120 U
100-01-6	4-Nitroaniline	590	< 590 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp02
SAMPLE

Lab Sample ID: QC62E
LIMS ID: 09-31491
Matrix: Tissue
Date Analyzed: 01/05/10 20:16

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

CAS Number	Analyte	RL	Result
534-52-1	4,6-Dinitro-2-Methylphenol	1,200	< 1,200 U
86-30-6	N-Nitrosodiphenylamine	120	< 120 U
101-55-3	4-Bromophenyl-phenylether	120	< 120 U
118-74-1	Hexachlorobenzene	120	< 120 U
87-86-5	Pentachlorophenol	590	< 590 U
85-01-8	Phenanthrene	120	< 120 U
86-74-8	Carbazole	120	< 120 U
120-12-7	Anthracene	120	< 120 U
84-74-2	Di-n-Butylphthalate	120	< 120 U
206-44-0	Fluoranthene	120	< 120 U
129-00-0	Pyrene	120	< 120 U
85-68-7	Butylbenzylphthalate	120	< 120 U
91-94-1	3,3'-Dichlorobenzidine	590	< 590 U
56-55-3	Benzo(a)anthracene	120	< 120 U
117-81-7	bis(2-Ethylhexyl)phthalate	120	< 120 U
218-01-9	Chrysene	120	< 120 U
117-84-0	Di-n-Octyl phthalate	120	< 120 U
205-99-2	Benzo(b)fluoranthene	120	< 120 U
207-08-9	Benzo(k)fluoranthene	120	< 120 U
50-32-8	Benzo(a)pyrene	120	< 120 U
193-39-5	Indeno(1,2,3-cd)pyrene	120	< 120 U
53-70-3	Dibenz(a,h)anthracene	120	< 120 U
191-24-2	Benzo(g,h,i)perylene	120	< 120 U
62-53-3	Aniline	120	< 120 U
62-75-9	N-Nitrosodimethylamine	590	< 590 U
90-12-0	1-Methylnaphthalene	120	< 120 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	69.6%	2-Fluorobiphenyl	79.7%
d14-p-Terphenyl	47.0%	d4-1,2-Dichlorobenzene	67.9%
d5-Phenol	87.8%	2-Fluorophenol	64.5%
2,4,6-Tribromophenol	97.3%	d4-2-Chlorophenol	69.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp02
DILUTION

Lab Sample ID: QC62E
LIMS ID: 09-31491
Matrix: Tissue
Data Release Authorized:
Reported: 01/07/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 01/06/10 16:19
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 25.5 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: NA
Lipids: 1.68 %

CAS Number	Analyte	RL	Result
108-95-2	Phenol	200	< 200 U
111-44-4	Bis-(2-Chloroethyl) Ether	200	< 200 U
95-57-8	2-Chlorophenol	200	< 200 U
541-73-1	1,3-Dichlorobenzene	200	< 200 U
106-46-7	1,4-Dichlorobenzene	200	< 200 U
100-51-6	Benzyl Alcohol	980	< 980 U
95-50-1	1,2-Dichlorobenzene	200	< 200 U
95-48-7	2-Methylphenol	200	< 200 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	200	< 200 U
106-44-5	4-Methylphenol	200	< 200 U
621-64-7	N-Nitroso-Di-N-Propylamine	980	< 980 U
67-72-1	Hexachloroethane	200	< 200 U
98-95-3	Nitrobenzene	200	< 200 U
78-59-1	Isophorone	200	< 200 U
88-75-5	2-Nitrophenol	980	< 980 U
105-67-9	2,4-Dimethylphenol	200	< 200 U
65-85-0	Benzoic Acid	2,000	< 2,000 U
111-91-1	bis(2-Chloroethoxy) Methane	200	< 200 U
120-83-2	2,4-Dichlorophenol	980	< 980 U
120-82-1	1,2,4-Trichlorobenzene	200	< 200 U
91-20-3	Naphthalene	200	< 200 U
106-47-8	4-Chloroaniline	980	< 980 U
87-68-3	Hexachlorobutadiene	200	< 200 U
59-50-7	4-Chloro-3-methylphenol	980	< 980 U
91-57-6	2-Methylnaphthalene	200	< 200 U
77-47-4	Hexachlorocyclopentadiene	980	< 980 U
88-06-2	2,4,6-Trichlorophenol	980	< 980 U
95-95-4	2,4,5-Trichlorophenol	980	< 980 U
91-58-7	2-Chloronaphthalene	200	< 200 U
88-74-4	2-Nitroaniline	980	< 980 U
131-11-3	Dimethylphthalate	200	< 200 U
208-96-8	Acenaphthylene	200	< 200 U
99-09-2	3-Nitroaniline	980	< 980 U
83-32-9	Acenaphthene	200	< 200 U
51-28-5	2,4-Dinitrophenol	2,000	< 2,000 U
100-02-7	4-Nitrophenol	980	< 980 U
132-64-9	Dibenzofuran	200	< 200 U
606-20-2	2,6-Dinitrotoluene	980	< 980 U
121-14-2	2,4-Dinitrotoluene	980	< 980 U
84-66-2	Diethylphthalate	200	< 200 U
7005-72-3	4-Chlorophenyl-phenylether	200	< 200 U
86-73-7	Fluorene	200	< 200 U
100-01-6	4-Nitroaniline	980	< 980 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp02
DILUTION

Lab Sample ID: QC62E
LIMS ID: 09-31491
Matrix: Tissue
Date Analyzed: 01/06/10 16:19

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

CAS Number	Analyte	RL	Result
534-52-1	4,6-Dinitro-2-Methylphenol	2,000	< 2,000 U
86-30-6	N-Nitrosodiphenylamine	200	< 200 U
101-55-3	4-Bromophenyl-phenylether	200	< 200 U
118-74-1	Hexachlorobenzene	200	< 200 U
87-86-5	Pentachlorophenol	980	< 980 U
85-01-8	Phenanthrene	200	< 200 U
86-74-8	Carbazole	200	< 200 U
120-12-7	Anthracene	200	< 200 U
84-74-2	Di-n-Butylphthalate	200	< 200 U
206-44-0	Fluoranthene	200	< 200 U
129-00-0	Pyrene	200	< 200 U
85-68-7	Butylbenzylphthalate	200	< 200 U
91-94-1	3,3'-Dichlorobenzidine	980	< 980 U
56-55-3	Benzo(a)anthracene	200	< 200 U
117-81-7	bis(2-Ethylhexyl)phthalate	200	< 200 U
218-01-9	Chrysene	200	< 200 U
117-84-0	Di-n-Octyl phthalate	200	< 200 U
205-99-2	Benzo(b)fluoranthene	200	< 200 U
207-08-9	Benzo(k)fluoranthene	200	< 200 U
50-32-8	Benzo(a)pyrene	200	< 200 U
193-39-5	Indeno(1,2,3-cd)pyrene	200	< 200 U
53-70-3	Dibenz(a,h)anthracene	200	< 200 U
191-24-2	Benzo(g,h,i)perylene	200	< 200 U
62-53-3	Aniline	200	< 200 U
62-75-9	N-Nitrosodimethylamine	980	< 980 U
90-12-0	1-Methylnaphthalene	200	< 200 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	76.0%	2-Fluorobiphenyl	85.6%
d14-p-Terphenyl	84.8%	d4-1,2-Dichlorobenzene	69.6%
d5-Phenol	65.6%	2-Fluorophenol	56.3%
2,4,6-Tribromophenol	111%	d4-2-Chlorophenol	61.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp03
SAMPLE

Lab Sample ID: QC62F
LIMS ID: 09-31492
Matrix: Tissue
Data Release Authorized:
Reported: 01/07/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 01/05/10 20:49
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 25.3 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: NA
Lipids: 1.64 %

CAS Number	Analyte	RL	Result
108-95-2	Phenol	120	< 120 U
111-44-4	Bis-(2-Chloroethyl) Ether	120	< 120 U
95-57-8	2-Chlorophenol	120	< 120 U
541-73-1	1,3-Dichlorobenzene	120	< 120 U
106-46-7	1,4-Dichlorobenzene	120	< 120 U
100-51-6	Benzyl Alcohol	590	< 590 U
95-50-1	1,2-Dichlorobenzene	120	< 120 U
95-48-7	2-Methylphenol	120	< 120 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	120	< 120 U
106-44-5	4-Methylphenol	120	< 120 U
621-64-7	N-Nitroso-Di-N-Propylamine	590	< 590 U
67-72-1	Hexachloroethane	120	< 120 U
98-95-3	Nitrobenzene	120	< 120 U
78-59-1	Isophorone	120	< 120 U
88-75-5	2-Nitrophenol	590	< 590 U
105-67-9	2,4-Dimethylphenol	120	< 120 U
65-85-0	Benzoic Acid	1,200	< 1,200 U
111-91-1	bis(2-Chloroethoxy) Methane	120	< 120 U
120-83-2	2,4-Dichlorophenol	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	120	< 120 U
91-20-3	Naphthalene	120	< 120 U
106-47-8	4-Chloroaniline	590	< 590 U
87-68-3	Hexachlorobutadiene	120	< 120 U
59-50-7	4-Chloro-3-methylphenol	590	< 590 U
91-57-6	2-Methylnaphthalene	120	< 120 U
77-47-4	Hexachlorocyclopentadiene	590	< 590 U
88-06-2	2,4,6-Trichlorophenol	590	< 590 U
95-95-4	2,4,5-Trichlorophenol	590	< 590 U
91-58-7	2-Chloronaphthalene	120	< 120 U
88-74-4	2-Nitroaniline	590	< 590 U
131-11-3	Dimethylphthalate	120	< 120 U
208-96-8	Acenaphthylene	120	< 120 U
99-09-2	3-Nitroaniline	590	< 590 U
83-32-9	Acenaphthene	120	< 120 U
51-28-5	2,4-Dinitrophenol	1,200	< 1,200 U
100-02-7	4-Nitrophenol	590	< 590 U
132-64-9	Dibenzofuran	120	< 120 U
606-20-2	2,6-Dinitrotoluene	590	< 590 U
121-14-2	2,4-Dinitrotoluene	590	< 590 U
84-66-2	Diethylphthalate	120	< 120 U
7005-72-3	4-Chlorophenyl-phenylether	120	< 120 U
86-73-7	Fluorene	120	< 120 U
100-01-6	4-Nitroaniline	590	< 590 U

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp03
SAMPLE

Lab Sample ID: QC62F
LIMS ID: 09-31492
Matrix: Tissue
Date Analyzed: 01/05/10 20:49

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

CAS Number	Analyte	RL	Result
534-52-1	4,6-Dinitro-2-Methylphenol	1,200	< 1,200 U
86-30-6	N-Nitrosodiphenylamine	120	< 120 U
101-55-3	4-Bromophenyl-phenylether	120	< 120 U
118-74-1	Hexachlorobenzene	120	< 120 U
87-86-5	Pentachlorophenol	590	< 590 U
85-01-8	Phenanthrene	120	< 120 U
86-74-8	Carbazole	120	< 120 U
120-12-7	Anthracene	120	< 120 U
84-74-2	Di-n-Butylphthalate	120	< 120 U
206-44-0	Fluoranthene	120	< 120 U
129-00-0	Pyrene	120	< 120 U
85-68-7	Butylbenzylphthalate	120	< 120 U
91-94-1	3,3'-Dichlorobenzidine	590	< 590 U
56-55-3	Benzo(a)anthracene	120	< 120 U
117-81-7	bis(2-Ethylhexyl)phthalate	120	< 120 U
218-01-9	Chrysene	120	< 120 U
117-84-0	Di-n-Octyl phthalate	120	< 120 U
205-99-2	Benzo(b)fluoranthene	120	< 120 U
207-08-9	Benzo(k)fluoranthene	120	< 120 U
50-32-8	Benzo(a)pyrene	120	< 120 U
193-39-5	Indeno(1,2,3-cd)pyrene	120	< 120 U
53-70-3	Dibenz(a,h)anthracene	120	< 120 U
191-24-2	Benzo(g,h,i)perylene	120	< 120 U
62-53-3	Aniline	120	< 120 U
62-75-9	N-Nitrosodimethylamine	590	< 590 U
90-12-0	1-Methylnaphthalene	120	< 120 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.6%	2-Fluorobiphenyl	83.5%
d14-p-Terphenyl	64.8%	d4-1,2-Dichlorobenzene	68.6%
d5-Phenol	80.0%	2-Fluorophenol	58.1%
2,4,6-Tribromophenol	110%	d4-2-Chlorophenol	67.7%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp03
DILUTION

Lab Sample ID: QC62F
LIMS ID: 09-31492
Matrix: Tissue
Data Release Authorized:
Reported: 01/07/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 01/06/10 16:53
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 25.3 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Percent Moisture: NA
Lipids: 1.64 %

CAS Number	Analyte	RL	Result
108-95-2	Phenol	200	< 200 U
111-44-4	Bis-(2-Chloroethyl) Ether	200	< 200 U
95-57-8	2-Chlorophenol	200	< 200 U
541-73-1	1,3-Dichlorobenzene	200	< 200 U
106-46-7	1,4-Dichlorobenzene	200	< 200 U
100-51-6	Benzyl Alcohol	990	< 990 U
95-50-1	1,2-Dichlorobenzene	200	< 200 U
95-48-7	2-Methylphenol	200	< 200 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	200	< 200 U
106-44-5	4-Methylphenol	200	< 200 U
621-64-7	N-Nitroso-Di-N-Propylamine	990	< 990 U
67-72-1	Hexachloroethane	200	< 200 U
98-95-3	Nitrobenzene	200	< 200 U
78-59-1	Isophorone	200	< 200 U
88-75-5	2-Nitrophenol	990	< 990 U
105-67-9	2,4-Dimethylphenol	200	< 200 U
65-85-0	Benzoic Acid	2,000	< 2,000 U
111-91-1	bis(2-Chloroethoxy) Methane	200	< 200 U
120-83-2	2,4-Dichlorophenol	990	< 990 U
120-82-1	1,2,4-Trichlorobenzene	200	< 200 U
91-20-3	Naphthalene	200	< 200 U
106-47-8	4-Chloroaniline	990	< 990 U
87-68-3	Hexachlorobutadiene	200	< 200 U
59-50-7	4-Chloro-3-methylphenol	990	< 990 U
91-57-6	2-Methylnaphthalene	200	< 200 U
77-47-4	Hexachlorocyclopentadiene	990	< 990 U
88-06-2	2,4,6-Trichlorophenol	990	< 990 U
95-95-4	2,4,5-Trichlorophenol	990	< 990 U
91-58-7	2-Chloronaphthalene	200	< 200 U
88-74-4	2-Nitroaniline	990	< 990 U
131-11-3	Dimethylphthalate	200	< 200 U
208-96-8	Acenaphthylene	200	< 200 U
99-09-2	3-Nitroaniline	990	< 990 U
83-32-9	Acenaphthene	200	< 200 U
51-28-5	2,4-Dinitrophenol	2,000	< 2,000 U
100-02-7	4-Nitrophenol	990	< 990 U
132-64-9	Dibenzofuran	200	< 200 U
606-20-2	2,6-Dinitrotoluene	990	< 990 U
121-14-2	2,4-Dinitrotoluene	990	< 990 U
84-66-2	Diethylphthalate	200	< 200 U
7005-72-3	4-Chlorophenyl-phenylether	200	< 200 U
86-73-7	Fluorene	200	< 200 U
100-01-6	4-Nitroaniline	990	< 990 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-H-Comp03
DILUTION

Lab Sample ID: QC62F
LIMS ID: 09-31492
Matrix: Tissue
Date Analyzed: 01/06/10 16:53

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

CAS Number	Analyte	RL	Result
534-52-1	4,6-Dinitro-2-Methylphenol	2,000	< 2,000 U
86-30-6	N-Nitrosodiphenylamine	200	< 200 U
101-55-3	4-Bromophenyl-phenylether	200	< 200 U
118-74-1	Hexachlorobenzene	200	< 200 U
87-86-5	Pentachlorophenol	990	< 990 U
85-01-8	Phenanthrene	200	< 200 U
86-74-8	Carbazole	200	< 200 U
120-12-7	Anthracene	200	< 200 U
84-74-2	Di-n-Butylphthalate	200	< 200 U
206-44-0	Fluoranthene	200	< 200 U
129-00-0	Pyrene	200	< 200 U
85-68-7	Butylbenzylphthalate	200	< 200 U
91-94-1	3,3'-Dichlorobenzidine	990	< 990 U
56-55-3	Benzo(a)anthracene	200	< 200 U
117-81-7	bis(2-Ethylhexyl)phthalate	200	< 200 U
218-01-9	Chrysene	200	< 200 U
117-84-0	Di-n-Octyl phthalate	200	< 200 U
205-99-2	Benzo(b)fluoranthene	200	< 200 U
207-08-9	Benzo(k)fluoranthene	200	< 200 U
50-32-8	Benzo(a)pyrene	200	< 200 U
193-39-5	Indeno(1,2,3-cd)pyrene	200	< 200 U
53-70-3	Dibenz(a,h)anthracene	200	< 200 U
191-24-2	Benzo(g,h,i)perylene	200	< 200 U
62-53-3	Aniline	200	< 200 U
62-75-9	N-Nitrosodimethylamine	990	< 990 U
90-12-0	1-Methylnaphthalene	200	< 200 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	79.2%	2-Fluorobiphenyl	88.4%
d14-p-Terphenyl	80.8%	d4-1,2-Dichlorobenzene	72.0%
d5-Phenol	88.3%	2-Fluorophenol	66.7%
2,4,6-Tribromophenol	112%	d4-2-Chlorophenol	69.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-W-Comp01
SAMPLE

Lab Sample ID: QF82A
LIMS ID: 10-1036
Matrix: Tissue
Data Release Authorized:
Reported: 01/26/10

QC Report No: QF82-Windward Environmental, LLC
Project: EW RI/FS Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 01/20/10
Date Analyzed: 01/22/10 17:18
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 15.1 g-as-rec
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	100	< 100 U
111-44-4	Bis-(2-Chloroethyl) Ether	100	< 100 U
95-57-8	2-Chlorophenol	100	< 100 U
541-73-1	1,3-Dichlorobenzene	100	< 100 U
106-46-7	1,4-Dichlorobenzene	100	< 100 U
100-51-6	Benzyl Alcohol	500	< 500 U
95-50-1	1,2-Dichlorobenzene	100	< 100 U
95-48-7	2-Methylphenol	100	< 100 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	100	< 100 U
106-44-5	4-Methylphenol	100	< 100 U
621-64-7	N-Nitroso-Di-N-Propylamine	500	< 500 U
67-72-1	Hexachloroethane	100	< 100 U
98-95-3	Nitrobenzene	100	< 100 U
78-59-1	Isophorone	100	< 100 U
88-75-5	2-Nitrophenol	500	< 500 U
105-67-9	2,4-Dimethylphenol	100	< 100 U
65-85-0	Benzoic Acid	1,000	< 1,000 U
111-91-1	bis(2-Chloroethoxy) Methane	100	< 100 U
120-83-2	2,4-Dichlorophenol	500	< 500 U
120-82-1	1,2,4-Trichlorobenzene	100	< 100 U
91-20-3	Naphthalene	100	< 100 U
106-47-8	4-Chloroaniline	500	< 500 U
87-68-3	Hexachlorobutadiene	100	< 100 U
59-50-7	4-Chloro-3-methylphenol	500	< 500 U
91-57-6	2-Methylnaphthalene	100	< 100 U
77-47-4	Hexachlorocyclopentadiene	500	< 500 U
88-06-2	2,4,6-Trichlorophenol	500	< 500 U
95-95-4	2,4,5-Trichlorophenol	500	< 500 U
91-58-7	2-Chloronaphthalene	100	< 100 U
88-74-4	2-Nitroaniline	500	< 500 U
131-11-3	Dimethylphthalate	100	< 100 U
208-96-8	Acenaphthylene	100	< 100 U
99-09-2	3-Nitroaniline	500	< 500 U
83-32-9	Acenaphthene	100	< 100 U
51-28-5	2,4-Dinitrophenol	1,000	< 1,000 U
100-02-7	4-Nitrophenol	500	< 500 U
132-64-9	Dibenzofuran	100	< 100 U
606-20-2	2,6-Dinitrotoluene	500	< 500 U
121-14-2	2,4-Dinitrotoluene	500	< 500 U
84-66-2	Diethylphthalate	100	< 100 U
7005-72-3	4-Chlorophenyl-phenylether	100	< 100 U
86-73-7	Fluorene	100	< 100 U
100-01-6	4-Nitroaniline	500	< 500 U
534-52-1	4,6-Dinitro-2-Methylphenol	1,000	< 1,000 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-W-Comp01
SAMPLE

Lab Sample ID: QF82A
LIMS ID: 10-1036
Matrix: Tissue
Date Analyzed: 01/22/10 17:18

QC Report No: QF82-Windward Environmental, LLC
Project: EW RI/FS Chinook Sampling
08-08-09-41

CAS Number	Analyte	RL	Result
86-30-6	N-Nitrosodiphenylamine	100	< 100 U
101-55-3	4-Bromophenyl-phenylether	100	< 100 U
118-74-1	Hexachlorobenzene	100	< 100 U
87-86-5	Pentachlorophenol	500	< 500 U
85-01-8	Phenanthrene	100	< 100 U
86-74-8	Carbazole	100	< 100 U
120-12-7	Anthracene	100	< 100 U
84-74-2	Di-n-Butylphthalate	100	< 100 U
206-44-0	Fluoranthene	100	< 100 U
129-00-0	Pyrene	100	< 100 U
85-68-7	Butylbenzylphthalate	100	< 100 U
91-94-1	3,3'-Dichlorobenzidine	500	< 500 U
56-55-3	Benzo(a)anthracene	100	< 100 U
117-81-7	bis(2-Ethylhexyl)phthalate	100	< 100 U
218-01-9	Chrysene	100	< 100 U
117-84-0	Di-n-Octyl phthalate	100	< 100 U
205-99-2	Benzo(b)fluoranthene	100	< 100 U
207-08-9	Benzo(k)fluoranthene	100	< 100 U
50-32-8	Benzo(a)pyrene	100	< 100 U
193-39-5	Indeno(1,2,3-cd)pyrene	100	< 100 U
53-70-3	Dibenz(a,h)anthracene	100	< 100 U
191-24-2	Benzo(g,h,i)perylene	100	< 100 U
62-53-3	Aniline	100	< 100 U
62-75-9	N-Nitrosodimethylamine	500	< 500 U
90-12-0	1-Methylnaphthalene	100	< 100 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	54.2%	2-Fluorobiphenyl	62.0%
d14-p-Terphenyl	63.2%	d4-1,2-Dichlorobenzene	54.4%
d5-Phenol	63.3%	2-Fluorophenol	52.7%
2,4,6-Tribromophenol	75.8%	d4-2-Chlorophenol	53.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-W-Comp02
SAMPLE

Lab Sample ID: QC62B
LIMS ID: 09-31488
Matrix: Tissue
Data Release Authorized:
Reported: 01/07/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 01/05/10 18:37
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 24.1 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: NA
Lipids: 1.78 %

CAS Number	Analyte	RL	Result
108-95-2	Phenol	120	< 120 U
111-44-4	Bis-(2-Chloroethyl) Ether	120	< 120 U
95-57-8	2-Chlorophenol	120	< 120 U
541-73-1	1,3-Dichlorobenzene	120	< 120 U
106-46-7	1,4-Dichlorobenzene	120	< 120 U
100-51-6	Benzyl Alcohol	620	< 620 U
95-50-1	1,2-Dichlorobenzene	120	< 120 U
95-48-7	2-Methylphenol	120	< 120 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	120	< 120 U
106-44-5	4-Methylphenol	120	< 120 U
621-64-7	N-Nitroso-Di-N-Propylamine	620	< 620 U
67-72-1	Hexachloroethane	120	< 120 U
98-95-3	Nitrobenzene	120	< 120 U
78-59-1	Isophorone	120	< 120 U
88-75-5	2-Nitrophenol	620	< 620 U
105-67-9	2,4-Dimethylphenol	120	< 120 U
65-85-0	Benzoic Acid	1,200	< 1,200 U
111-91-1	bis(2-Chloroethoxy) Methane	120	< 120 U
120-83-2	2,4-Dichlorophenol	620	< 620 U
120-82-1	1,2,4-Trichlorobenzene	120	< 120 U
91-20-3	Naphthalene	120	< 120 U
106-47-8	4-Chloroaniline	620	< 620 U
87-68-3	Hexachlorobutadiene	120	< 120 U
59-50-7	4-Chloro-3-methylphenol	620	< 620 U
91-57-6	2-Methylnaphthalene	120	< 120 U
77-47-4	Hexachlorocyclopentadiene	620	< 620 U
88-06-2	2,4,6-Trichlorophenol	620	< 620 U
95-95-4	2,4,5-Trichlorophenol	620	< 620 U
91-58-7	2-Chloronaphthalene	120	< 120 U
88-74-4	2-Nitroaniline	620	< 620 U
131-11-3	Dimethylphthalate	120	< 120 U
208-96-8	Acenaphthylene	120	< 120 U
99-09-2	3-Nitroaniline	620	< 620 U
83-32-9	Acenaphthene	120	< 120 U
51-28-5	2,4-Dinitrophenol	1,200	< 1,200 U
100-02-7	4-Nitrophenol	620	< 620 U
132-64-9	Dibenzofuran	120	< 120 U
606-20-2	2,6-Dinitrotoluene	620	< 620 U
121-14-2	2,4-Dinitrotoluene	620	< 620 U
84-66-2	Diethylphthalate	120	< 120 U
7005-72-3	4-Chlorophenyl-phenylether	120	< 120 U
86-73-7	Fluorene	120	< 120 U
100-01-6	4-Nitroaniline	620	< 620 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-W-Comp02
SAMPLE

Lab Sample ID: QC62B
LIMS ID: 09-31488
Matrix: Tissue
Date Analyzed: 01/05/10 18:37

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

CAS Number	Analyte	RL	Result
534-52-1	4,6-Dinitro-2-Methylphenol	1,200	< 1,200 U
86-30-6	N-Nitrosodiphenylamine	120	< 120 U
101-55-3	4-Bromophenyl-phenylether	120	< 120 U
118-74-1	Hexachlorobenzene	120	< 120 U
87-86-5	Pentachlorophenol	620	< 620 U
85-01-8	Phenanthrene	120	< 120 U
86-74-8	Carbazole	120	< 120 U
120-12-7	Anthracene	120	< 120 U
84-74-2	Di-n-Butylphthalate	120	< 120 U
206-44-0	Fluoranthene	120	< 120 U
129-00-0	Pyrene	120	< 120 U
85-68-7	Butylbenzylphthalate	120	< 120 U
91-94-1	3,3'-Dichlorobenzidine	620	< 620 U
56-55-3	Benzo(a)anthracene	120	< 120 U
117-81-7	bis(2-Ethylhexyl)phthalate	120	< 120 U
218-01-9	Chrysene	120	< 120 U
117-84-0	Di-n-Octyl phthalate	120	< 120 U
205-99-2	Benzo(b)fluoranthene	120	< 120 U
207-08-9	Benzo(k)fluoranthene	120	< 120 U
50-32-8	Benzo(a)pyrene	120	< 120 U
193-39-5	Indeno(1,2,3-cd)pyrene	120	< 120 U
53-70-3	Dibenz(a,h)anthracene	120	< 120 U
191-24-2	Benzo(g,h,i)perylene	120	< 120 U
62-53-3	Aniline	120	< 120 U
62-75-9	N-Nitrosodimethylamine	620	< 620 U
90-12-0	1-Methylnaphthalene	120	< 120 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	82.3%	2-Fluorobiphenyl	91.2%
d14-p-Terphenyl	64.3%	d4-1,2-Dichlorobenzene	77.8%
d5-Phenol	99.2%	2-Fluorophenol	77.9%
2,4,6-Tribromophenol	102%	d4-2-Chlorophenol	79.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-W-Comp03
SAMPLE

Lab Sample ID: QC62C
LIMS ID: 09-31489
Matrix: Tissue
Data Release Authorized:
Reported: 01/07/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/28/09
Date Analyzed: 01/05/10 19:10
Instrument/Analyst: NT4/JZ
GPC Cleanup: Yes

Sample Amount: 20.0 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 3.00
Percent Moisture: NA
Lipids: 1.44 %

CAS Number	Analyte	RL	Result
108-95-2	Phenol	150	< 150 U
111-44-4	Bis-(2-Chloroethyl) Ether	150	< 150 U
95-57-8	2-Chlorophenol	150	< 150 U
541-73-1	1,3-Dichlorobenzene	150	< 150 U
106-46-7	1,4-Dichlorobenzene	150	< 150 U
100-51-6	Benzyl Alcohol	750	< 750 U
95-50-1	1,2-Dichlorobenzene	150	< 150 U
95-48-7	2-Methylphenol	150	< 150 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	150	< 150 U
106-44-5	4-Methylphenol	150	< 150 U
621-64-7	N-Nitroso-Di-N-Propylamine	750	< 750 U
67-72-1	Hexachloroethane	150	< 150 U
98-95-3	Nitrobenzene	150	< 150 U
78-59-1	Isophorone	150	< 150 U
88-75-5	2-Nitrophenol	750	< 750 U
105-67-9	2,4-Dimethylphenol	150	< 150 U
65-85-0	Benzoic Acid	1,500	< 1,500 U
111-91-1	bis(2-Chloroethoxy) Methane	150	< 150 U
120-83-2	2,4-Dichlorophenol	750	< 750 U
120-82-1	1,2,4-Trichlorobenzene	150	< 150 U
91-20-3	Naphthalene	150	< 150 U
106-47-8	4-Chloroaniline	750	< 750 U
87-68-3	Hexachlorobutadiene	150	< 150 U
59-50-7	4-Chloro-3-methylphenol	750	< 750 U
91-57-6	2-Methylnaphthalene	150	< 150 U
77-47-4	Hexachlorocyclopentadiene	750	< 750 U
88-06-2	2,4,6-Trichlorophenol	750	< 750 U
95-95-4	2,4,5-Trichlorophenol	750	< 750 U
91-58-7	2-Chloronaphthalene	150	< 150 U
88-74-4	2-Nitroaniline	750	< 750 U
131-11-3	Dimethylphthalate	150	< 150 U
208-96-8	Acenaphthylene	150	< 150 U
99-09-2	3-Nitroaniline	750	< 750 U
83-32-9	Acenaphthene	150	< 150 U
51-28-5	2,4-Dinitrophenol	1,500	< 1,500 U
100-02-7	4-Nitrophenol	750	< 750 U
132-64-9	Dibenzofuran	150	< 150 U
606-20-2	2,6-Dinitrotoluene	750	< 750 U
121-14-2	2,4-Dinitrotoluene	750	< 750 U
84-66-2	Diethylphthalate	150	< 150 U
7005-72-3	4-Chlorophenyl-phenylether	150	< 150 U
86-73-7	Fluorene	150	< 150 U
100-01-6	4-Nitroaniline	750	< 750 U

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: EW09-CHN-W-Comp03
SAMPLE

Lab Sample ID: QC62C
LIMS ID: 09-31489
Matrix: Tissue
Date Analyzed: 01/05/10 19:10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

CAS Number	Analyte	RL	Result
534-52-1	4,6-Dinitro-2-Methylphenol	1,500	< 1,500 U
86-30-6	N-Nitrosodiphenylamine	150	< 150 U
101-55-3	4-Bromophenyl-phenylether	150	< 150 U
118-74-1	Hexachlorobenzene	150	< 150 U
87-86-5	Pentachlorophenol	750	< 750 U
85-01-8	Phenanthrene	150	< 150 U
86-74-8	Carbazole	150	< 150 U
120-12-7	Anthracene	150	< 150 U
84-74-2	Di-n-Butylphthalate	150	< 150 U
206-44-0	Fluoranthene	150	< 150 U
129-00-0	Pyrene	150	< 150 U
85-68-7	Butylbenzylphthalate	150	< 150 U
91-94-1	3,3'-Dichlorobenzidine	750	< 750 U
56-55-3	Benzo(a)anthracene	150	< 150 U
117-81-7	bis(2-Ethylhexyl)phthalate	150	< 150 U
218-01-9	Chrysene	150	< 150 U
117-84-0	Di-n-Octyl phthalate	150	< 150 U
205-99-2	Benzo(b)fluoranthene	150	< 150 U
207-08-9	Benzo(k)fluoranthene	150	< 150 U
50-32-8	Benzo(a)pyrene	150	< 150 U
193-39-5	Indeno(1,2,3-cd)pyrene	150	< 150 U
53-70-3	Dibenz(a,h)anthracene	150	< 150 U
191-24-2	Benzo(g,h,i)perylene	150	< 150 U
62-53-3	Aniline	150	< 150 U
62-75-9	N-Nitrosodimethylamine	750	< 750 U
90-12-0	1-Methylnaphthalene	150	< 150 U

Reported in µg/kg (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	79.4%	2-Fluorobiphenyl	91.2%
d14-p-Terphenyl	68.2%	d4-1,2-Dichlorobenzene	72.2%
d5-Phenol	94.1%	2-Fluorophenol	74.9%
2,4,6-Tribromophenol	107%	d4-2-Chlorophenol	77.6%

FORM I

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Anchor Environmental	**Service Request:**	K1000029
Project:	EW RI/FS Chinook Sampling	**Date Collected:**	06/10/2009
Sample Matrix:	Animal tissue	**Date Received:**	09/18/2009

Polynuclear Aromatic Hydrocarbons

Sample Name:	EW09-CHN-SC-Comp-01	**Units:**	ug/Kg
Lab Code:	K1000029-001	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	**6.9**	J	16	0.26	1	02/02/10	02/05/10	KWG1000922	
2-Methylnaphthalene	**3.9**	J	16	0.20	1	02/02/10	02/05/10	KWG1000922	
1-Methylnaphthalene	**3.5**	J	16	0.22	1	02/02/10	02/05/10	KWG1000922	
C2-Naphthalenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
C3-Naphthalenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
C4-Naphthalenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
Biphenyl	**3.1**	J	16	0.39	1	02/02/10	02/05/10	KWG1000922	
Acenaphthylene	**1.2**	J	16	0.16	1	02/02/10	02/05/10	KWG1000922	
Dibenzofuran	**12**	J	16	0.36	1	02/02/10	02/05/10	KWG1000922	
Acenaphthene	**16**	J	16	0.17	1	02/02/10	02/05/10	KWG1000922	
Fluorene	**18**		16	0.31	1	02/02/10	02/05/10	KWG1000922	
C1-Fluorenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
C2-Fluorenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
C3-Fluorenes	**17**		16	16	1	02/02/10	02/05/10	KWG1000922	
Dibenzothiophene	**9.4**	J	16	0.20	1	02/02/10	02/05/10	KWG1000922	
C1-Dibenzothiophenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
C2-Dibenzothiophenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
C3-Dibenzothiophenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
Phenanthrene	**200**		16	1.1	1	02/02/10	02/05/10	KWG1000922	
Anthracene	**15**	J	16	0.61	1	02/02/10	02/05/10	KWG1000922	
C1-Phenanthrenes/Anthracenes	**86**		16	16	1	02/02/10	02/05/10	KWG1000922	
C2-Phenanthrenes/Anthracenes	**38**		16	16	1	02/02/10	02/05/10	KWG1000922	
C3-Phenanthrenes/Anthracenes	**31**		16	16	1	02/02/10	02/05/10	KWG1000922	
C4-Phenanthrenes/Anthracenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
Fluoranthene	**230**		16	0.48	1	02/02/10	02/05/10	KWG1000922	
Pyrene	**120**		16	0.39	1	02/02/10	02/05/10	KWG1000922	
C1-Fluoranthenes/Pyrenes	**62**		16	16	1	02/02/10	02/05/10	KWG1000922	
Benz(a)anthracene	**33**		16	0.52	1	02/02/10	02/05/10	KWG1000922	
Chrysene	**77**		16	0.64	1	02/02/10	02/05/10	KWG1000922	
C1-Chrysenes	**27**		16	16	1	02/02/10	02/05/10	KWG1000922	
C2-Chrysenes	**27**		16	16	1	02/02/10	02/05/10	KWG1000922	
C3-Chrysenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
C4-Chrysenes	ND	U	16	16	1	02/02/10	02/05/10	KWG1000922	
Benzo(b)fluoranthene	**39**		16	0.45	1	02/02/10	02/05/10	KWG1000922	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	Anchor Environmental	**Service Request:**	K1000029
Project:	EW RI/FS Chinook Sampling	**Date Collected:**	06/10/2009
Sample Matrix:	Animal tissue	**Date Received:**	09/18/2009

Polynuclear Aromatic Hydrocarbons

Sample Name:	EW09-CHN-SC-Comp-01	**Units:**	ug/Kg
Lab Code:	K1000029-001	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8270C SIM		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Benzo(k)fluoranthene	**13**	J	16	0.30	1	02/02/10	02/05/10	KWG1000922	
Benzo(e)pyrene	**19**		16	0.19	1	02/02/10	02/05/10	KWG1000922	
Benzo(a)pyrene	**9.8**	J	16	0.20	1	02/02/10	02/05/10	KWG1000922	
Perylene	**2.4**	J	16	0.26	1	02/02/10	02/05/10	KWG1000922	
Indeno(1,2,3-cd)pyrene	**10**	J	16	0.32	1	02/02/10	02/05/10	KWG1000922	
Dibenz(a,h)anthracene	**1.8**	J	16	0.15	1	02/02/10	02/05/10	KWG1000922	
Benzo(g,h,i)perylene	**7.7**	J	16	0.19	1	02/02/10	02/05/10	KWG1000922	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	82	38-112	02/05/10	Acceptable
Fluoranthene-d10	78	44-121	02/05/10	Acceptable
Terphenyl-d14	76	48-134	02/05/10	Acceptable

Comments:

PCBs

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: EW09-CHN-H-Comp01
SAMPLE

Lab Sample ID: QC62D
LIMS ID: 09-31490
Matrix: Tissue
Data Release Authorized:
Reported: 01/04/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 12/31/09 21:38
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: No
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.0 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	4.0	< 4.0 U
53469-21-9	Aroclor 1242	4.0	< 4.0 U
12672-29-6	**Aroclor 1248**	**4.0**	**19**
11097-69-1	**Aroclor 1254**	**4.0**	**21**
11096-82-5	**Aroclor 1260**	**4.0**	**10**
11104-28-2	Aroclor 1221	4.0	< 4.0 U
11141-16-5	Aroclor 1232	4.0	< 4.0 U
37324-23-5	Aroclor 1262	4.0	< 4.0 U
11100-14-4	Aroclor 1268	4.0	< 4.0 U

Reported in μg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	83.4%
Tetrachlorometaxylene	92.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: EW09-CHN-H-Comp02
SAMPLE

Lab Sample ID: QC62E
LIMS ID: 09-31491
Matrix: Tissue
Data Release Authorized:
Reported: 01/04/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 12/31/09 22:01
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: No
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	4.0	< 4.0 U
53469-21-9	Aroclor 1242	4.0	< 4.0 U
12672-29-6	**Aroclor 1248**	**4.0**	**21**
11097-69-1	**Aroclor 1254**	**4.0**	**21**
11096-82-5	**Aroclor 1260**	**4.0**	**9.5**
11104-28-2	Aroclor 1221	4.0	< 4.0 U
11141-16-5	Aroclor 1232	4.0	< 4.0 U
37324-23-5	Aroclor 1262	4.0	< 4.0 U
11100-14-4	Aroclor 1268	4.0	< 4.0 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	82.4%
Tetrachlorometaxylene	106%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: EW09-CHN-H-Comp03
SAMPLE

Lab Sample ID: QC62F
LIMS ID: 09-31492
Matrix: Tissue
Data Release Authorized:
Reported: 01/04/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 12/31/09 22:25
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: No
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.6 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	3.9	< 3.9 U
53469-21-9	Aroclor 1242	3.9	< 3.9 U
12672-29-6	**Aroclor 1248**	**3.9**	**22**
11097-69-1	**Aroclor 1254**	**3.9**	**22**
11096-82-5	**Aroclor 1260**	**3.9**	**9.8**
11104-28-2	Aroclor 1221	3.9	< 3.9 U
11141-16-5	Aroclor 1232	3.9	< 3.9 U
37324-23-5	Aroclor 1262	3.9	< 3.9 U
11100-14-4	Aroclor 1268	3.9	< 3.9 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	83.6%
Tetrachlorometaxylene	99.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: EW09-CHN-W-Comp01
SAMPLE

Lab Sample ID: QC62A
LIMS ID: 09-31487
Matrix: Tissue
Data Release Authorized:
Reported: 01/04/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 12/31/09 20:27
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: No
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.0 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	4.0	< 4.0 U
53469-21-9	Aroclor 1242	4.0	< 4.0 U
12672-29-6	Aroclor 1248	4.0	< 4.0 U
11097-69-1	Aroclor 1254	12	< 12 Y
11096-82-5	**Aroclor 1260**	**4.0**	**7.4**
11104-28-2	Aroclor 1221	4.0	< 4.0 U
11141-16-5	Aroclor 1232	4.0	< 4.0 U
37324-23-5	Aroclor 1262	4.0	< 4.0 U
11100-14-4	Aroclor 1268	4.0	< 4.0 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.5%
Tetrachlorometaxylene	78.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: EW09-CHN-W-Comp02
SAMPLE

Lab Sample ID: QC62B
LIMS ID: 09-31488
Matrix: Tissue
Data Release Authorized:
Reported: 01/04/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 12/31/09 20:50
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: No
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	4.0	< 4.0 U
53469-21-9	Aroclor 1242	4.0	< 4.0 U
12672-29-6	**Aroclor 1248**	**4.0**	**17**
11097-69-1	Aroclor 1254	40	< 40 Y
11096-82-5	**Aroclor 1260**	**4.0**	**55**
11104-28-2	Aroclor 1221	4.0	< 4.0 U
11141-16-5	Aroclor 1232	4.0	< 4.0 U
37324-23-5	Aroclor 1262	4.0	< 4.0 U
11100-14-4	Aroclor 1268	4.0	< 4.0 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	81.6%
Tetrachlorometaxylene	92.4%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: EW09-CHN-W-Comp03
SAMPLE

Lab Sample ID: QC62C
LIMS ID: 09-31489
Matrix: Tissue
Data Release Authorized:
Reported: 01/04/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 12/31/09 21:14
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: No
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 25.1 g-as-rec
Final Extract Volume: 1.0 mL
Dilution Factor: 5.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	4.0	< 4.0 U
53469-21-9	Aroclor 1242	4.0	< 4.0 U
12672-29-6	**Aroclor 1248**	**4.0**	**13**
11097-69-1	Aroclor 1254	20	< 20 Y
11096-82-5	**Aroclor 1260**	**4.0**	**11**
11104-28-2	Aroclor 1221	4.0	< 4.0 U
11141-16-5	Aroclor 1232	4.0	< 4.0 U
37324-23-5	Aroclor 1262	4.0	< 4.0 U
11100-14-4	Aroclor 1268	4.0	< 4.0 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	74.5%
Tetrachlorometaxylene	81.1%

FORM I

PESTICIDES

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Pesticides/PCB by GC/ECD Method SW8081B

Sample ID: EW09-CHN-H-Comp01
SAMPLE

Lab Sample ID: QC62D
LIMS ID: 09-31490
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 01/01/10 04:55
Instrument/Analyst: ECD6/AAR
GPC Cleanup: No
Sulfur Cleanup: No
Florisil Cleanup: No
Acid Cleanup: No

Sample Amount: 5.34 g-as-rec
Final Extract Volume: 2.0 mL
Dilution Factor: 4.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
319-84-6	alpha-BHC	1.9	< 1.9 U
319-85-7	beta-BHC	1.9	< 1.9 U
319-86-8	delta-BHC	1.9	< 1.9 U
58-89-9	gamma-BHC (Lindane)	1.9	< 1.9 U
76-44-8	Heptachlor	1.9	< 1.9 U
309-00-2	Aldrin	1.9	< 1.9 U
1024-57-3	Heptachlor Epoxide	1.9	< 1.9 U
959-98-8	Endosulfan I	1.9	< 1.9 U
60-57-1	Dieldrin	3.8	< 3.8 U
72-55-9	4,4'-DDE	3.8	< 3.8 U
72-20-8	Endrin	3.8	< 3.8 U
33213-65-9	Endosulfan II	3.8	< 3.8 U
72-54-8	4,4'-DDD	3.8	< 3.8 U
1031-07-8	Endosulfan Sulfate	3.8	< 3.8 U
50-29-3	4,4'-DDT	3.8	< 3.8 U
72-43-5	Methoxychlor	19	< 19 U
7421-93-4	Endrin Aldehyde	3.8	< 3.8 U
5566-34-7	gamma Chlordane	1.9	< 1.9 U
5103-71-9	alpha Chlordane	1.9	< 1.9 U
8001-35-2	Toxaphene	750	< 750 U
118-74-1	Hexachlorobenzene	1.9	< 1.9 U
87-68-3	Hexachlorobutadiene	1.9	< 1.9 U
789-02-6	2,4'-DDT	3.8	< 3.8 U
3424-82-6	2,4'-DDE	3.8	< 3.8 U
53-19-0	2,4'-DDD	3.8	< 3.8 U
27304-13-8	oxy Chlordane	3.8	< 3.8 U
5103-73-1	cis-Nonachlor	3.8	< 3.8 U
39765-80-5	trans-Nonachlor	3.8	< 3.8 U
2385-85-5	Mirex	3.8	< 3.8 U

Reported in µg/kg (ppb)

Pest/PCB Surrogate Recovery

Decachlorobiphenyl	80.1%
Tetrachlorometaxylene	68.6%

The CAS RN for gamma Chlordane has been corrected from 5103-74-2 effective Aug 2, 2009.

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Pesticides/PCB by GC/ECD Method SW8081B

Sample ID: EW09-CHN-H-Comp02
SAMPLE

Lab Sample ID: QC62E
LIMS ID: 09-31491
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 01/01/10 05:15
Instrument/Analyst: ECD6/AAR
GPC Cleanup: No
Sulfur Cleanup: No
Florisil Cleanup: No
Acid Cleanup: No

Sample Amount: 5.58 g-as-rec
Final Extract Volume: 2.0 mL
Dilution Factor: 4.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
319-84-6	alpha-BHC	1.8	< 1.8 U
319-85-7	beta-BHC	1.8	< 1.8 U
319-86-8	delta-BHC	3.3	< 3.3 Y
58-89-9	gamma-BHC (Lindane)	1.8	< 1.8 U
76-44-8	Heptachlor	1.8	< 1.8 U
309-00-2	Aldrin	1.8	< 1.8 U
1024-57-3	Heptachlor Epoxide	1.8	< 1.8 U
959-98-8	Endosulfan I	1.8	< 1.8 U
60-57-1	Dieldrin	3.6	< 3.6 U
72-55-9	4,4'-DDE	3.6	< 3.6 U
72-20-8	Endrin	3.6	< 3.6 U
33213-65-9	Endosulfan II	3.6	< 3.6 U
72-54-8	4,4'-DDD	3.6	< 3.6 U
1031-07-8	Endosulfan Sulfate	3.6	< 3.6 U
50-29-3	4,4'-DDT	3.6	< 3.6 U
72-43-5	Methoxychlor	18	< 18 U
7421-93-4	Endrin Aldehyde	3.6	< 3.6 U
5566-34-7	gamma Chlordane	1.8	< 1.8 U
5103-71-9	alpha Chlordane	1.8	< 1.8 U
8001-35-2	Toxaphene	720	< 720 U
118-74-1	Hexachlorobenzene	1.8	< 1.8 U
87-68-3	Hexachlorobutadiene	1.8	< 1.8 U
789-02-6	2,4'-DDT	3.6	< 3.6 U
3424-82-6	2,4'-DDE	3.6	< 3.6 U
53-19-0	2,4'-DDD	3.6	< 3.6 U
27304-13-8	oxy Chlordane	3.6	< 3.6 U
5103-73-1	cis-Nonachlor	3.6	< 3.6 U
39765-80-5	trans-Nonachlor	3.6	< 3.6 U
2385-85-5	Mirex	3.6	< 3.6 U

Reported in µg/kg (ppb)

Pest/PCB Surrogate Recovery

Decachlorobiphenyl	96.4%
Tetrachlorometaxylene	84.8%

The CAS RN for gamma Chlordane has been corrected from 5103-74-2 effective Aug 2, 2009.

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Pesticides/PCB by GC/ECD Method SW8081B

Sample ID: EW09-CHN-H-Comp03
SAMPLE

Lab Sample ID: QC62F
LIMS ID: 09-31492
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 01/01/10 05:35
Instrument/Analyst: ECD6/AAR
GPC Cleanup: No
Sulfur Cleanup: No
Florisil Cleanup: No
Acid Cleanup: No

Sample Amount: 5.62 g-as-rec
Final Extract Volume: 2.0 mL
Dilution Factor: 4.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
319-84-6	alpha-BHC	1.8	< 1.8 U
319-85-7	beta-BHC	1.8	< 1.8 U
319-86-8	delta-BHC	1.8	< 1.8 U
58-89-9	gamma-BHC (Lindane)	1.8	< 1.8 U
76-44-8	Heptachlor	1.8	< 1.8 U
309-00-2	Aldrin	1.8	< 1.8 U
1024-57-3	Heptachlor Epoxide	1.8	< 1.8 U
959-98-8	Endosulfan I	1.8	< 1.8 U
60-57-1	Dieldrin	3.6	< 3.6 U
72-55-9	4,4'-DDE	3.6	< 3.6 U
72-20-8	Endrin	3.6	< 3.6 U
33213-65-9	Endosulfan II	3.6	< 3.6 U
72-54-8	4,4'-DDD	3.6	< 3.6 U
1031-07-8	Endosulfan Sulfate	3.6	< 3.6 U
50-29-3	4,4'-DDT	3.6	< 3.6 U
72-43-5	Methoxychlor	18	< 18 U
7421-93-4	Endrin Aldehyde	3.6	< 3.6 U
5566-34-7	gamma Chlordane	1.8	< 1.8 U
5103-71-9	alpha Chlordane	1.8	< 1.8 U
8001-35-2	Toxaphene	710	< 710 U
118-74-1	Hexachlorobenzene	1.8	< 1.8 U
87-68-3	Hexachlorobutadiene	1.8	< 1.8 U
789-02-6	2,4'-DDT	3.6	< 3.6 U
3424-82-6	2,4'-DDE	3.6	< 3.6 U
53-19-0	2,4'-DDD	3.6	< 3.6 U
27304-13-8	oxy Chlordane	3.6	< 3.6 U
5103-73-1	cis-Nonachlor	3.6	< 3.6 U
39765-80-5	trans-Nonachlor	3.6	< 3.6 U
2385-85-5	Mirex	3.6	< 3.6 U

Reported in µg/kg (ppb)

Pest/PCB Surrogate Recovery

Decachlorobiphenyl	96.2%
Tetrachlorometaxylene	80.3%

The CAS RN for gamma Chlordane has been corrected from 5103-74-2 effective Aug 2, 2009.

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Pesticides/PCB by GC/ECD Method SW8081B

Sample ID: EW09-CHN-W-Comp01
SAMPLE

Lab Sample ID: QC62A
LIMS ID: 09-31487
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 01/01/10 03:54
Instrument/Analyst: ECD6/AAR
GPC Cleanup: No
Sulfur Cleanup: No
Florisil Cleanup: No
Acid Cleanup: No

Sample Amount: 5.01 g-as-rec
Final Extract Volume: 2.0 mL
Dilution Factor: 4.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
319-84-6	alpha-BHC	2.0	< 2.0 U
319-85-7	beta-BHC	2.0	< 2.0 U
319-86-8	delta-BHC	2.0	< 2.0 U
58-89-9	gamma-BHC (Lindane)	2.0	< 2.0 U
76-44-8	Heptachlor	2.0	< 2.0 U
309-00-2	Aldrin	2.0	< 2.0 U
1024-57-3	Heptachlor Epoxide	2.0	< 2.0 U
959-98-8	Endosulfan I	2.0	< 2.0 U
60-57-1	Dieldrin	4.0	< 4.0 U
72-55-9	4,4'-DDE	4.0	< 4.0 U
72-20-8	Endrin	4.0	< 4.0 U
33213-65-9	Endosulfan II	4.0	< 4.0 U
72-54-8	4,4'-DDD	4.0	< 4.0 U
1031-07-8	Endosulfan Sulfate	4.0	< 4.0 U
50-29-3	4,4'-DDT	4.0	< 4.0 U
72-43-5	Methoxychlor	20	< 20 U
7421-93-4	Endrin Aldehyde	4.0	< 4.0 U
5566-34-7	gamma Chlordane	2.0	< 2.0 U
5103-71-9	alpha Chlordane	2.0	< 2.0 U
8001-35-2	Toxaphene	800	< 800 U
118-74-1	Hexachlorobenzene	2.0	< 2.0 U
87-68-3	Hexachlorobutadiene	2.0	< 2.0 U
789-02-6	2,4'-DDT	4.0	< 4.0 U
3424-82-6	2,4'-DDE	4.0	< 4.0 U
53-19-0	2,4'-DDD	4.0	< 4.0 U
27304-13-8	oxy Chlordane	4.0	< 4.0 U
5103-73-1	cis-Nonachlor	4.0	< 4.0 U
39765-80-5	trans-Nonachlor	4.0	< 4.0 U
2385-85-5	Mirex	4.0	< 4.0 U

Reported in µg/kg (ppb)

Pest/PCB Surrogate Recovery

Decachlorobiphenyl	92.9%
Tetrachlorometaxylene	72.0%

The CAS RN for gamma Chlordane has been corrected from 5103-74-2 effective Aug 2, 2009.

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Pesticides/PCB by GC/ECD Method SW8081B

Sample ID: EW09-CHN-W-Comp02
SAMPLE

Lab Sample ID: QC62B
LIMS ID: 09-31488
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 01/01/10 04:14
Instrument/Analyst: ECD6/AAR
GPC Cleanup: No
Sulfur Cleanup: No
Florisil Cleanup: No
Acid Cleanup: No

Sample Amount: 5.06 g-as-rec
Final Extract Volume: 2.0 mL
Dilution Factor: 4.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
319-84-6	alpha-BHC	2.0	< 2.0 U
319-85-7	beta-BHC	2.0	< 2.0 U
319-86-8	delta-BHC	2.0	< 2.0 U
58-89-9	gamma-BHC (Lindane)	2.0	< 2.0 U
76-44-8	Heptachlor	2.0	< 2.0 U
309-00-2	Aldrin	2.0	< 2.0 U
1024-57-3	Heptachlor Epoxide	2.0	< 2.0 U
959-98-8	Endosulfan I	2.0	< 2.0 U
60-57-1	Dieldrin	4.0	< 4.0 U
72-55-9	4,4'-DDE	4.0	< 4.0 U
72-20-8	Endrin	4.0	< 4.0 U
33213-65-9	Endosulfan II	4.0	< 4.0 U
72-54-8	4,4'-DDD	4.0	< 4.0 U
1031-07-8	Endosulfan Sulfate	4.0	< 4.0 U
50-29-3	4,4'-DDT	4.0	< 4.0 U
72-43-5	Methoxychlor	20	< 20 U
7421-93-4	Endrin Aldehyde	4.0	< 4.0 U
5566-34-7	gamma Chlordane	2.0	< 2.0 U
5103-71-9	alpha Chlordane	2.0	< 2.0 U
8001-35-2	Toxaphene	790	< 790 U
118-74-1	Hexachlorobenzene	2.0	< 2.0 U
87-68-3	Hexachlorobutadiene	2.0	< 2.0 U
789-02-6	2,4'-DDT	4.0	< 4.0 U
3424-82-6	2,4'-DDE	4.0	< 4.0 U
53-19-0	2,4'-DDD	4.0	< 4.0 U
27304-13-8	oxy Chlordane	4.0	< 4.0 U
5103-73-1	cis-Nonachlor	4.0	< 4.0 U
39765-80-5	trans-Nonachlor	4.0	< 4.0 U
2385-85-5	Mirex	4.0	< 4.0 U

Reported in µg/kg (ppb)

Pest/PCB Surrogate Recovery

Decachlorobiphenyl	83.8%
Tetrachlorometaxylene	69.4%

The CAS RN for gamma Chlordane has been corrected from 5103-74-2 effective Aug 2, 2009.

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Pesticides/PCB by GC/ECD Method SW8081B

Sample ID: EW09-CHN-W-Comp03
SAMPLE

Lab Sample ID: QC62C
LIMS ID: 09-31489
Matrix: Tissue
Data Release Authorized:
Reported: 01/06/10

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41
Date Sampled: 06/11/09
Date Received: 06/11/09

Date Extracted: 12/26/09
Date Analyzed: 01/01/10 04:35
Instrument/Analyst: ECD6/AAR
GPC Cleanup: No
Sulfur Cleanup: No
Florisil Cleanup: No
Acid Cleanup: No

Sample Amount: 5.00 g-as-rec
Final Extract Volume: 2.0 mL
Dilution Factor: 4.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
319-84-6	alpha-BHC	2.0	< 2.0 U
319-85-7	beta-BHC	2.0	< 2.0 U
319-86-8	delta-BHC	2.0	< 2.0 U
58-89-9	gamma-BHC (Lindane)	2.0	< 2.0 U
76-44-8	Heptachlor	2.0	< 2.0 U
309-00-2	Aldrin	2.0	< 2.0 U
1024-57-3	Heptachlor Epoxide	2.0	< 2.0 U
959-98-8	Endosulfan I	2.0	< 2.0 U
60-57-1	Dieldrin	4.0	< 4.0 U
72-55-9	4,4'-DDE	4.0	< 4.0 U
72-20-8	Endrin	4.0	< 4.0 U
33213-65-9	Endosulfan II	4.0	< 4.0 U
72-54-8	4,4'-DDD	4.0	< 4.0 U
1031-07-8	Endosulfan Sulfate	4.0	< 4.0 U
50-29-3	4,4'-DDT	4.0	< 4.0 U
72-43-5	Methoxychlor	20	< 20 U
7421-93-4	Endrin Aldehyde	4.0	< 4.0 U
5566-34-7	gamma Chlordane	2.0	< 2.0 U
5103-71-9	alpha Chlordane	2.0	< 2.0 U
8001-35-2	Toxaphene	800	< 800 U
118-74-1	Hexachlorobenzene	2.0	< 2.0 U
87-68-3	Hexachlorobutadiene	2.0	< 2.0 U
789-02-6	2,4'-DDT	4.0	< 4.0 U
3424-82-6	2,4'-DDE	4.0	< 4.0 U
53-19-0	2,4'-DDD	4.0	< 4.0 U
27304-13-8	oxy Chlordane	4.0	< 4.0 U
5103-73-1	cis-Nonachlor	4.0	< 4.0 U
39765-80-5	trans-Nonachlor	4.0	< 4.0 U
2385-85-5	Mirex	4.0	< 4.0 U

Reported in µg/kg (ppb)

Pest/PCB Surrogate Recovery

Decachlorobiphenyl	80.0%
Tetrachlorometaxylene	64.4%

The CAS RN for gamma Chlordane has been corrected from 5103-74-2 effective Aug 2, 2009.

FORM I

LIPIDS

ANALYTICAL RESOURCES INCORPORATED

LIPIDS ANALYSIS DATA SHEET
Percent Lipids by Method Bligh&Dyer

Data Release Authorized:
Reported: 12/29/09
Date Received: 06/11/09

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

Client/ ARI ID	Date Sampled	Matrix	Analysis Date	RL	Result
EW09-CHN-W-Comp01 QC62A 09-31487	06/11/09	Tissue	12/26/09	0.0040	0.758 %
EW09-CHN-W-Comp02 QC62B 09-31488	06/11/09	Tissue	12/26/09	0.0040	1.78 %
EW09-CHN-W-Comp03 QC62C 09-31489	06/11/09	Tissue	12/26/09	0.0040	1.44 %
EW09-CHN-H-Comp01 QC62D 09-31490	06/11/09	Tissue	12/26/09	0.0037	1.54 %
EW09-CHN-H-Comp02 QC62E 09-31491	06/11/09	Tissue	12/26/09	0.0036	1.68 %
EW09-CHN-H-Comp03 QC62F 09-31492	06/11/09	Tissue	12/26/09	0.0036	1.64 %
Method Blank			12/26/09	0.0040	< 0.0040 % U
Method Blank			12/26/09	0.0040	0.0400 %
Method Blank			12/26/09	0.0040	< 0.0040 % U

Results Are On A Wet Weight Basis

RL-Analytical reporting limit
U-Undetected at reported detection limit

SOLIDS

TOTAL SOLIDS ANALYSIS DATA SHEET
Total Solids by Method EPA 160.3

ANALYTICAL RESOURCES INCORPORATED

Data Release Authorized:
Reported: 12/29/09
Date Received: 06/11/09
Page 1 of 1

QC Report No: QC62-Windward Environmental, LLC
Project: EW RI/FS-Chinook Sampling
08-08-09-41

Client/ ARI ID	Date Sampled	Matrix	Analysis Date	RL	Result
EW09-CHN-H-Comp01 QC62D 09-31490	06/11/09	Tissue	12/28/09	0.01	19.96
EW09-CHN-H-Comp02 QC62E 09-31491	06/11/09	Tissue	12/28/09	0.01	20.14 %
EW09-CHN-H-Comp03 QC62F 09-31492	06/11/09	Tissue	12/28/09	0.01	20.28 %

Results Are On A Wet Weight Basis

RL-Analytical reporting limit
U-Undetected at reported detection limit

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Anchor Environmental	**Service Request:**	K1000029
Project:	EW RI/FS Chinook Sampling	**Date Collected:**	06/10/09
Sample Matrix:	Tissue	**Date Received:**	09/18/09

Solids, Total

Prep Method:	NONE	Units:	PERCENT
Analysis Method:	Freeze Dry	Basis:	Wet
Test Notes:			

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
EW09-CHN-SC-Comp-01	K1000029-001	01/19/10	68.8	

APPENDIX E

Field Collection Forms and Field Notes

Wind Ward environmental LLC

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #:** 08-08-09-41

Field crew initials: MGC

Comments: April 28, 2009

Processed by Matt Luxon and Joanna Flores

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww) mm / g length / ww	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
4/28/09	11:55	~~Strip 27 Mouth~~	~~EW09-S27-BSCOL-CHU-W-01~~				
		EW09-S27-BSCOL-CHU-W-01		46 / 1.06	0.02	0.92	
			02	48 / 1.50	nm	0.74	
			03	~~36 / 0.64~~ 36 / 0.72	0.02	0.46	
			04	~~38 / 0.52~~ 34 / 0.38	0.02	0.70	
			05	~~44~~ 38 / 0.48	NM	0.40	
			06	46 / 0.66	0.02	0.60	
			07	32 / 0.40	0.02	0.36	
			08	32 / 0.44	0.02	0.38	
			09	33 / 0.54	nm	0.48	
			10	42 / 0.64	empty	0.60	
			11	38 / 0.52	0.02	0.47	
			12	43 / 0.70	0.04	0.68	
			13	38 / 0.52	nm	0.46	
			14	39 / 0.60	0.02	0.50	
			15	42 / 0.68	0.02	0.58	
			16	38 / 0.54	nm	0.42	

nm - not measurable

Wind Ward environmental LLC

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #:** 08-08-09-41

Field crew initials: MGC

Comments: Processed by Matt Lukow & Joanna Flores Page 2/6

4/28/09

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	~~INITIAL FISH WEIGHT (g ww)~~ length/weight mm/g	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
4/28/09	11:55	slip 27 Hawk	EWE09-S27-B500HCHU-W-17	42/0.46	empty	0.40	
			18	047/0.42	nm	0.38	
			19	45/0.54	nm	0.48	
			20	45/0.76	0.06	0.70	
			21	48/0.74	empty	0.72	
			22	37/0.50	0.04	0.44	
			23	48/0.86	0.02	0.78	
			24	43/0.66	0.04	0.58	
			25	38/0.62	nm	0.58	
			26	32/0.40	empty	0.38	
			27	36/0.50	"	0.48	
			28	42/0.86	nm	0.78	
			29	40/0.68	nm	0.66	
			30	39/0.54	0.02	0.50	
			31	40/0.56	0.02	0.52	
			32	38/0.44	empty	0.42	
			33	40/0.60	empty	0.58	

Wind Ward environmental LLC

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #:** 08-08-09-41

Field crew initials: MGL

Comments: 4/25/09

Processed by Matt Luxon and Jessica Flower

Page 3/6

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww)	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
4/25/09	11:55	Strip 27 Waste	EW09-S27-3S001-CHU-WL-34	42 / 0.64	0.02	0.60	
			35	39 / 0.52	nm	0.48	
			36	40 / 0.60	0.02	0.54	
			37	39 / 0.48	empty	0.48	
			38	40 / 0.52	empty	0.52	
			39	32 / 0.36	empty	0.36	
			40	37 / 0.64	empty	0.64	
			41	36 / 0.50	empty	0.50	
			42	33 / 0.48	empty	0.48	
			43	40 / 0.54	empty	0.54	
			44	37 / 0.60	empty	0.60	
			45	37 / 0.48	empty	0.48	
			46	38 / 0.54	empty	0.54	
			47	34 / 0.36	empty	0.36	
			48	37 / 0.50	empty	0.50	
			49	36 / 0.38	empty	0.38	
			50	40 / 0.54	empty	0.54	

Wind Ward environmental LLC

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #:** 08-08-09-41

Field crew initials: MGL

Comments: 4/28/09

Processed by Matt Luxon and Joanna Flores

Page 4/6

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww)	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
4/28/09	~~12:37~~ 11:55	Slip 27 Mouth	EW09-S27-BS01-CHU-U-51	42/0.52	empty	0.52	
			52	43/0.64	0.02	0.58	
			53	45/0.74	0.02	0.66	
			54	44/0.66	nm	0.62	
	12:37		EW09-S27-BS02-CHU-U-01	44/0.56	0.02	0.74	
			02	40/0.58	0.02	0.54	
			03	46/0.86	0.08	0.72	
			04	52/1.14	0.02	1.04	
			05	48/1.00	0.04	0.92	
			06	48/0.90	0.02	0.80	
			07	41/0.64	0.02	0.58	
			08	42/0.78	nm	0.76	
			09	50/1.08	empty	1.08	
			10	48/0.98	0.02	0.94	
			11	42/0.80	0.04	0.68	
			12	45/0.94	nm	0.88	
			13	55/~~0.88~~ 1.14	nm	1.06	

Windward environmental LLC

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #:** 08-08-09-41

Field crew initials: MGL

Comments: Processed by Matt Luxon and Joanna Plover

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww)	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
4/28/09	1237	slip 27 mouth	EW09-S27-BS012-CMW-14	45/0.72	0.04	0.66	
			15	44/0.70	0.02	0.64	
			16	45/0.74	nm	0.68	
			17	~~120~~ 51/1.20	0.04	1.10	
			18	53/1.10	0.02	0.98	
			19	55/1.24	0.02	0.98	
			20	47/0.88	empty	0.80	
			21	48/1.08	0.02	1.02	
			22	45/0.86	nm	0.78	
			23	43/0.70	nm	0.68	
			24	44/0.90	nm	0.92	
			25	59/1.62	nm	1.54	
			26	48/1.14	0.02	1.02	
			27	42/0.60	empty	0.58	
			28	47/0.90	nm	0.84	
			29	45/0.70	0.02	0.62	
			30	55/1.04	0.04	0.96	

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling

Project #: 08-08-09-41

Field crew initials: MGL

Comments: Beach seine # 001
Beach seine # 002

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww) + length (mm)		STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-10-09	1003	EW S27	EW09-S27-00 1 -CH N - H - 001.	69	3.28	0.022	3.18	
6-10-09	1003	EW S27	EW09-S27-00 1 -CH N - H - 002.	74	3.75	0.059	3.58	
skt ~~6-10-09~~	~~1003~~	~~EW S27~~	~~EW09-S27-00 1 -CH N - W - 001.~~	85mm	5.72g	~~6.12g~~	5.51g	
~~6-10-09~~	~~1003~~	~~EW S27~~	~~EW09-S27-00 1 -CH U - H - 001.~~					
~~6-10-09~~	~~1003~~	~~EW S27~~	~~EW09-S27-00 1 -CH U - H - 002~~					
~~6-10-09~~	~~1003~~	~~EW S27~~	~~EW09-S27-00 1 -CH U - H - 003~~					
~~6-10-09~~	~~1003~~	~~EW S27~~	~~EW09-S27-00 1 -CH U - H - 004.~~					
~~6-10-09~~	~~1003~~	~~EW S27~~	~~EW09-S27-00 1 -CH U - H - 005~~					
6-10-09	1033	EW S27	EW09-S27-00 2 -CH N - W - 001.	78mm	5.25g	0.08g	5.09g	
6-10-09	1033	EW S27	EW09-S27-00 2 -CH N - W - 002.	69mm	3.92g	0.03g	3.73g	
6-10-09	1033	EW S27	EW09-S27-00 2 -CH N - W - 003.	122 mm	16.17g	empty	15.95	yearlings
6-10-09	1033	EW S27	EW09-S27-00 2 -CH N - W - 004.	110 mm	13.86g	empty	13.70	yearling
~~6-10-09~~	~~1033~~	~~EW S27~~	~~EW09-S27-00 2 -CH N - W - 005.~~					
~~6-10-09~~	~~1033~~	~~EW S27~~	~~EW09-S27-00 2 -CH N - W - 006.~~					
~~6-10-09~~	~~1033~~	~~EW S27~~	~~EW09-S27-00 2 -CH N - W - 007.~~					
6-10-09	1033	EW S27	EW09-S27-00 2 -CH N - H - 001.	80	5.26	0.031	5.10	
6-10-09	1033	EW S27	EW09-S27-00 2 -CH N - H - 002.	67	3.13	0.030	2.96	
6-10-09	1033	EW S27	EW09-S27-00 2 -CH N - H - 003.	70	3.42	0.010	3.22	

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #: 08-08-09-41**

Field crew initials: MGL

Comments: Beach seine #'s: 002, 003, 006

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww)		STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-10-09	1033	EW S27	EW09-S27-002-CH N - H - 004.	79	4.79	0.021	4.63	
6-10-09	1033	EW S27	EW09-S27-002-CH N - H - 005.	76	4.20	0.010	4.16	
6-10-09	1104	EW S27	EW09-S27-003-CH N - H - 001.	78mm	5.04g	0.04g	4.89g	
6-10-09	1104	EW S27	EW09-S27-003-CH N - H - 002.	74mm	4.99g	0.04g	4.82g	
6-10-09	1104	EW S27	EW09-S27-003-CH N - H - 003.	83mm	6.57g	0.08g	6.30g	
6-10-09	1104	EW S27	EW09-S27-003-CH N - H - 004.	72mm	3.79g	empty	3.65g	
6-10-09	1104	EW S27	EW09-S27-003-CH N - H - 005.	68mm	3.13g	empty	3.00g	
6-10-09	1104	EW S27	EW09-S27-003-CH N - H - 006.	82mm	4.88g	0.01g	4.74g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - W - 001.	68mm	2.78g	0.03g	2.54g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - W - 002.	66mm	3.34g	0.07g	3.20g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - W - 003.	79mm	4.13g	0.03g	3.95g	Wild Jar #1 1.42g (wild chinook, juveniles)
6-10-09	1156	EW S27	EW09-S27-006-CH N - W - 004.	69mm	3.60g	0.06g	3.35g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - H - 001.	83mm	6.49g	empty	6.28g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - H - 002.	66mm	3.39g	0.02g	3.29g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - H - 003.	80mm	5.24g	<0.01g	5.06g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - H - 004.	68mm	3.15g	empty	3.09g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - H - 005.	83mm	6.60g	0.11g	6.18g	
6-10-09	1156	EW S27	EW09-S27-006-CH N - H - 006.	76mm	4.48g	0.12g	4.21g	

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling Project #: 08-08-09-41

Field crew initials: MGL

Comments: Beachseine 006
Beach seine 008

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww) length (mm)		STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-007.	80mm	5.36g	0.02g	5.18g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-008.	81mm	6.23g	0.02g	na	fish rejected.
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-009.	74mm	3.40g	empty	3.23g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-010.	84mm	4.99g	0.04g	4.56g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-011.	68mm	3.34g	0.07g	3.02g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-012.	69mm	2.57g	0.06g	2.30g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-013.	78mm	5.08g	0.07g	4.80g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-014.	82mm	5.30g	0.01g	5.03g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-015.	68mm	3.83g	0.03g	3.42g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-016.	68mm	2.40g	0.07g	2.07g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-017.	67mm	3.02g	0.09g	2.80g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-018.	78mm	4.80g	0.03g	4.42g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-019.	64mm	3.97g	0.21g	3.43g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-020.	74mm	3.46g	0.04g	3.34g	
6-10-09	1304	EW S27	EW09-S27-008-CHN-W-001.	82mm	4.67g	0.03g	4.50g	
6-10-09	1304	EW S27	EW09-S27-008-CHN-W-002.	67mm	3.51g	0.03g	3.40g	
6-10-09	1304	EW S27	EW09-S27-008-CHN-W-003.	71mm	4.70g	0.05g	4.47g	
6-10-09	1304	EW S27	EW09-S27-008-CHN-W-004.	69mm	3.83g	0.09g	3.63g	
6-10-09	1156	EW S27	EW09-S27-006-CHN-H-021	67mm	3.14g	0.11g	2.75g	

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #: 08-08-09-41**

Field crew initials: MGL

Comments: Beach seine 008

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww) length (mm)		STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-10-09	1304	EW S27	EW09-S27-008-CH N - W - 005.	68mm	4.47g	0.02g	4.28g	
6-10-09	1304	EW S27	EW09-S27-008-CH N - W - 006.	73 ~~71~~mm	4.13g	0.01g	3.91g	
6-10-09	1304	EW S27	EW09-S27-008-CH N - W - 007.	78mm	4.24g	0.06g	3.97g	
6-10-09	1304	EW S27	EW09-S27-008-CH N - W - 008.	72mm	4.60g	0.07g	4.44g	
6-10-09	1304	EW S27	EW09-S27-008-CH N - W - 009.	71mm	4.23g	0.06g	4.01g	
6-10-09	1304	EW S27	EW09-S27-008-CH N - W - 010.	71mm	3.80g	empty	3.57g	
~~6-10-09~~	~~1304~~	~~EW S27~~	~~EW09-S27-008-CH N - W - 011.~~	~~66mm~~	~~3.21g~~	~~0.05~~	~~3.09g~~	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 001.	67	3.86	0.053	3.71	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 002.	83	6.00	0.049	5.93	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 003.	79	3.13	0.042	2.95	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 004.	64	3.05	0.034	2.86	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 005.	77	4.29	0.011	4.15	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 006.	79	5.68	0.012	5.56	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 007.	73	3.84	0.019	3.66	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 008.	76	4.00	0.012	3.98	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 009.	77	5.68	0.022	5.49	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 010.	80	5.93	0.064	5.72	
~~6-10-09~~	~~1304~~	~~EW S27~~	~~EW09-S27-008-CH N - H - 011.~~					

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling Project #: 08-08-09-41

Field crew initials: MGL

Comments: Beach seine 008

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww) + length (mm)		STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 012.	70	3.66	0.011	3.52	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 013.	69	4.09	0.023	3.97	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 014.	75	4.84	0.051	4.63	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 015.	85	7.14	0.101	6.81	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 016.	73	4.65	0.021	4.47	
6-10-09	1304	EW S27	EW09-S27-008-CH N - H - 017.	68	3.26	0.153	3.03	
6-10-09	1304	EW S27	EW09-S27-008-CH N - W - 011.	120mm	16.8g	empty	16.48g	yearling
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					
6-10-09		EW S27	EW09-S27-00___-CH___ - ___ - 0___.					

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #: 08-08-09-41**

Field crew initials: MGL

Comments: Beach Seine 005
Beach Seine 007

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww)	length (mm)	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-10-09	11:36	EW S27	EW09-S27-005-CHN-W-001.	83	5.00	0.010	4.88	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-W-002.	84	5.03	Ø	5.03	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-001.	78	5.26	0.022	5.16	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-002.	77	4.86	0.011	4.75	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-005.	61	2.85	0.045	2.75	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-004.	71	4.01	0.025	3.71	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-005.	69	4.13	0.010	3.91	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-006.	87	6.39	Ø	6.39	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-007.	73	3.87	~~0.037~~ 0.031	3.77	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-008.	70	3.46	0.041	3.28	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-009.	73	4.19	0.033	3.98	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-010.	75	4.04	0.010	3.82	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-011.	75	3.92	0.014	3.55	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-012.	70	3.59	0.018	3.45	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-013.	62	2.51	0.090	2.36	
6-10-09	11:36	EW S27	EW09-S27-005-CHN-H-014.	62	2.88	0.008	2.73	
6-10-09	12:26	EW S27	EW09-S27-007-CHN-W-001.	66mm	3.21g	0.05g	3.09g	
6-10-09	12:26	EW S27	EW09-S27-007-CHN-W-002.	62mm	2.70g	0.04g	2.41g	

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling Project #: 08-08-09-41

Field crew initials: MGL

Comments: Beach seine 07

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww) length (mm)		STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-10-09	12:36	EW S27	EW09-S27-00 7 -CH N -W -0 03.	72mm	3.55g	<0.01g	3.35g	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 01.	60	2.84	0.104	2.63	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 02.	62	2.76	0.035	2.63	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 03.	70	4.49	0.030	4.35	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 04.	71	3.97	0.033	3.80	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 05.	71	4.03	0.161	3.56	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 06.	71	4.62	0.016	4.45	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 07.	75	4.49	0.052	4.26	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 08.	73	4.32	0.030	4.16	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 09.	70	3.81	Ø	3.81	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 10.	77	no data	0.04g	4.39g	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 11.	84	5.76g	empty	5.56g	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 12.	74	3.91g	0.07g	3.71g	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 13.	78	4.48g	0.06g	4.26g	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 14.	75	4.80g	<0.01g	4.60g	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 15.	77	4.47g	0.02g	4.31g	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 16.	76	4.00g	0.10g	3.76g	
6-10-09		EW S27	EW09-S27-00 7 -CH N -H -0 17.	76	4.26g	0.06g	4.07g	[Hatchery Jar #2 1.54g]

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #: 08-08-09-41**

Field crew initials: MGL

Comments: Beach seine 007

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww) / length (mm)		STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-10-09	12:36	EW S27	EW09-S27-007-CH N - H - 018.	65	3.14	0.048	2.97	
		EW S27	EW09-S27-00__-CH__ - __ - 019.	69	4.01	0.059	3.75	
		EW S27	EW09-S27-00__-CH__ - __ - 020.	70	4.52	0.027	4.31	
		EW S27	EW09-S27-00__-CH__ - __ - 021.	80	5.34	0.001	5.23	
		EW S27	EW09-S27-00__-CH__ - __ - 022.	66	2.94	0.076	2.68	
		EW S27	EW09-S27-00__-CH__ - __ - 023.	81	4.90	0.027	4.76	
		EW S27	EW09-S27-00__-CH__ - __ - 024.	75	4.13	0.054	3.93	
		EW S27	EW09-S27-00__-CH__ - __ - 025.	81	5.48	0.076	5.12	
		EW S27	EW09-S27-00__-CH__ - __ - 026.	82	5.55	0.502	4.9	– ate fish
		EW S27	EW09-S27-00__-CH__ - __ - 027.	74	5.66	0.065	5.66	
		EW S27	EW09-S27-00__-CH__ - __ - 028.	65	3.22	0.052	3.15	
		EW S27	EW09-S27-00__-CH__ - __ - 029.	73	4.01	0.025	3.86	
		EW S27	EW09-S27-00__-CH__ - __ - 030.	74	4.06	0.008	3.94	
		EW S27	EW09-S27-00__-CH__ - __ - 031.	75	3.87	0.054	3.61	
		EW S27	EW09-S27-00__-CH__ - __ - 032.	77	5.04	0.016	4.83	
		EW S27	EW09-S27-00__-CH__ - __ - 033.	61	2.55	0.022	2.41	
		EW S27	EW09-S27-00__-CH__ - __ - 034.	77	4.77	0.028	4.55	
		EW S27	EW09-S27-00__-CH__ - __ - 035.	73	3.99	0.008	3.85	

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #: 08-08-09-41**

Field crew initials: MGL

Comments: Beach seine 07
Beach Seine 09
Beach seine 10

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww)	length (mm)	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
June 10-09	12~~26~~	EW S27	EW09-S27-007-CH N-H-036.	70	3.00	0.001	2.91	
		EW S27	EW09-S27-007-CH N-H-037.	68	3.49	0.044	3.32	
		EW S27	EW09-S27-007-CH N-H-038	74	4.62	0.029	4.44	
		EW S27	EW09-S27-007-CH N-H-039.	72	4.50	0.079	4.28	
		EW S27	EW09-S27-007-CH N-H-040.	72	3.67	0.009	3.50	Hatchery Jar #1 3.06 g
		EW S27	EW09-S27-007-CH N-H-041.	82	5.71	0.050	5.52	
	—	EW S27	EW09-S27-007-CH N-H-042.	75	4.82	0.021	4.65	
	1342	EW S27	EW09-S27-009-CH N-W-001.	~~78~~ 78 mm	5.21 g	0.03 g	4.94 g	
		EW S27	EW09-S27-009-CH N-W-002.	72 mm	3.81 g	0.06 g	3.57 g	
		EW S27	EW09-S27-009-CH N-W-003.	76 mm	4.71 g	0.03 g	4.57 g	
		EW S27	EW09-S27-009-CH N-W-004.	70 mm	3.29 g	0.01 g	3.18 g	
		EW S27	EW09-S27-009-CH N-W-005.	71 mm	3.10 g	0.04 g	2.86 g	
	—	EW S27	EW09-S27-009-CH N-W-006.	64 mm	2.74 g	0.02 g	2.60 g	
	1407	EW S27	EW09-S27-0010-CH N-W-001.	66 mm	2.85 g	0.05 g	2.73 g	
	1407	EW S27	EW09-S27-0010-CH N-W-002.	77 mm	4.76 g	0.10 g	4.47 g	
	1407	EW S27	EW09-S27-0010-CH N-W-003.	69 mm	3.30 g	0.12 g	3.06 g	
	1407	EW S27	EW09-S27-0010-CH N-W-004.	77 mm	4.50 g	empty	4.40 g	
	1432	EW S27	EW09-S27-0011-CH N-W-001.	130 mm	19.50 g	empty	19.10 g	yearling

Windward environmental LLC

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling Project #: 08-08-09-41

Field crew initials: MGL

Comments: Beach Seine #013, #014, #017, #018, #019

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww)	length (mm)	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-11-09	11:10	EW S27	EW09-S27-0013-CHN-W-001	77	3.76	Ø	3.66	
6-11-09	11:30	EW S27	EW09-S27-0014-CHN-W-001	81	6.43	0.125	6.22	→ fish remains in stomach
6-11-09	|	EW S27	EW09-S27-0014-CHN-W-002	68	2.48	0.01	2.36	
6-11-09	|	EW S27	EW09-S27-0014-CHN-W-003	90	6.64	0.02	6.45	
6-11-09	11:30	EW S27	EW09-S27-0014-CHN-W-004	71	2.95	0.02	2.89	
6-11-09	12:28	EW S27	EW09-S27-0017-CHN-W-001	71	4.71	0.03	4.48	
6-11-09	|	EW S27	EW09-S27-0017-CHN-W-002	67	3.20	0.03	2.98	
6-11-09	12:28	EW S27	EW09-S27-0017-CHN-W-003	64	2.89	0.04	2.77	
6-11-09	12:46	EW S27	EW09-S27-0018-CHN-W-001	76	4.25	0.05	4.06	
6-11-09	|	EW S27	EW09-S27-0018-CHN-W-002	70	3.88	0.10	3.64	
6-11-09	|	EW S27	EW09-S27-0018-CHN-W-003	77	4.16	0.02	4.04	
6-11-09	12:46	EW S27	EW09-S27-0018-CHN-W-004	71	3.31	0.07	3.13	
6-11-09	1309	EW S27	EW09-S27-0019-CHN-W-001	76	4.94	0.02	4.50	
6-11-09	|	EW S27	EW09-S27-0019-CHN-W-002	65	2.65	0.03	2.54	
6-11-09	|	EW S27	EW09-S27-0019-CHN-W-003	85	6.28	0.08	6.04	
6-11-09	|	EW S27	EW09-S27-0019-CHN-W-004	76	4.53	0.04	3.28	
6-11-09	1309	EW S27	EW09-S27-0019-CHN-W-005	69	2.92	0.05	2.76	

Stomach Container #2 = 0.98g

(wild) Chinook

Wind Ward environmental LLC

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #:** 08-08-09-41

Field crew initials: MGL

Comments: Beach Seine #019, #020, #021, #022

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww) + length (mm)		STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
6-11-09	1309	EW S27	EW09-S27-00~~19~~-CHN-W-006	69	3.01	Ø	2.86	
6-11-09	1337	EW S27	EW09-S27-00~~20~~-CHN-W-001	75	3.88	0.05	3.72	
6-11-09	1355	EW S27	EW09-S27-00~~21~~-CHN-W-001	78	5.18	0.02	5.08	
6-11-09	1	EW S27	EW09-S27-00~~21~~-CHN-W-002	74	3.68	0.05	3.51	
6-11-09	1355	EW S27	EW09-S27-00~~21~~-CHN-W-003	73	2.53	0.05	~~3.05~~ a 2.43	
6-11-09	1412	EW S27	EW09-S27-00~~22~~-CHN-W-001	74	3.98	0.11	3.77	
6-11-09	1412	EW S27	EW09-S27-00~~22~~-CHN-W-002	82	4.57	0.044	4.52	
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					
6-11-09		EW S27	EW09-S27-00_-CH__-__-0__					

Windward environmental LLC

STOMACH CONTENTS TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #:** 08-08-09-41

Field crew initials: MGL

Comments: Processed by Matt Laxon and Joanna Flower

COLLECTION DATE	COLLECTION TIME	LOCATION ID	SPECIMEN ID	INITIAL FISH WEIGHT (g ww)	STOMACH CONTENT WEIGHT (g ww)	FISH WEIGHT W/O STOMACH CONTENTS (g ww)	RUNNING TOTAL STOMACH CONTENTS WEIGHT (g ww)
4/28/09	12:37	Sediment	EW09-S27-BS02-CHU-31	45/0.02	0.02	0.74	
			32	39/0.62	empty	0.58	
			33	47/0.98	0.02	0.88	
			34	45/0.86	0.02	0.80	
			35	44/0.98	nm	0.92	
			36	44/0.86	0.04	0.80	
			37	50/1.00	nm	0.94	
			38	40/0.88	nm	0.82	
			39	45/0.86	0.02	0.76	
			40	43/0.76	0.02	0.70	
			41	39/0.62	nm	0.56	
			42	45/0.92	0.02	0.86	
			43	45/0.80	nm	0.74	
			44	46/0.94	empty	0.94	
			45	44/0.90	0.02	0.80	
			46	43/0.78	nm	0.60	
			47	40/0.66	0.02	0.58	

NON-TARGET SPECIES TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling Project #: 08-08-09-41

Field crew initials: MGL

Comments: Beach Seines #001 through #008

COLLECTION DATE	COLLECTION TIME	LOCATION ID	COLLECTION METHOD	SPECIES	LENGTH RANGE (mm)	TOTAL WEIGHT (g ww)	COUNT	COMMENTS
6/10/09	10:03	S27-001	Beach Seine	crescent gunnel			1	
				chum Salmonids			45	
	1033	S27-002		coho			10	
				chinook (hatchery)			1	
	11:22	S27-004		shiner surfperch			1	
				Pacific herring			1	
	1136	S27-005		Threespine stickleback			1	
				chum			1	
	1156	S27-006		shiner surfperch			3	
				jellyfish			7	
				smelt			1	
				chum			43	
	1226	S27-007		chum			40	
				smelt			1	
				jellyfish			4	
				ctenophores			80	
	1304	S27-008		chum			103	

NON-TARGET SPECIES TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling Project #: 08-08-09-41

Field crew initials: MGL

Comments: Beach Seines #008 through #013

COLLECTION DATE	COLLECTION TIME	LOCATION ID	COLLECTION METHOD	SPECIES	LENGTH RANGE (mm)	TOTAL WEIGHT (g ww)	COUNT	COMMENTS
6/10/09	1304	S27-008	Beach Seine	Pacific Sandlance			1	
				chinook (hatchery)			46	
	1342	S27-009		chum			55	
				chinook (hatchery)			38	
				herring			1	
	1407	S27-010		chinook (hatchery)			31	
				chum			55	
				striped perch			3	
	1432	S27-011		chinook (hatchery)			12	
				chum			20	
				herring			1	
6/11/09	1046	S27-012		sandlance			2	
				chum			40	
				chinook (hatchery)			22	
				jellyfish			~10	
				ctenophores			~100	
	11:10	S27-013		jellyfish			10	

NON-TARGET SPECIES TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling Project #: 08-08-09-41

Field crew initials: MGL

Comments: Beach Seine #013 through #017

COLLECTION DATE	COLLECTION TIME	LOCATION ID	COLLECTION METHOD	SPECIES	LENGTH RANGE (mm)	TOTAL WEIGHT (g ww)	COUNT	COMMENTS
6/11/09	11:10	S27-013	Beach Seine	Three Spine stickelback		~~3~~ cc	3	
				ctenophores			~100	
				chinook (hatchery)			15	
				chum			40	
	1130	S27-014		chinook (hatchery)			~~5~~ 19	
				chum			1	
				jellyfish			10	
				ctenophores			20	
	1150	S27-015		jellyfish			17	
				ctenophores			~100	
				chum			15	
				chinook (hatchery)			5	
	1204	S27-016		chinook (hatchery)			25	
				chum			2	
	1228	S27-017		jellyfish			7	
				chum			2	
				chinook (hatchery)			25	

NON-TARGET SPECIES TALLY FORM

Project Name: EW RI/FS – Fish and crab sampling **Project #:** 08-08-09-41

Field crew initials: MGL

Comments: BeachSeine #018 through #022

COLLECTION DATE	COLLECTION TIME	LOCATION ID	COLLECTION METHOD	SPECIES	LENGTH RANGE (mm)	TOTAL WEIGHT (g ww)	COUNT	COMMENTS
6/11/09	1246	S27-018	BeachSeine	chum			55	
				chinook (hatchery)			30	
	1309	S27-019		chum			55	
				chinook (hatchery)			30	
	1337	S27-020		chinook (hatchery)			4	
	1355	S27-021		shiner surfperch			3	
				smelt			1	
				chinook (hatchery)			15	
				chum			20	
				jellyfish			3	
	1412	S27-022		chum			55	
				chinook (hatchery)			15	

Wind Ward environmental LLC

PROTOCOL MODIFICATION FORM

Project Name and Number: EWR/FS - Fish and Crab Sampling 08-08-09-41

Material to be Sampled: Chinook

Measurement Parameter: N/A

Standard Procedure for Field Collection & Laboratory Analysis (cite reference):

"All relevant information for each individually wrapped and labeled specimen will be recorded on the target species tally form."

(QAPP, Section 3.2.2)

Reason for Change in Field Procedure or Analysis Variation: The Target Species Tally form and the Stomach contents tally form are very similar and redundant. The length data was added to the Stomach contents tally form to eliminate the additional time needed to complete the target species tally form.

Variation from Field or Analytical Procedure: All information for each individual specimen was recorded on the Stomach contents tally form.

Special Equipment, Materials or Personnel Required: N/A

Initiator's Name: Matt Luxon Date: July 15, 2009

Project Manager: Date:

QA Manager: Date:

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EW RI/FS: Juvenile Chinook Salmon
Tissue Collection
04.28.09

April 28, 2009
Juvenile chum salmon sampling
East waterway

10:20 am meet w/ Taylor crew
at 1st Ave S. Boat launch.
Peter Heltzel boat operator, Field Coordinator
for Taylor
- John Berg
- Brad Kwiatkowski
- Reviewed health & Safety Plan
- Motored to East Waterway via W.
waterway.

11:27 - Arrive @ slip 27 site
- setup gear

N 47.34.759
W 122.20.555
Set 1 - EW09-S27 (Mouth) - BS - 001
11:41 deploy net -
11:46 - begin retrieval
11:55 - Complete retrieval
NON target - 1 Dc < 10 cm
2 unknown sculpin
1 sandlance
1 Skate

56 4/28/09
chum → chum bagged
2 released
12:16 completed Processing - redeploying net
12:37 - retrieve net -
EW-09-S27 (Mouth) - BS-002

released - 120
bagged - 37
67
104

1pm - completed sampling
- Samples bagged - return to 1st Ave Bl.

1:54 arrive 1st Ave Bl.
transport samples to ARI

Completed Processing
7:28 pm

June 10, 2009
East waterway Juvenile chinook
Sampling:

Matt Luxey - Windward Field Coordinator
Peter Hettzel - Taylor Associates FC
John - Taylor Crew
Brad - Taylor Crew

- Met @ 1st Ave S. Bridge 9:20am
- Safety meeting
- Motor to East

Set 1 - slip 27 mouth
10:00am set
10:03 retrieval
Non target - 1 Crescent gunnel

Target - ~~11~~ (2) hatchery chinook
1 wild
5 chum

(40 ~~coho~~ chum thrown back live small)

Set 2 Slip 27 Mouth
10:29am set
10:33 retrieval

Fish collected
: chinook wild - 2
Chinook hatchery - ~~#5~~ ~~7~~ 5
~~wild~~ Chinook - 2
Coho - 10 - returned to EW
1 hatchery chinook released
- unknown fish positively ID'd as chinook

Set 3 slip 27 mouth
retrieval 11:04

Fish collected 6 hatchery chinook

No fish returned

total so far wild chinook 5+2+4+4
hatchery chinook 13+14+20
+42
89
+17
106

Set 4 No keepers
Set 11:15 non target: 1 shiner surfperch
retrieval 11:22 1 Pacific herring

Set 5 slip 27 mouth

retrieval 11:36

hatchery chinook 14

wild chinook 2

non target 1 3 spine stickelback

1 chum

June 10 2009

Set 6

Set - 11:56

retrieval - ~~11:56~~ 12:02

Non-target

3 shiner surfperch

7 Jellies

1 smelt 43 chum

keepers

4 wild chinook

20 hatchery Chinook

Set 7 slip 27 mouth

Set 12:19

retrieval 12:26

target: 42 hatchery chinook

3 wild chinook

Non-target: 40 chum

1 smelt

4 Jellies

50 ctenophores

June 10, 2009

Set 8 slip 27 mouth

set 12:57

retrieval 13:04

keepers - 17 hatchery Chinook

wild chinook

non target 103 chum

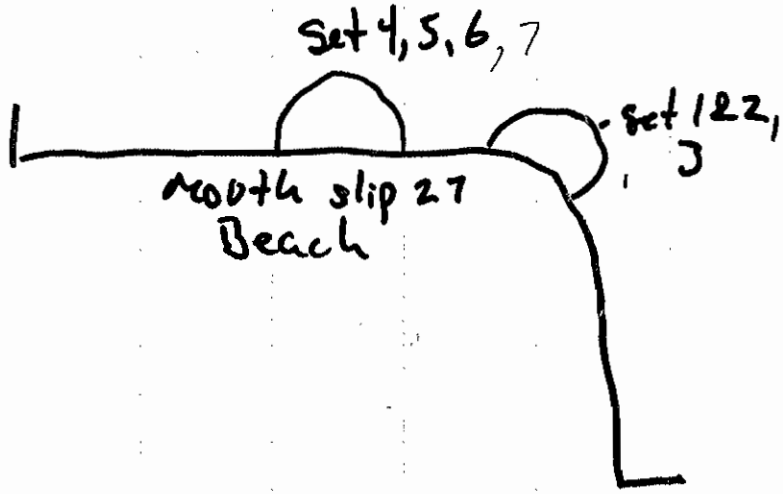
46 hatchery chinook

1 Pacific Sandlance

---

total so far - hatchery 106

wild 15 + 11 + 6



June 10 Slip 27 mouth
Set 9 keepers: chinook wild 6
Set 13:38 Non-target - 38 hatchery chinook
Retrieval: 13:42 - 55 chum
- 1 herring

Set 10 keepers 4 chinook wild
set 14:00 non target
retrieval: 14:07 31 hatchery chinook
55 chum
3 striped perch

Set 11 target - 1 chinook - wild
retrieval 14 non-target - 12 - chinook - hatchery
1432 20 - chum
1 herring

1450 return to 1st Ave S Boatlaunch

June 11, 2009 EW Chinook Sampling

0900 - Meet Peter Hetzel & Taylor crew @
1st Ave. S. bridge

Depart boat launch 09:27

~~132 ha~~ Total catch yesterday
106 hatchery chinook
32 wild chinook
4 Yearlings chinook

10:31 Set 12 target 2 chinook
10:46 retrieval
W. beach
NON target
2 Sandlance
40 chum
22 chinook hatc
~10 Jellies
~100 ctenophores

Set 13
W. beach Retrieval 11:10
→ target 1 wild chinook
NON target
~10 Jellies 15 hatchery chinook
~100 ctenophores 40 chum
3 3spine stickelbacks

June 11, 2009

Set 14 retrieval 11:30
slip 27 mouth
(corner)
→ target - 4 chinook - wild
NON-target - 19 chinook - hatch
1 chum
~10 jellies
~20 ctenophores

Set 15
retrieval 11:50
slip 27 mouth
(corner)
NO keepers

non-target
17 jellies
~100 ctenophores
15 chum
5 chinook - hatchery

Set 16
retrieval 1204
Slip 27 mouth
(corner)

non-target
25 chinook - hatch
2 chum
no jellies...
→ NO keepers

Set 17
retrieval 1228
3 keepers (wild chinook)
-

Non target
- 7 jellies
0 ctenophore
2 ch
25 chinook
~~2 chu~~

Set 18
slip 27 mouth
1246 retrieval
w. beach
target - 4 wild chinook
NON target - 55 chum
30 hatchery chinook

Set 19
w. beach
slip 27 mouth
retrieval 1309
target - chinook wild 6
NON-target - 30 hatchery chinook
55 chum

Set 20
Slip 27
w. beach
retrieval 1337
bad snag on rock
Target 1 chinook
NON-target - 4 hatchery

Catch so far 32

13	1
14	4
15	3
16	4
17	6
	50
	+ 4

54

18	1
19	3
20	2

~~June~~ June 11, 2009

Set 21
Retrieval 1355
slip 27 north
target 8 wild chinook
- coho

non-target
3 shiner surfperch
1 smelt
15 hatchery chinook
20 chum
8 Jellies

Set 22
retrieval 1412
Slip 27 north
- coho

target
2 wild chinook
non-target
55 chum
15 hatchery chinook

12	0
13	1
14	4
15	0
16	0
17	3
18	4
19	6
20	1
21	3
22	2
	22
	36

36
24
60

~~44 20~~

1430 return to S. Park boat launch
1500 transport samples to ARI

APPENDIX F

Chain-of-Custody and Compositing Forms

CHAIN-OF-CUSTODY/TEST REQUEST FORM

2686

Project/Client Name: Windward EW09/FS - Fish + Crab Sampling
Project Number: 08-08-09-41
Contact Name: Marina Mitchell
Sampled By: MGL

Ship to:
Attn:
Shipping Date:
Shipper:
Airbill Number:
Form filled out by:
Turnaround requested:

Sample Collection Date (m/d/y)	Time	Sample Identification	Volume of Sample / # of Containers	Matrix	Test(s) Requested (check test(s) required): Airline							Comments / Instructions [Jar tag number(s)]
6/11/09	1309	EW09-S27-019-CHN-W-001	1	TISSUE	X							
	1		1									
	1		1									
	1309		1									
	1		1									
	1309	EW09-S27-019-CHN-W-002	1									
	1412	EW09-S27-022-CHN-W-001	1									
	1412	EW09-S27-022-CHN-W-002	1									
	1355	EW09-S27-021-CHN-W-001	1									
	1		1									
	1355	EW09-S27-021-CHN-W-002	1									
6/11/09	1337	EW09-S27-020-CHN-W-001	1	TISSUE	X							
~~6/11/09~~		**Total Number of Containers**	12	Purchase Order / Statement of Work #								

1) Released by:	1) Rec'd by:	2) Released by:	2) Rec'd by:
Print name: Chelsea Lorenz		Print name:	
Signature:	Company:	Signature:	Company:
Company: Windward		Company:	
Date/Time: 6/11/09 4:45	Date/Time:	Date/Time:	Date/Time:

* Distribution: White copies accompany shipment; yellow retained by consignor.

To be completed by Laboratory upon sample receipt:

Date of receipt::	Laboratory W.O. #:
Condition upon receipt:	Time of receipt:
Cooler temperature:	Received by:

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

00062:00003

CHAIN-OF-CUSTODY/TEST REQUEST FORM

2697

Project/Client Name: Windward EWR/Ecs - Fish & Crab Sampling
Project Number: 08-008-09-41
Contact Name: Marina Mitchell
Sampled By: MBL

Ship to:
Attn:
Shipper:
Form filled out by:
Shipping Date:
Airbill Number:
Turnaround requested:

Sample Collection Date (m/d/y)	Time	Sample Identification	Volume of Sample / # of Containers	Matrix	Test(s) Requested (check test(s) required): Arsenic							Comments / Instructions [Jar tag number(s)]
6/11/09	1246	EW09-S27-008-CHN-W-001	1	Tissue	X							
	1246	EW09-S27-013-CHN-W-001										
	1130	EW09-S27-014-CHN-W-001										
	1130	EW09-S27-014-CHN-W-004										
	1110	EW09-S27-013-CHN-W-001										
	1228	EW09-S27-017-CHN-W-001										
	1228	EW09-S27-017-CHN-W-003	1	Tissue	X							
6/11/09		Total Number of Containers	12	Purchase Order / Statement of Work #								

1) Released by:	1) Rec'd by:	2) Released by:	2) Rec'd by:
Print name: Chelsea Lovera		Print name:	
Signature:	Company:	Signature:	Company:
Company: Windward		Company:	
Date/Time: 6/11/09 4:45	Date/Time:	Date/Time:	Date/Time:

* Distribution: White copies accompany shipment; yellow retained by consignor.

To be completed by Laboratory upon sample receipt:

Date of receipt::	Laboratory W.O. #:
Condition upon receipt:	Time of receipt:
Cooler temperature:	Received by:

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

0C52:00001

CHAIN-OF-CUSTODY/TEST REQUEST FORM

2CP0

Project/Client Name: Windward EWRI/RS - Maintenance Sampling
Project Number: 08-09-09-41
Contact Name: Marina Mitchell
Sampled By: MGL

Ship to:
Attn:
Shipper:
Form filled out by:

Shipping Date:
Airbill Number:
Turnaround requested:

Sample Collection Date (m/d/y)	Time	Sample Identification	Volume of Sample / # of Containers	Matrix	Test(s) Requested (check test(s) required): Arsenic							Comments / Instructions [Jar tag number(s)]
6/11/09	N/A	EW09-CHN-W-SC-comp02	1	Stomach Contents	X							
6/10/09	N/A	EW09-CHN-W-SC-comp01	1									
		EW09-CHN-H-SC-comp01	1									
6/10/09	N/A	EW09-CHN-H-SC-comp02		Stomach	X							
		Total Number of Containers		Purchase Order / Statement of Work #								

1) Released by: Windward	1) Rec'd by:	2) Released by:	2) Rec'd by:
Print name: Chelsea Lorenz		Print name:	
Signature: Chelsea	Company:	Signature:	Company:
Company: Windward		Company:	
Date/Time: 6/11/09 4:45	Date/Time:	Date/Time:	Date/Time:

* Distribution: White copies accompany shipment; yellow retained by consignor.

To be completed by Laboratory upon sample receipt:

Date of receipt::	Laboratory W.O. #:
Condition upon receipt:	Time of receipt:
Cooler temperature:	Received by:

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

00062:00005

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: std
ARI Client Company: Windward	Phone: 206·378·1364
Client Contact: Marina Mitchell	
Client Project Name: EW RI/FS - Fish + Crab Sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 1	of 14
Date: 6-10-2009	Ice Present?
No. of Coolers:	Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-S27-001-CHN-H-001	6-10-2009	10:03	tissue	1	X								
-002		10:03		1	X								
EW09-S27-001-CHN-W-001		10:03		1	X								
EW09-S27-002-CHN-W-001		10:33		1	X								
-002				1	X								
-003				1	X								
-004				1	X								
-005				1	X								
-006				1	X								
-007				1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea Lorenz	(Signature) [illegible]	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: [illegible]	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 11:45	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Std.
ARI Client Company: Windward	Phone: 206-378-1364
Client Contact: Marina Mitchell	
Client Project Name: EW R1 RI/FS - Fish + Crab Sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 2 of 14

Date: 6-10-2009 | Ice Present?

No. of Coolers: | Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Archive								Notes/Comments
EW09-527-002-CHN-H-001	6-10-2009	10:33	tissue	1	X								
-002				1	X								
-003				1	X								
-004		10:33		1	X								
-005		10:33		1	X								
EW09-527-003-CHN-H-001		11:04		1	X								
-002				1	X								
-003				1	X								
-004				1	X								
-005				1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature): Chelsea L	(Signature): Jamie Hayes	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: Jamie Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1645	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

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0052:00007

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Std.
ARI Client Company: Windward	Phone: 206-378-1364
Client Contact: Marina Mitchell	
Client Project Name: EW R21/FS - Fish + Crab Sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 3 of 14	
Date: 6-10-2009	Ice Present?
No. of Coolers:	Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-S27-003-CHN-H-006	6-10-2009	11:04	tissue	1	X								
EW09-S27-006-CHN-W-001		11:56		1	X								
-002				1	X								
-003				1	X								
-004				1	X								
EW09-S27-006-CHN-H-001				1	X								
-002				1	X								
-003				1	X								
-004				1	X								
-005				1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea L	(Signature) Jami Hayes	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: Jami Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1645	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Std.	Page: 4 of 14	
ARI Client Company: Windward	Phone: 206.378.1364	Date: 6-10-2009	Ice Present?
Client Contact: Marina Mitchell		No. of Coolers:	Cooler Temps:
Client Project Name: EW-RI/FS - Fish + Crab Sampling			
Client Project #: 08-08-09-41	Samplers: MGL		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-S27-006-CHN-H-006	6-10-2009	11:56	tissue	1	X								
-007				1	X								
-008				1	X								
-009				1	X								
-010				1	X								
-011				1	X								
-012				1	X								
-013				1	X								
-014				1	X								
-015				1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea L	(Signature) Sami Hayes	(Signature)	(Signature)
	Printed Name: Chelsea Lorentz	Printed Name: Sami Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1640	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Std.
ARI Client Company: Windward	Phone: 206.378.1364
Client Contact: Marina Mitchell	
Client Project Name: SW RI/FS - Fish + Crab Sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 5 of 14	
Date: 6-10-2009	Ice Present?
No. of Coolers:	Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-S27-006-CHN-H-016	6-10-2009	11:56	tissue	1	X								
-017				1	X								
-018				1	X								
-019				1	X								
-020				1	X								
-021		~~13:04~~ 11:56		1	X								
EW09-S27-008-CHN-W-001		13:04		1	X								
-002				1	X								
-003				1	X								
-004				1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea Lorenz	(Signature) Jamie Hayes	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: Jamie Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 4:45	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:
ARI Client Company: Windward	Phone: 206-378-1364
Client Contact: Marina Mitchell	
Client Project Name: EWR/PS - Chinook Sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 6 of 14

Date: 6-10-2009 | Ice Present?

No. of Coolers: | Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09527-007-CHN-H-022	6/10/09	1226	Tissue	1	X								
023				1									
024				1									
025				1									
026				1									
027				1									
028				1									
029				1									
030				1									
EW09527-007-CHN-H-031	6/10/09	1226	Tissue	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: [illegible]	Printed Name:	Printed Name:
	Company: Windward	Company: [illegible]	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 [illegible]	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:
ARI Client Company: Windward	Phone: 206-378-1364
Client Contact: Marina Mitchell	
Client Project Name: EWRI/FS - Chinook Sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 7 of 14

Date: 6.10.2009 Ice Present?

No. of Coolers: Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-S27-007-CHN-H-012	6/10/09	1226	TBSLU	1	X								
013				1									
014				1									
015				1									
016				1									
017				1									
018				1									
019				1									
020				1									
EW09-S27-007-CHN-H-021	6/10/09	1226	TBSLU		X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea L	(Signature) [illegible]	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: Jenni Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1604	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:
ARI Client Company: Windward	Phone: 206-378-1364
Client Contact: Marina Mitchell	
Client Project Name: EWRI/FS - Chinook Sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 2 of 14

Date: 6-11-2009 Ice Present?

No. of Coolers: Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-S27-007-CHN-H-002	6/10/09	1226	TISSUE	1	X								
003				1									
004				1									
005				1									
006				1									
007				1									
008				1									
009				1									
010				1									
EW09-S27-007-CHN-H-011	6/10/09	1226	TISSUE	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: Thom Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1655	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

0062:000013

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 9 of 14	
ARI Client Company: Windward	Phone: 206-378-1364	Date: 6-10-2009	Ice Present?
Client Contact: Maira Mitchell		No. of Coolers:	Cooler Temps:
Client Project Name: EW21/ES - Chinook Sampling			
Client Project #: 08-08-09-411	Samplers: MGL		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Archive								Notes/Comments
EW09-527-005-CHN-H-009	6/10/09	1136	Tissue	1	X								
010				1									
011				1									
012				1									
013				1									
EW09-527-005-CHN-H-014		1136		1									
EW09-527-007-CHN-W-~~015~~ 001		1226		1									
~~016~~ 002				1									
~~017~~ 003				1									
EW09-527-007-CHN-H-~~018~~ 001	6/10/09	1226	Tissue	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea Lorenz	(Signature) Jemi Hayes	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: Jemi Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1045	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 10 of 14	
ARI Client Company: Windward	Phone: 206-378-1364	Date: 6-10-2009	Ice Present?
Client Contact: Marina Mitchell		No. of Coolers:	Cooler Temps:
Client Project Name: EW RI/FS ~~Fish~~ Chinook sampling			
Client Project #: 08-08-09-41	Samplers: MGL		

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Analytical Chemists and Consultants
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Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Archive								Notes/Comments
EW09-527-005-CHN-W-001	6/10/09	1136	Tissue	1	X								
EW09-527-005 CHN-W-002				1	X								
EW09-527-005-CHN-H-001				1	X								
002				1	X								
003				1	X								
004				1	X								
005				1	X								
006				1	X								
007				1	X								
EW09-527-005-CHN#008	6/10/09	1136	tissue	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea L	(Signature) Jami Hayes	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: Jami Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1645	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

QC52:00015

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:
ARI Client Company: Windward	Phone: 206-378-1364
Client Contact: Marina Mitchell	
Client Project Name: EW RI/FS - Chinook Sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 11 of 14

Date: 6-10-2009 Ice Present?

No. of Coolers: Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-S27-007-CHN-H-002	6/10/09	1226	tissue	1	X								
EW09-S27-009-CHN-W-001		1342		1									
002				1									
003				1									
004				1									
005				1									
006				1									
EW09-S27-~~009~~ 010-CHN-W-001		1407		1									
002				1									
003	6/10/09		tissue	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea Lorenz	(Signature) [illegible]	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: [illegible]	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1645	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

QC62:00016

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 12 of 14	
ARI Client Company: Windward	Phone: 206-378-1364	Date: 6-10-2009	Ice Present?
Client Contact: Marna Mitchell		No. of Coolers:	Cooler Temps:
Client Project Name: EWR1/FS-Chinook Sampling			
Client Project #: 08-08-09-41	Samplers: MGL		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Arsenic								Notes/Comments
EW09-S27-007-CHN-H-032	6/10/09	1226	Tissue	1	X								
033				1									
034				1									
035				1									
036				1									
037				1									
038				1									
039				1									
040				1									
EW09-S27-007-CHN-H-041	6/10/09	1226	Tissue	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) Dami Hayes	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: Dami Hayes	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1605	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 13 of 14	
ARI Client Company: Windward	Phone: 206-378-1364	Date: 6-10-2009	Ice Present?
Client Contact: Marina Mitchell		No. of Coolers:	Cooler Temps:
Client Project Name: EWR/FS - Chinook Sampling			
Client Project #: 08-08-09-41	Samplers: MGL		

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Analytical Chemists and Consultants
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Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-527-008-CHN-W-005	6/10/09	1304	TISSUE	1	X								
EW09-527-008-CHN-H-010													
EW09-527-008-CHN-H-001													
EW09-527-008-CHN-H-004	6/10/09	1304	TISSUE	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) [signature]	(Signature) [signature]	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: [illegible]	Printed Name:	Printed Name:
	Company: Windward	Company: ARI	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 [illegible]	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

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0C62:000018

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:
ARI Client Company: Windward	Phone:
Client Contact: Manna Mitchell	
Client Project Name: EW RI/FS - chinook sampling	
Client Project #: 08-08-09-41	Samplers: MGL

Page: 14 of 14

Date: 6-16-2009 Ice Present?

No. of Coolers: Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Archive								Notes/Comments
EW09-527-010-CHN-W-004	6/10/09	1407	tissue	1	X								
EW09-527-011-CHN-W-001		1432	tissue	1	X								
EW09-527-008-CHN-H-005		1304		1	X								
006				1	X								
007				1	X								
008				1	X								
009				1	X								
010				1	X								
EW09-527-008-CHN-H011				1	X								
	6/10/09	1304	tissue	1	X								

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
	(Signature) Chelsea Lorenz	(Signature) [illegible]	(Signature)	(Signature)
	Printed Name: Chelsea Lorenz	Printed Name: [illegible]	Printed Name:	Printed Name:
	Company: Windward	Company: [illegible]	Company:	Company:
	Date & Time: 6/11/09 4:45	Date & Time: 6/11/09 1045	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

0062:000019

K0908773

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested:	Page: 1 of 1	
ARI Client Company:	Phone:	Date: 9/17/09	Ice Present? Y
Client Contact: Sue Dunnihoo	206-695-6200	No. of Coolers: 1	Cooler Temps:
Client Project Name: EW RI/FS - CHINOOK SAMPLING			
Client Project #: UB-08-09-41	Samplers:		

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested								Notes/Comments
EW09-CHN-wild-SC-comp-01	6-10-09	NA	Tissue	1									Limited Volume
EW09-CHN-hatchery-SC-comp-01	6-10-09		Tissue	1									Limited Volume
EW09-CHN-hatchery-SC-comp-02	6-10-09		Tissue	1									Limited Volume
EW09-CHN-W-SC-comp-02	6-11-09		Tissue	1									Limited Volume

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Mikka Mulumba	Printed Name: Les Kennedy	Printed Name:	Printed Name:
	Company: ARI	Company: CAS	Company:	Company:
	Date & Time: 9/17/09 1450	Date & Time: 9/18/09 0845	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Windward environmental LLC

HOMOGENIZATION FORM FOR EW CHINOOK WHOLE-BODY COMPOSITE SAMPLES

Project Name: EW RI/FS – Chinook Sampling **ARI IDs:** PC 42 Box 1

Date(s) Homogenized: 9-22-09 **Homogenized By:** PD **Equipment:** ~~magic bullet~~ magic bullet / spatula PD 9-22-09

ARI ID	SAMPLE ID	COMPOSITE SAMPLE ID EW09-CHN-W-COMP01
PC 42	EW09-S27-011-CHN-W-001	
Box 1	EW09-S27-008-CHN-W-011	
	EW09-S27-002-CHN-W-003	
	EW09-S27-002-CHN-W-004	
Total weight of composited homogenized sample plus jar and lid (g)		258.87g
Weight of jar and lid (g)		203.33g
Total weight of composited homogenized sample (g)		55.54g − 20

35.54

Instructions: Combine the individual fish and homogenize to a smooth, creamy paste. Record equipment used. Provide Windward with the final weight of the homogenized/composited sample and archive samples frozen. The Windward Project Coordinator will provide further analytical instructions. Follow all laboratory SOPs for instrument decontamination to ensure that the integrity of the composite sample is maintained with no cross contamination between composite samples.

Number of Specimens for sample EW09-CHN-W-comp01 = 4 Pic 100-0046

SAMPLE VOLUME IS EXTREMELY LIMITED FOR CHEMICAL ANALYSIS. PLEASE USE EXTREME CARE TO PRESERVE ALL AVAILABLE TISSUE.

Additional Notes:

Wind Ward environmental LLC

HOMOGENIZATION FORM FOR EW CHINOOK WHOLE-BODY COMPOSITE SAMPLES

Project Name: EW RI/FS – Chinook Sampling **ARI IDs:**

Date(s) Homogenized: 9/22/09 **Homogenized By:** WC **Equipment:** Magic Bullet spatula

ARI ID	SAMPLE ID	ARI ID	SAMPLE ID	COMPOSITE SAMPLE ID EW09-CHN-W-COMP02
PC42	EW09-S27-014-CHN-W-003		EW09-S27-018-CHN-W-002	
	EW09-S27-019-CHN-W-003		EW09-S27-009-CHN-W-002	
BOX 2	EW09-S27-009-CHN-W-001		EW09-S27-013-CHN-W-001	
	EW09-S27-005-CHN-W-002		EW09-S27-006-CHN-W-004	
	EW09-S27-019-CHN-W-001		EW09-S27-008-CHN-W-002	
	EW09-S27-009-CHN-W-003		EW09-S27-018-CHN-W-004	
	EW09-S27-008-CHN-W-003		EW09-S27-009-CHN-W-004	
	EW09-S27-008-CHN-W-008		EW09-S27-017-CHN-W-002	
	EW09-S27-019-CHN-W-004		EW09-S27-019-CHN-W-006	
	EW09-S27-008-CHN-W-005		EW09-S27-019-CHN-W-005	
	EW09-S27-008-CHN-W-007		EW09-S27-010-CHN-W-001	
	EW09-S27-018-CHN-W-003		EW09-S27-009-CHN-W-006	
	EW09-S27-008-CHN-W-006		EW09-S27-019-CHN-W-002	
	EW09-S27-002-CHN-W-002		EW09-S27-014-CHN-W-002	
			Total weight of composited homogenized sample plus jar and lid (g)	423.50g
			Weight of jar and lid (g)	329.03g
			Total weight of composited homogenized sample (g)	94.47g

Instructions: Combine the individual fish and homogenize to a smooth, creamy paste. Record equipment used. Provide Windward with the final weight of the homogenized/composited sample and archive samples frozen. The Windward Project Coordinator will provide further analytical instructions. Follow all laboratory SOPs for instrument decontamination to ensure that the integrity of the composite sample is maintained with no cross contamination between composite samples.

Number of Specimens for sample EW09-CHN-W-comp02 = 28 PiC 106-0047

SAMPLE VOLUME IS EXTREMELY LIMITED FOR CHEMICAL ANALYSIS. PLEASE USE EXTREME CARE TO PRESERVE ALL AVAILABLE TISSUE.

Additional Notes:

Windward environmental LLC

HOMOGENIZATION FORM FOR EW CHINOOK WHOLE-BODY COMPOSITE SAMPLES

Project Name: EW RI/FS – Chinook Sampling **ARI IDs:**

Date(s) Homogenized: 9-22-09 **Homogenized By:** PV **Equipment:** Magic bullet / spatula

ARI ID	SAMPLE ID	ARI ID	SAMPLE ID	COMPOSITE SAMPLE ID EW09-CHN-W-COMP03
	EW09-S27-014-CHN-W-001		EW09-S27-008-CHN-W-004	
PC42	EW09-S27-002-CHN-W-001		EW09-S27-008-CHN-W-010	
	EW09-S27-021-CHN-W-001		EW09-S27-021-CHN-W-002	
BOX 3x	EW09-S27-005-CHN-W-001		EW09-S27-007-CHN-W-003	
	EW09-S27-010-CHN-W-002		EW09-S27-006-CHN-W-002	
	EW09-S27-017-CHN-W-001		EW09-S27-010-CHN-W-003	
	EW09-S27-008-CHN-W-001		EW09-S27-007-CHN-W-001	
	EW09-S27-022-CHN-W-002		EW09-S27-009-CHN-W-005	
	EW09-S27-010-CHN-W-004		EW09-S27-014-CHN-W-004	
	EW09-S27-018-CHN-W-001		EW09-S27-017-CHN-W-003	
	EW09-S27-008-CHN-W-009		EW09-S27-006-CHN-W-001	
	EW09-S27-006-CHN-W-003		EW09-S27-007-CHN-W-002	
	EW09-S27-022-CHN-W-001			
	EW09-S27-020-CHN-W-001		EW09-S27-021-CHN-W-003	
			Total weight of composited homogenized sample plus jar and lid (g)	420.16g
			Weight of jar and lid (g)	329.76g
			Total weight of composited homogenized sample (g)	90.4g

Instructions: Combine the individual fish and homogenize to a smooth, creamy paste. Record equipment used. Provide Windward with the final weight of the homogenized/composited sample and archive samples frozen. The Windward Project Coordinator will provide further analytical instructions. Follow all laboratory SOPs for instrument decontamination to ensure that the integrity of the composite sample is maintained with no cross contamination between composite samples.

Number of Specimens for sample EW09-CHN-W-comp03 = 27 pic 100-0048

SAMPLE VOLUME IS EXTREMELY LIMITED FOR CHEMICAL ANALYSIS. PLEASE USE EXTREME CARE TO PRESERVE ALL AVAILABLE TISSUE.

Additional Notes:

Wind Ward environmental LLC

HOMOGENIZATION FORM FOR EW CHINOOK WHOLE-BODY COMPOSITE SAMPLES

Project Name: EW RI/FS – Chinook Sampling **ARI IDs:**

Date(s) Homogenized: 9/22/09 **Homogenized By:** WC **Equipment:** Magic Bullet & spatula

ARI ID	SAMPLE ID	ARI ID	SAMPLE ID	COMPOSITE SAMPLE ID EW09-CHN-H-COMP01
	EW09-S27-008-CHN-H-015		EW09-S27-007-CHN-H-030	
PC42	EW09-S27-006-CHN-H-001		EW09-S27-007-CHN-H-029	
	EW09-S27-008-CHN-H-002		EW09-S27-007-CHN-H-016	
	EW09-S27-007-CHN-H-041		EW09-S27-007-CHN-H-004	
Box 44-46	EW09-S27-007-CHN-H-027		EW09-S27-007-CHN-H-012	
	EW09-S27-006-CHN-H-007		EW09-S27-008-CHN-H-001	
	EW09-S27-002-CHN-H-001		EW09-S27-007-CHN-H-009	
	EW09-S27-006-CHN-H-013		EW09-S27-007-CHN-H-040	
	EW09-S27-006-CHN-H-010		EW09-S27-007-CHN-H-037	
	EW09-S27-003-CHN-H-006		EW09-S27-002-CHN-H-003	
	EW09-S27-007-CHN-H-042		EW09-S27-006-CHN-H-011	
	EW09-S27-002-CHN-H-004		EW09-S27-007-CHN-H-028	
	EW09-S27-007-CHN-H-038		EW09-S27-007-CHN-H-018	
	EW09-S27-007-CHN-H-039		EW09-S27-002-CHN-H-002	
	EW09-S27-007-CHN-H-013		EW09-S27-007-CHN-H-036	
	EW09-S27-007-CHN-H-010		EW09-S27-005-CHN-H-003	
	EW09-S27-007-CHN-H-017		EW09-S27-006-CHN-H-012	
	EW09-S27-007-CHN-H-024		EW09-S27-006-CHN-H-016	
			Total weight of composited homogenized sample plus jar and lid (g)	448.86
			Weight of jar and lid (g)	331.79g
			Total weight of composited homogenized sample (g)	117.07

Instructions: Combine the individual fish and homogenize to a smooth, creamy paste. Record equipment used. Provide Windward with the final weight of the homogenized/composited sample and archive samples frozen. The Windward Project Coordinator will provide further analytical instructions. Follow all laboratory SOPs for instrument decontamination to ensure that the integrity of the composite sample is maintained with no cross contamination between composite samples.

Number of Specimens for sample EW09-CHN-H-comp01 = 36 Pic 100-0050

SAMPLE VOLUME IS EXTREMELY LIMITED FOR CHEMICAL ANALYSIS. PLEASE USE EXTREME CARE TO PRESERVE ALL AVAILABLE TISSUE.

Additional Notes:

Windward environmental LLC

HOMOGENIZATION FORM FOR EW CHINOOK WHOLE-BODY COMPOSITE SAMPLES

Project Name: EW RI/FS – Chinook Sampling **ARI IDs:**

Date(s) Homogenized: 9-22-09 **Homogenized By:** PD **Equipment:** magic bullet / spatula

ARI ID	SAMPLE ID	ARI ID	SAMPLE ID	COMPOSITE SAMPLE ID EW09-CHN-H-COMP02
	EW09-S27-006-CHN-H-005		EW09-S27-005-CHN-H-010	
	EW09-S27-005-CHN-H-006		EW09-S27-005-CHN-H-004	
PC42	EW09-S27-008-CHN-H-010		EW09-S27-008-CHN-H-008	
	EW09-S27-008-CHN-H-006		EW09-S27-006-CHN-H-019	
BOX	EW09-S27-007-CHN-H-026		EW09-S27-007-CHN-H-031	
SA	EW09-S27-007-CHN-H-021		EW09-S27-008-CHN-H-007	
5B	EW09-S27-005-CHN-H-001		EW09-S27-003-CHN-H-004	
	EW09-S27-003-CHN-H-001		EW09-S27-008-CHN-H-012	
	EW09-S27-003-CHN-H-002		EW09-S27-006-CHN-H-020	
	EW09-S27-005-CHN-H-002		EW09-S27-006-CHN-H-009	
	EW09-S27-006-CHN-H-018		EW09-S27-001-CHN-H-001	
	EW09-S27-007-CHN-H-034		EW09-S27-006-CHN-H-004	
	EW09-S27-007-CHN-H-006		EW09-S27-008-CHN-H-003	
	EW09-S27-007-CHN-H-007		EW09-S27-008-CHN-H-004	
	EW09-S27-006-CHN-H-006		EW09-S27-007-CHN-H-022	
	EW09-S27-007-CHN-H-008		EW09-S27-007-CHN-H-001	
	EW09-S27-002-CHN-H-005			
	EW09-S27-005-CHN-H-005		EW09-S27-007-CHN-H-033	
			Total weight of composited homogenized sample plus jar and lid (g)	455.21g
			Weight of jar and lid (g)	327.76g
			Total weight of composited homogenized sample (g)	127.45g

Instructions: Combine the individual fish and homogenize to a smooth, creamy paste. Record equipment used. Provide Windward with the final weight of the homogenized/composited sample and archive samples frozen. The Windward Project Coordinator will provide further analytical instructions. Follow all laboratory SOPs for instrument decontamination to ensure that the integrity of the composite sample is maintained with no cross contamination between composite samples.

Number of Specimens for sample EW09-CHN-H-comp02 = 35 Pic 100-0051

SAMPLE VOLUME IS EXTREMELY LIMITED FOR CHEMICAL ANALYSIS. PLEASE USE EXTREME CARE TO PRESERVE ALL AVAILABLE TISSUE.

Additional Notes:

Windward environmental LLC

HOMOGENIZATION FORM FOR EW CHINOOK WHOLE-BODY COMPOSITE SAMPLES

Project Name: EW RI/FS – Chinook Sampling **ARI IDs:**

Date(s) Homogenized: 9/22/09 **Homogenized By:** WC **Equipment:** Magic bullet/Spatula

ARI ID	SAMPLE ID	ARI ID	SAMPLE ID	COMPOSITE SAMPLE ID EW09-CHN-H-COMP03
	EW09-S27-003-CHN-H-003		EW09-S27-007-CHN-H-005	
	~~EW09-S27-006-CHN-H-008~~	MM 1.29.10	EW09-S27-007-CHN-H-019	
PC42	EW09-S27-007-CHN-H-011		EW09-S27-007-CHN-H-035	
	EW09-S27-008-CHN-H-009		EW09-S27-005-CHN-H-011	
Box 6A	EW09-S27-007-CHN-H-025		EW09-S27-005-CHN-H-007	
	EW09-S27-006-CHN-H-014		EW09-S27-006-CHN-H-015	
6B	EW09-S27-006-CHN-H-003		EW09-S27-001-CHN-H-002	
	EW09-S27-007-CHN-H-032		EW09-S27-005-CHN-H-012	
	EW09-S27-007-CHN-H-023		EW09-S27-005-CHN-H-008	
	EW09-S27-008-CHN-H-014		EW09-S27-006-CHN-H-002	
	EW09-S27-007-CHN-H-014		EW09-S27-008-CHN-H-017	
	EW09-S27-008-CHN-H-016		EW09-S27-006-CHN-H-021	
	EW09-S27-007-CHN-H-020		EW09-S27-003-CHN-H-005	
	EW09-S27-007-CHN-H-003		EW09-S27-006-CHN-H-017	
	EW09-S27-007-CHN-H-015		EW09-S27-005-CHN-H-014	
	EW09-S27-008-CHN-H-005		EW09-S27-007-CHN-H-002	
	EW09-S27-005-CHN-H-009			
	EW09-S27-008-CHN-H-013		EW09-S27-005-CHN-H-013	
			Total weight of composited homogenized sample plus jar and lid (g)	447.42g
			Weight of jar and lid (g)	327.22g
			Total weight of composited homogenized sample (g)	120.20g

Instructions: Combine the individual fish and homogenize to a smooth, creamy paste. Record equipment used. Provide Windward with the final weight of the homogenized/composited sample and archive samples frozen. The Windward Project Coordinator will provide further analytical instructions. Follow all laboratory SOPs for instrument decontamination to ensure that the integrity of the composite sample is maintained with no cross contamination between composite samples.

Number of Specimens for sample EW09-CHN-H-comp03 = 35 PIC 100-0049

SAMPLE VOLUME IS EXTREMELY LIMITED FOR CHEMICAL ANALYSIS. PLEASE USE EXTREME CARE TO PRESERVE ALL AVAILABLE TISSUE.

Additional Notes:

Columbia Analytical Services, Inc.

Service Request Number(s):	K0908773

TISSUE HOMOGENIZATION DATA

Laboratory ID	Weight of Sample* (g)	Tare of Jar (g)		Matrix	Number per Sample	
K0908773-001	1.462	79.434		Stomach contents		
K0908773-002	1.428	78.984	AB 9/24/09			
K0908773-003	2.806	~~78.618~~	79.412			
K0908773-004	0.909	78.618				

AB 9/24/09

Comments:

* The weight of sample is after homogenization.

Balance ID: 21-B	Date Balance Checked: 9/24/09
Analyst: Angela Black	Date: 9/24/09
Reviewed:	Date:

R\:ICP\misc\digforms\TISSUEBENCHSHT