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McNeil Island: Intertidal Screening Survey for Toxic Chemicals in Water, Sediment, and Clam Tissue

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ABSTRACT

Priority pollutant metals and organics concentrations were measured in freshwater discharges, intertidal sediments, and clam tissues from McNeil Island to determine if contamination documented on the island has migrated into Puget Sound. The level of chemical contamination was found to be generally low and in the range of values typically reported for reference (background) areas of Puget Sound. An exception was sediment from the outlet of Eden Creek Reservoir which contained elevated concentrations of arsenic, chromium, lead, and polyaromatic hydrocarbons. Chromium and polyaromatic hydrocarbon concentrations in sediments from this site exceeded the 90th percentile level reported for sediments from urban areas of Puget Sound.

INTRODUCTION

McNeil Island which occupies an area of approximately seven square miles in southern Puget Sound, was the site of a federal penitentiary between 1873 and 1981. In 1981 the island was acquired by the Washington State Department of Corrections which currently operates it as a state correctional facility, housing approximately 1,000 inmates. In support of the penitentiary, a number of activities have taken place including shipbuilding, cannery operations, furniture refinishing, motor vehicle maintenance and repair, dairy and agricultural farming, electrical power generation, and landfill waste disposal. As a result of these activities and associated disposal practices, contamination of soil and ground water on the island with a variety of organic compounds and metals has occurred (Hart Crowser, 1987). However, the extent to which these contaminants have migrated off the island into Puget Sound has not been adequately investigated. The Toxics Investigations and Ground Water Monitoring Section (TIGWMS) was therefore requested by Ecology's Southwest Regional Office (SWRO) to conduct a study aimed at characterizing the occurrence of toxic chemicals in the nearshore marine environment around McNeil Island, specifically below drainage from contaminated areas. The data generated from this investigation will be used in conjunction with information from the McNeil Island Preliminary Site Assessment: Phase II being conducted by Hart Crowser, Inc., to prioritize areas requiring further characterization work or cleanup activities.

METHODS

Sampling

Water, sediment, and clam sampling was conducted April 18-19, 1988, by Art Johnson and Dale Norton from TIGWMS, and Toby Michelena of the SWRO. Sampling locations are shown in Figure 1.

Water - Water samples were collected as grabs by directly filling sample containers at the point where drains/creeks discharged to the beach. Containers used were as

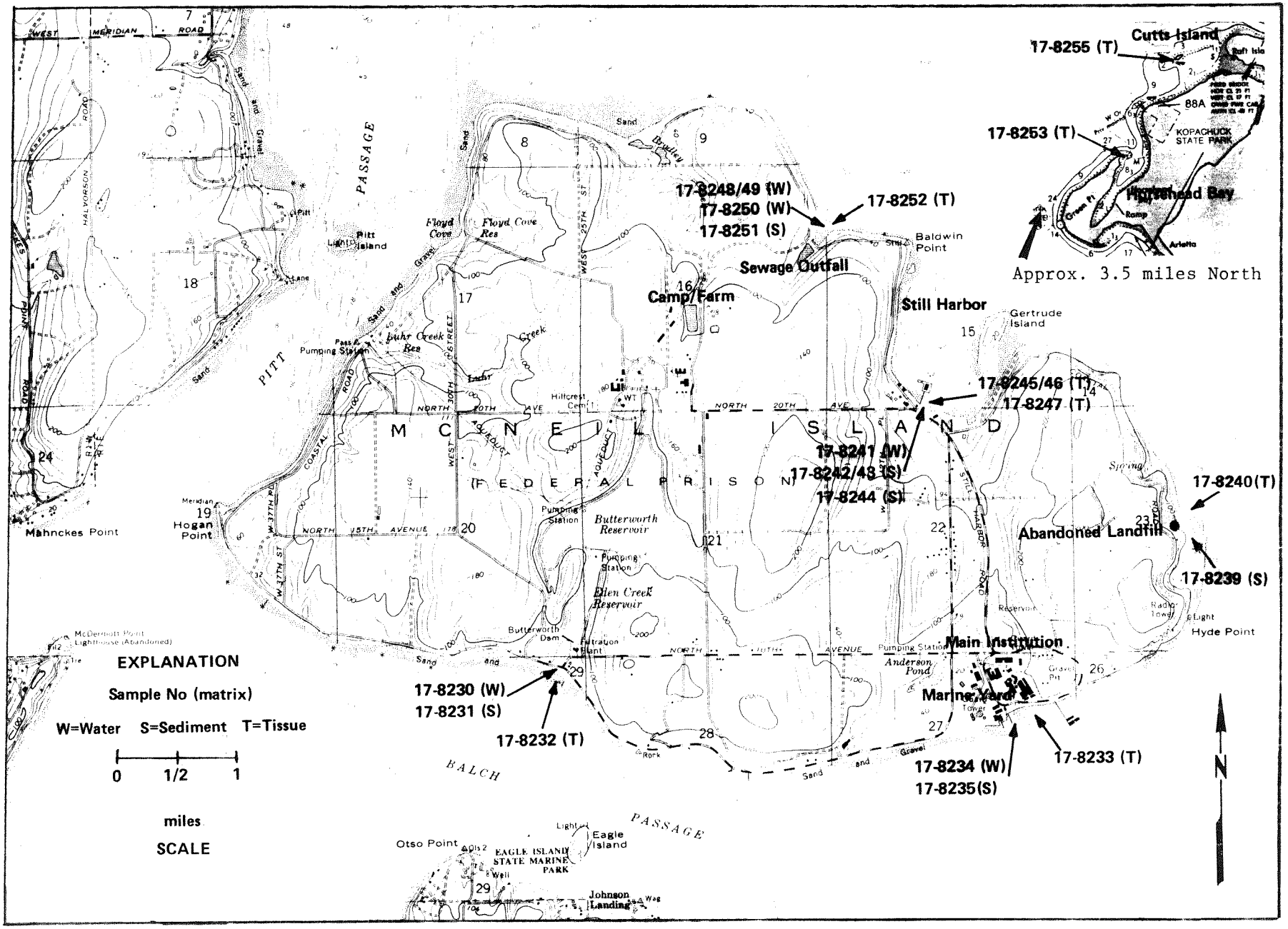

Figure 1: McNeil Island site map and station locations.

follows: total suspended solids, 500 mL polyethylene; total organic carbon, 40 mL glass vials with 1 mL H_2SO_4 added as preservative; and volatile organics, 40 mL glass vials with teflon septa obtained from I-Chem, Hayward, California. Flow was measured with a Marsh-McBirney magnetic flow meter and top-setting rod.

Sediment - Intertidal sediments were collected at low tide immediately below the point of discharge of drains/creeks, using 1.5-inch ID stainless steel core tubes. Fine-grained materials were preferentially selected when available. To characterize each location, the top 2 cm layer only from several cores was composited into a stainless steel beaker and homogenized by stirring with a stainless steel spoon. Sub-samples for total organic carbon, percent moisture, metals, and organics analyses were then placed in priority pollutant-cleaned 8-oz. glass jars with teflon lined lids obtained from I-Chem, Hayward, California. Aliquots for grain size analysis were placed in Whirl-pack bags.

Tissue - Clam samples were dug with a shovel, as close to specific discharges as possible. Only undamaged clams were retained for analysis. These were first rinsed in on-site seawater and then allowed to depurate for 24 hours in 5-gallon plastic buckets filled with on-site seawater. At the end of the depuration period the clams were removed, wrapped in aluminum foil, placed in plastic bags, and frozen overnight pending dissection the following day at the Ecology/EPA Manchester Environmental Laboratory. For each sample, the clams were partially thawed, measured, all soft tissues removed, composited, and homogenized in a Waring blender. The homogenized tissue was then placed in 8-oz. glass jars (previously described) and stored at $4^{o}C$ until analyzed. Information on clams collected at each location is summarized in Table 1.

Immediately after collection, all water and sediment samples were wrapped in plastic bags and stored on ice for transport to the Ecology/EPA Manchester Environmental Laboratory. All equipment used in sampling and dissection (i.e., core tubes, spoons, beakers, dissection tools, and blenders) was precleaned with sequential washes of liquinox detergent/hot tap water, 10 percent nitric acid, distilled/dieonized water, pesticide-grade methylene chloride, and pesticide-grade acetone.

Analysis

Target chemicals, analytical methods, and laboratories used in this investigation are listed in Table 2. Quality of the data set was evaluated through the use of blanks, spiked samples, duplicates, and analysis of a standard reference material.

Metals- Metals data for sediment and tissue samples were considered acceptable without qualifications, being within precision and accuracy goals of +/- 20 percent established for this project, for all target metals except arsenic, lead, and copper in tissue. Results of the Manchester Laboratory's analysis of Japan's National Institute of Environmental Studies (NEIS) certified reference material No. 6 (mussel tissue) are summarized in Table 3. Arsenic values for tissue are reported in Table 5 as estimates due to low matrix spike recoveries (50 percent) and low accuracy obtained (30 percent) on analysis of the NEIS certified reference material. Lead concentrations in tissue are

Table 1. Data on clams collected by Ecology April 18-19, 1988 for the McNeil Island screening investigation.

Location	Sample Number	Species+ (number)	Size (mm) Mean (range)
Eden Creek Res. @ Outlet	17-8232	Butter (15)	65 (58-78)
Main Institution	17-8233	Butter (15)	68 (57-85)
Hyde Point	17-8240	Butter (8)	86 (64-98)
Still Harbor (duplicate)	17-8245/46	Native Littleneck (37)	52 (40-62)
" " (replicate)	17-8247	Native Littleneck (35)	53 (43-63)
Camp/Farm Sewage Outlet	17-8252	Native Littleneck (20)	57 (46-67)
Horsehead Bay (control)	17-8253	Native Littleneck (25)	57 (52-63)
Cutts Island (control)	17-8255	Butter (8)	83 (75-89)

+ = Butter = *Saxidomus giganteus*
Native Littleneck = *Protothaca staminea*

Table 2. Field and analytical methods for McNeil Island Screening Investigation.

Analysis	Method	Reference	Laboratory
		-WATER-	
Flow	Marsh-McBirney	--	Field
Temperature	Precision Thermometer	--	"
pH	Beckman model 21	--	"
Specific Conductance	Beckman model RB-5	--	"
Total Suspended Solids	Dry @ 103-105°C	APHA, 1985	Ecology/EPA Manchester Lab
Total Organic Carbon	Persulfate-UV Oxidation		Manchester, Wa.
Volatile Organics	Purge and Trap/GC-MS/ method 624	EPA, 1984a	Analytical Resources, Inc. Seattle, Wa.
		-SEDIMENT-	
Percent Moisture	Dry @ 105°C	APHA, 1985	Laucks Testing Laboratories
Total Organic Carbon	Combustion CO_2 measurement	in-house	Seattle, Wa.
Grain Size	Seive and pipet	Holme, 1971	" "
As, Hg, Pb	Atomic absorption spectroscopy	EPA contract lab program SOW	Ecology/EPA Manchester Lab Manchester, Wa.
Cd, Cr, Cu, Zn	Inductively coupled plasma	No. 785 July, 1985a	" "
Semivolatile Organics	Stable isotope dilution/GC-MS method 1625c	EPA, 1988	Analytical Resources, Inc. Seattle, Wa.
Pesticide/PCB	GC-ECD method 8080	EPA, 1984b	" "
		-TISSUE-	
Percent Moisture	Dry @ 105°C	APHA, 1985	Analytical Resources, Inc.
Percent Lipids	Grammetric	EPA, 1980a	Seattle, Wa.
As, Hg, Pb	Atomic absorption spectroscopy	EPA contract lab program SOW	Ecology/EPA Manchester Lab Manchester, Wa.
Cd, Cr, Cu, Zn	Inductively coupled plasma	No. 785 July, 1985a	" "
Semivolatile Organics	GC-MS method 625	EPA, 1984a	Analytical Resources, Inc.
Pesticide/PCB	GC-ECD method 8080	EPA, 1984b	Seattle, Wa.

Table 3. Results of analysis of NEIS Certified Reference Material No. 6 (Mussel Tissue). (results expressed in mg/kg, dry weight)

Metal	Certified Value	Acceptable Range-1	Reported Values+ AA	ICP
Arsenic	9.2 ± 0.5	7.0-12	6.4	--
Cadmium	0.82 ± 0.03	0.63-1.0	--	0.92
Chromium	0.63 ± 0.07	0.45-0.84	--	0.81
Copper	4.9 ± 0.3	3.7-6.2	--	4.5
Lead	0.91 ± 0.04	0.70-1.1	0.22	--
Mercury*	0.05	0.04-0.06	0.04	--
Zinc	106 ± 6.0	80-136	--	95

1 = Accuracy goal of ± 20 percent established for this project.
+ = Reported as mean of duplicate analysis.
* = Reference value not certified; analyzed by atomic absorption spectroscopy:cold vapor method.

not reported due to poor precision on duplicate analyses (relative percent difference = 120 percent) and extremely low accuracy results (75 percent) obtained on analysis of the NEIS reference material. Copper results for tissue are flagged as estimates due to method blank contamination.

Organics- Quality assurance review of semivolatiles data on sediments was performed by Roger McGinnis of Ecology and Environment, Inc., Seattle, Washington. Roy Araki of the Ecology/EPA Manchester Environmental Laboratory reviewed all other organics results (i.e., volatiles, semivolatiles and pesticide/PCB). In the opinion of the reviewers, no major problems were encountered in the analyses of these samples, and, consequently, the data set is considered acceptable with the following qualifications. Methylene chloride and acetone, common laboratory contaminants, were detected at low levels in method blanks; as a result, all detected values for these two compounds have been flagged. Based on calibration results, detection limits for several semivolatile compounds in sediments should be considered estimates and have also been flagged where appropriate. Laboratory precision estimated from duplicate analyses, was excellent for all organics being within +/- 20 percent. Accuracy of the organics analyses was evaluated through the use of labeled compound recoveries. Recoveries were acceptable for all organics analyses except semivolatiles in tissue. In several instances matrix spike recoveries for semivolatile organics in tissue exceeded quality control (QC) limits established by the EPA contract laboratory program for a soil/sediment matrix. While no QC limits exist for a tissue matrix, these results suggest that if concentrations of target compounds were reported above detection limits, they could overestimate actual environmental levels. This is not expected to impact the data set since no semivolatiles were detected in tissue samples. Detection limits for semivolatiles in tissue were in the range of 70-350 ug/kg (i.e., ppb) wet weight. Results for semivolatile organic compounds in sediment have been recovery corrected.

RESULTS

Water and Sediment

The results of analysis of water and sediment samples collected by Ecology April 18-19, 1988, from McNeil Island freshwater discharges are summarized in Table 4. A complete list of all organic compounds analyzed and associated detection limits are shown in Appendix 1.

Good agreement was seen between analysis of replicate (two individual samples collected at the same locations: water - Camp/Farm sewage outlet; sediment - Still Harbor) samples, suggesting that single grabs of water and sediment were representative of the conditions present at the time of sampling. Conventionals data on water samples can be summarized as follows. Flow in individual discharges ranged from 0.03 - 0.18 cfs. pH was consistent ranging from 7.3 - 7.5. Specific conductivity measurements indicate that all discharges except the Marine Yard storm drain were flushed of saltwater at the time of sampling. Total suspended solids concentrations

Table 4. Summary of chemicals detected in water/sediment samples collected by Ecology 4/18-19/1988 from McNeil Island freshwater discharges. (metals - mg/kg; organics - ug/kg, dry weight basis unless otherwise indicated)

Location	Eden Creek Res. @ Outlet		Marine Yard Storm Drain		Hyde Point Landfill	Still Harbor			Camp/Farm Sewage Outlet		
Matrix	Water	Sediment	Water	Sediment	Sediment	Water	Sediment	Sediment	Water	Water	Sediment
Sample No. 17-	8230	8231	8234	8235	8239	8241	8242/43+	8244	8248/49+	8250	8251
Flow (cfs)	0.15	--	0.18	--	--	0.03	--	--	--	--	--
Temperature (°C)	11.7	--	13.1	--	--	8.6	--	--	10.9	--	--
pH (S.U.)	7.3	--	7.3	--	--	7.4	--	--	7.5	7.5	--
Spec. Cond. (umhos/cm)	260	--	3400	--	--	85	--	--	385	380	--
TSS (mg/L)	3	--	4	--	--	1	--	--	15	14	--
TOC											
Water (mg/L)	6.8	--	17	--	--	18	--	--	27	25	--
Sediment (%)	--	7.8	--	0.6	0.7	--	0.8	0.6	--	--	0.5
Moisture (%)	--	92.8	--	18.1	29.4	--	19.3	18.6	--	--	18.6
Grain Size (%)											
Gravel (>2mm)	--	<2	--	<2	<2	--	<2	<2	--	--	<2
Sand (2mm-62um)	--	14.2	--	97.2	91	--	95	93	--	--	83.8
Silt (62um-4um)	--	24.4	--	1.9	6.0	--	4.0	5.5	--	--	14.3
Clay (<4um)	--	61.4	--	0.9	3.0	--	1.5	1.5	--	--	1.9
Metals											
Arsenic	--	**22**	--	**0.4**	**2.3**	--	**0.7**	**0.8**	--	--	**1.2**
Cadmium	--	0.2U	--	0.5U	**0.6**	--	0.5U	0.5U	--	--	0.5U
Chromium	--	**70**	--	**12**	**14**	--	**12**	**14**	--	--	**13**
Copper	--	**28**	--	**13**	**11**	--	**9.2**	**8.4**	--	--	**16**
Lead	--	**22**	--	**2.8**	**4.2**	--	**3.5**	**4.0**	--	--	**6.9**
Mercury*	--	**0.03**	--	**0.03**	**0.03**	--	**0.02**	**0.03**	--	--	**0.03**
Zinc	--	**58**	--	**40**	**30**	--	**39**	**41**	--	--	**40**
Volatiles (ug/L)											
Methylene Chloride	**2.0B**	--	**1.3B**	--	--	**0.5JB**	--	--	**3.6B**	**0.7JB**	--
Acetone	0.6U	--	0.6U	--	--	0.6U	--	--	**6.6B**	**5.1B**	--
Chloroform	**0.5J**	--	**2.1**	--	--	**0.4J**	--	--	**24**	**21**	--
Bromodichloromethane	0.2U	--	0.2U	--	--	0.2U	--	--	**2.2**	**2.3**	--
Tetrachloroethene	0.6U	--	**0.6J**	--	--	0.6U	--	--	0.6U	0.6U	--
Toluene	0.6U	--	0.6U	--	--	0.6U	--	--	**4.7**	**4.1**	--
Semivolatiles											
Phenol	--	360U	--	26U	**60**	--	**16J**	**36**	--	--	24U
4-Methylphenol	--	360U	--	26U	**33**	--	**41**	**46**	--	--	**17J**
Bis (2-ethylhexyl) phthalate	--	**420**	--	83UJ	57UJ	--	39UJ	44UJ	--	--	34UJ
Di-n-Buthylphthalate	--	360U	--	**54**	21U	--	26U	23U	--	--	24U
Carbazole	--	**1100**	--	26U	21U	--	20U	23U	--	--	24U
Anthracene	--	**360**	--	26U	21U	--	**50J**	**65**	-	--	24U
Phenanthrene	--	**6400**	--	**39**	21U	--	**110**	**66**	--	--	24U
Sum LPAH	--	**6800**	--	**39**	--	--	**160J**	**130**	--	--	--
Fluoranthene	--	**20000**	--	**83**	23UJ	--	**220**	**150**	--	--	20UJ
Benzo (a) Anthracene	--	**1700**	--	26U	21U	--	**120**	**140**	--	--	24U
Chrysene	--	**5600**	--	**29**	**13J**	--	**190**	**190**	--	--	24U
Pyrene	--	**14000**	--	50UJ	15UJ	--	**220**	**250**	--	--	18UJ
Benzo (b) Fluoranthene	--	**3600**	--	24UJ	21U	--	100UJ	**140**	--	--	24U
Benzo (k) Fluoranthene	--	**3100**	--	18UJ	21U	--	97UJ	**120**	--	--	24U
Benzo (a) Pyrene	--	**1600**	--	26U	21U	--	89UJ	**110**	--	--	24U
Dibenzo (a,h) Anthracene	--	**350J**	--	26U	21U	--	26U	**11J**	--	--	24U
Indeno (1,2,3-cd) Pyrene	--	**1500**	--	26U	21U	--	26U	**39**	--	--	24U
Benzo (ghi) Perylene	--	**1500**	--	13UJ	12UJ	--	22U	34UJ	--	--	24U
Sum HPAH	--	**53000J**		**110**	**13J**	--	**750**	**1200**	--	--	--
Pesticide/PCB											
Pesticides	--	ND	--	ND	ND	--	ND	ND	--	--	ND
Arochlor 1254	--	400U	--	40U	40U	--	40U	40U	--	--	**25J**

-- = Not Analyzed
ND = Not detected, see appendix one for complete list of analytes.
* = Reported on wet weight basis
+ = Reported as mean of duplicate analysis

U = Not detected at detection limit shown
J = Estimated conc.; see quality assurance section for details
B = Analyte found in blank as well as sample

were relatively low ranging from 1 - 15 mg/L (i.e., ppm). Total organic carbon ranged from 6.8 - 27 mg/L, with the highest values occurring in the Camp/Farm sewage outlet.

Six volatile organic compounds were detected in discharges targeted for sampling. As previously mentioned, detection of methylene chloride and acetone in these samples is the result of laboratory contamination. Chloroform was detected in all five discharges at concentrations between 0.5 and 24 ug/L (i.e., ppb). The highest levels were present in the Camp/Farm sewage outlet, as would be expected since chloroform and other trihalomethanes are commonly produced when freshwater is disinfected with chlorine (EPA, 1980b). The highest concentrations of bromodichloromethane, another trihalomethane, and toluene, a volatile aromatic hydrocarbon, were also detected in the Camp/Farm sewage outlet at approximately 2 and 4 ug/L, respectively. Tetrachloroethene was present at an estimated concentration of 0.6 ug/L in the Marine Yard storm drain.

Intertidal sediments, with the exception of sample no. 17-8231 from the outlet of Eden Creek Reservoir, can be characterized as sandy with low total organic carbon concentrations in the range of 0.5 - 0.8 percent and a moisture content of 18 - 29 percent. This is in contrast to sediments from the outlet of Eden Creek Reservoir which were primarily fine material with a total organic carbon concentration of 7.8 percent and a moisture content of 93 percent. A similar pattern was seen with respect to metals and organics data in that the chemical composition of sediments from the outlet of Eden Creek Reservoir was quite different from that of the other sites. The highest sediment concentrations of arsenic (22 mg/kg; i.e., ppm), chromium (70 mg/kg), copper (28 mg/kg), lead (22 mg/kg) and zinc (58 mg/kg) were present at the outlet of Eden Creek Reservoir. Concentrations of metals in the remaining sediment samples were relatively low. Difference in grain size between sites is no doubt one of the primary reasons for the apparent metals patterns.

A total of 20 organic compounds were detected in sediments from the five sampling sites. Again, the highest concentrations of most constituents (primarily polyaromatic hydrocarbons [PAH]) occurred in sediments from the outlet of Eden Creek Reservoir. As noted earlier this is probably a function of grain size as well as total organic carbon content. A number of PAHs were also detected in sediment from Still Harbor (total PAH = 1300 ug/kg). In addition, Still Harbor sediments contained the highest concentration of 4-methylphenol (46 ug/kg). Phenol was detected at 60 ug/kg in sediment below the abandoned landfill at Hyde Point. Arochlor 1254 was detected at an estimated concentration of 25 ug/kg at the Camp/Farm sewage outlet.

Tissue

Summarized in Table 5 are the results of metals and organics analyses of clam tissue samples collected by Ecology April 18-19, 1988, from McNeil Island and control stations on Horsehead Bay and Cutts Island.

Table 5. Summary of compounds detected in clam tissue samples collected by Ecology April 18-19, 1988, from McNeil Island, WA. (metals - mg/kg; organics - ug/kg, wet weight basis)

	McNEIL ISLAND						CONTROL	
Location	Eden Creek Res. Outlet	Main Inst.	Hyde Pt.	Still Harbor		Camp/ Farm	Horsehead Bay	Cutts Island
Species	BC	BC	BC	LN	LN	LN	LN	BC
Sample No. 17-	8232	8233	8240	8245/46+	8247	8252	8253	8255
Moisture (%)	12.5	13.5	15	10.6	11.0	11.3	10.7	15.3
Lipids (%)	4.7	5.2	4.2	3.8	3.9	4.3	4.4	4.0
Metals								
Arsenic	1.9J	2.2J	1.7J	1.4J	1.1J	1.3J	1.4J	2.4J
Cadmium	0.06	0.13	0.09	0.34	0.29	0.31	0.35	0.16
Chromium	0.54	0.40	0.93	0.27	0.1U	0.22	0.23	0.47
Copper	2.0J	2.5J	1.7J	0.96J	0.68J	0.99J	0.75J	2.3J
Mercury	0.012	0.0097	0.0079	0.011	0.011	0.0097	0.012	0.0097
Zinc	9.2	12.0	8.5	15.0	16.0	13.0	10.0	9.4
Organics								
Semivolatiles	ND	ND	ND	ND	ND	ND	ND	ND
Pesticides/PCB	ND	ND	ND	ND	ND	ND	ND	ND
Miscellaneous								
Benzoic Acid	260M	ND	ND	700M	380M	460M	ND	ND

LN = Native Littleneck (*Protothaca staminea*)
BC = Butter clams (*Saxidomus giganteus*)
\+ = Reported as mean of duplicate analysis
ND = Not detected; see appendix one for complete list of analytes and detection limits
M = Estimated value of analyte, confirmed by analyst but has low spectral match
U = Not detected at detection limit shown
J = Estimated value, see quality assurance section for details

Lipids content of the clam samples ranged between 3.8 and 5.2 percent. Metals concentrations were fairly consistent in all clams from McNeil Island, ranging between a factor of 2 to 9 for individual metals. Compared to control samples from Horsehead Bay (native littlenecks) and Cutts Island (butters), metals concentrations in clams from McNeil Island do not appear to be substantially elevated, with the possible exception of chromium in butter clams from Hyde Point (factor of 2).

No semivolatile organic or pesticide/PCB compounds were detected in clams from any of the collection areas with the following detection limits: semivolatiles, 70-350 ug/kg wet weight; Pesticide/PCB, 2-40 ug/kg wet weight; except toxaphene 200 ug/kg wet weight. Estimated concentrations of benzoic acid in the range of 250-700 ug/kg were seen in 50 percent of the tissue samples.

DISCUSSION

Table 6 compares concentrations of volatile organics detected in freshwater discharges (primarily the Camp/Farm sewage outlet) from McNeil Island with data on effluents from municipal wastewater treatment plants in the U.S. and available EPA water quality criteria for the protection of saltwater aquatic life. As previously mentioned, the Camp/Farm sewage outlet contained the highest concentrations of chloroform (24 ug/L), bromodichloromethane (2.3 ug/L), and toluene (4.7 ug/L) measured during the present study. These concentrations fall in the lower end of values seen in effluents from municipal treatment plants across the U.S.. In addition, no dilution would be required for the levels of chloroform, bromodichloromethane, tetrachloroethene, or toluene measured in any of the discharges sampled from McNeil Island to meet EPA criteria for the protection of saltwater aquatic life.

To place intertidal sediment results from this investigation into perspective, representative metals and organics concentrations reported in Puget Sound sediments are summarized in Table 7. Also included in Table 7 are "apparent effects threshold" (AET) values developed for Puget Sound sediments in an attempt to estimate contaminant concentrations above which deleterious effects would be observed in marine benthic communities (PTI, 1988). These data indicate that metals concentrations measured in McNeil Island intertidal sediments during the present investigation fall in the range of values typically reported in sediments from Puget Sound reference (i.e., background) areas, with the exception of arsenic, chromium, and lead in sediments from the outlet of Eden Creek Reservoir. Arsenic (22 mg/kg), chromium (70 mg/kg), and lead (22 mg/kg) concentrations in sediments at the outlet of Eden Creek Reservoir are above the 90th percentile level reported for Puget Sound reference areas. In addition, arsenic is above the median value reported for non-reference areas (i.e., urban bays) while chromium is above the 90th percentile level for non-reference areas. None of the sediment metals concentrations measured during this investigation exceeded AET values.

Table 6. Comparison of volatile organics detected in McNeil Island freshwater discharges with concentrations measured in effluents from publicly owned U.S. treatment plants and available water quality criteria. (concentrations reported in ug/L)

		U.S. Public Treatment Plant Effluents					
				Concentration		EPA Saltwater Criteria	
Compound	McNeil Island median (range)	Number of Samples	Percent Detected	Minimum	Maximum	Acute	Chronic
Chloroform	2.1 (0.4J-24)	302	82	1	87	620*	1400*
Bromodichloromethane	0.2U (0.2U-2.3)	302	16	1	6	12000+	6400+
Tetrachloroethene	0.6U (0.6U-0.6J)	--	--	--	--	10200	450
Toluene	0.6U (0.6U-4.7)	302	53	1	1100	6300	5000

* = Calculated using water quality screening assessment methodology
+ = Criteria for halomethanes
U = Not detected at detection limit shown
J = Estimated concentration, see quality assurance section for details

References:
EPA, 1985b. "Water Quality Screening Assessment"
EPA, 1986. "Quality Criteria for Water"

Table 7. Comparison of metals and organics data on McNeil Island intertidal sediments with concentrations reported in other Puget Sound sediments. (metals - mg/kg; organics - ug/kg, dry weight basis)

	McNeil Island median (range)	Reference Areas-1			Non-Reference Areas-2			Apparent Effects Thresholds-3	
		Minimum	Median	90 %	Minimum	Median	90 %	Amphipod	Benthic
Metals									
Arsenic	1.0 (0.4-22)	1.9	5.6	20	1.2	11	39	93	57
Cadmium	0.5U (0.2u-0.6)	0.1	0.7	1.5	0.01U	0.62	3.2	6.7	5.1
Chromium	14 (12-70)	9.6	40	67	5.4	31	66	270	260
Copper	12 (8.4-28)	3.6	33	57	3.8	55	90	1300	530
Lead	4.1 (2.8-22)	0.1U	9.6	20	4.4	48	220	660	450
Mercury	0.03 (0.02-0.04)	0.016	0.055	0.11	0.01	0.23	1.1	2.1	2.1
Zinc	40 (30-58)	15	76	95	18	100	320	960	410
Semivolatiles									
Phenol	36 (16J-60)	4.3U	--	--	1.7	130	500	1200	1200
4-Methylphenol	37 (17J-46)	10U	--	--	10	180	760	3600	1800
Bis (2-ethylhexyl) phthalate	51UJ (34UJ-420)	--	--	--	--	--	--	>3100	1300
Di-n-Buthylphthalate	24U (21U-54)	--	--	--	--	--	--	1400	>5100
Carbazole	24U (20U-1100)	--	--	--	--	--	--	--	--
Anthracene	38UJ (21U-360)	2.7	6	--	1U	110	530	13000	4400
Phenanthrene	53 (21U-6400)	2.6	14	--	1U	290	1300	6900	5400
Sum LPAH	150J (39-6800)	2.5	24	160	1.3	850	4400	24000	13000
Fluoranthene	120 (20UJ-20000)	9.6	24	91	1U	530	2300	30000	24000
Benzo (a) Anthracene	73U (21U-1700)	2.6	5.5	--	1U	530	2300	5100	5100
Chrysene	110 (13J-5600)	3.9	10	--	1U	420	2000	9200	9200
Pyrene	140UJ (15UJ-14000)	11	22	114	1U	630	2300	16000	16000
Total benzofluoranthenes	120UJ (21U-6700)	9.1	18	--	2.6	710	3600	7800	9900
Benzo (a) Pyrene	58UJ (21U-1600)	4.1	8.4	--	1U	350	1700	3000	3600
Dibenzo (a,h) Anthracene	25U (11J-350J)	3.3U	--	--	1U	52	450	540	970
Indeno (1,2,3-cd) Pyrene	26U (21U-1500)	6.6	--	--	1.6	170	840	1800	2600
Benzo (ghi) Perylene	23U (12UJ-1500)	4.0	7.6	--	1U	180	1300	1400	2600
Sum HPAH	750 (13J-53000J)	22	76	200	1.3	3400	4400	69000	69000
Total PCBs	-- (25J)	2.7	8.6	--	0.5U	120	1200	3100	1000

Source: Tetra Tech, 1986. Users Manual for the Pollutants of Concern Matrix.

1-Reference Areas - Sites within Puget Sound considered to be relatively pristine
2-Non-Reference Areas - All sites within Puget Sound that do not meet reference area definition
3-PTI, 1988
Amphipod: based on bioassay with marine amphipod Rhepoxynius abronius
Benthic: based on analysis of benthic infaunal communities

U = Not detected at detection limit shown
J = Estimated concentration; see quality assurance section for details
- = No data

While the concentrations of arsenic, chromium, and lead in sediments at the outlet of Eden Creek Reservoir are not expected to cause adverse effects on benthic communities, they do appear to be higher than would be expected. Water discharged at this location consists primarily of overflow from Eden Creek Reservoir and filter backwash from the islands drinking water treatment plant (Hart Crowser, 1987).

Data from other parts of Puget Sound suggest that priority pollutant organics levels in McNeil Island intertidal sediments are in the range of concentrations reported for relatively clean areas of Puget Sound, with the exception of low molecular weight PAH (LPAH) and high molecular weight PAH (HPAH) in samples from the outlet of Eden Creek Reservoir and Still Harbor. At the outlet of Eden Creek Reservoir, LPAH and HPAH levels are above the 90th percentile of concentrations measured in Puget Sound urban areas. Still Harbor LPAH and HPAH concentrations, while not as high as those reported in urban areas, are higher than the 90th percentile of concentrations for clean areas of Puget Sound. Potentially higher concentrations of PAH compounds than reported during this investigation could exist in Still Harbor sediments if a nearby sink for fine-grained material is present. Priority pollutant organics in intertidal sediments from McNeil Island did not exceed levels considered deleterious to benthic communities (as indicated by AETs).

To place results of metals analysis of McNeil Island clam samples into perspective, typical values for Puget Sound shellfish are summarized in Table 8. These data indicate that metals concentrations measured in clams during the present investigation are in relatively good agreement with previous studies of McNeil Island shellfish conducted in 1987 by the Washington State Department of Natural Resources (DNR) except for arsenic. However, as previously explained, Ecology's arsenic measurements are probably 50 percent low. Comparing metals concentrations in McNeil Island shellfish with values from other parts of Puget Sound indicates that clams from McNeil Island contain metals concentrations in the range of values typically seen in other parts of Puget Sound. Incidentally, based on the limited amount of data presented here, metals concentrations measured in butter- and native littleneck clams throughout Puget Sound appear to be relatively consistent.

Also shown in Table 8 is a summary of legal limits for hazardous metals in fish and fishery products compiled by the Food and Agricultural Organization of the United Nations from 29 countries. Arsenic and cadmium were the only metals in McNeil Island clams that exceeded criteria listed for countries other than the U.S. No U.S criteria exist for arsenic and cadmium in fishery products.

Elevated levels of arsenic are commonly seen in shellfish due to their ability to concentrate it from seawater. It is generally agreed that for most marine species arsenic exists as arsenobetaine, a water-soluble organoarsenical. The potential risks associated with consumption of seafoods containing arsenobetaine seem to be minor (Eisler, 1988). In addition, Floyd Frost an epidemiologist with the Washington State Department of Social and Health Services (DSHS), reviewed the data on arsenic in McNeil Island clams and concluded that the observed levels did not pose a human

Table 8. Comparison of metals concentrations in clams collected by Ecology April 18-19, 1988 from McNeil Island with other data on Puget Sound shellfish. (mg/kg, wet weight)

Location	McNeil Island		Puget Sound Ranges-1		Legal Limits-2
	Ecology, 1988	Jamison, 1987	Reference	Non-reference	
Metal	mean (range) No. Samples	mean (range) No. Samples	mean (range) No. Samples	mean (range) No. Samples	mean (range)
Arsenic	1.6 (1.1J-2.2J)[6]	3.9 (2.1-9.0)[9]	2.7 (1.9-3.7)[18]	2.9 (1.3-4.8)[44]	2.3 (0.1-10)
Cadmium	0.20 (0.06-0.34)[6]	0.38 (0.07-0.61)[9]	0.22 (0.09-0.40)[20]	0.25 (0.04-0.56)[49]	0.91 (0-5.5)
Chromium	0.41 (0.1U-0.93)[6]	--	-- (0.55)[1]	0.50 (0.08-0.82)[7]	1.0 (1.0)
Copper	1.5 (0.68J-2.5J)[6]	2.0 (1.1-7.4)[9]	1.4 (0.38-2.8)[18]	1.6 (0.6-4.2)[37]	18 (10-100)
Mercury	0.01 (0.0079-0.012)[6]	0.02U (0.02U-0.022)[9]	0.02 (0.012-0.02)[13]	0.02 (0.01-0.068)[38]	0.75 (0.1-1.0)
Zinc	12 (9.2-16)[6]	15 (14-16)[9]	15 (12-18)[20]	15 (12-21)[49]	160 (30-1000)

1 -Reference- areas considered to be relatively pristine

-Non-reference - all other areas that don't meet reference definition

2 -Compiled by Food and Agricultural Organization of the United Nations

U = Not detected at detection limit shown

J = Estimated concentration, see quality assurance section for details

- = No data

Jamison, 1987-*Saxidomus giganteus*, *Protothaca staminea*.

Faigenblum, 1987-*Saxidomus giganteus*, *Protothaca staminea*.

Yake *et al.*, 1984-*Saxidomus giganteus*, *Protothaca staminea*.

health hazard (Frost, 1987). While the relationship between tissue-cadmium concentrations and hazards to the organism or its consumer are not well documented, the available data suggest that consumption of organisms with tissue concentrations of 13-15 mg/kg wet weight represents a significant hazard to animals of higher trophic levels (Eisler, 1985). The highest concentrations of cadmium (0.61 mg/kg) measured in McNeil Island clams are over 20 times lower than this level.

SUMMARY

Based on the results of this investigation, it appears that current discharges from McNeil Island are having little impact on nearshore concentrations of priority pollutant metals and organics in intertidal sediments and clam tissues. An exception to this general finding are sediments from the outlet of Eden Creek Reservoir which contained concentrations of chromium and polyaromatic hydrocarbon that were above the 90th percentile level reported for sediments from urban areas of Puget Sound. Arsenic and lead concentrations also appeared to be enriched at this location. Concentrations of priority pollutant metals and organics in the remainder of intertidal sediment and tissue samples from McNeil Island fall into the range of values typically seen in clean areas of Puget Sound.

RECOMMENDATIONS

- Additional sampling should be conducted at the outlet of Eden Creek Reservoir to determine the extent of arsenic, chromium, lead and polyaromatic hydrocarbon contamination at this location. This sampling should also attempt to ascertain if on-going sources of these compounds are present.

- If a nearby sink of fine-grained material exists in the vicinity of the Still Harbor loading dock, sediment samples should be obtained and analyzed for priority pollutant PAH compounds.

References

APHA, 1985. Standard Methods for the Examination of Water and Wastewater. 16th ed.

Eisler, 1985. Cadmium Hazards to Fish, Wildlife and Invertebrates: A Synoptic Review. Biological Report 85(1.2) USFWS Patuxent Wildlife Research Center, Laurel, MD.

Eisler, 1988. Arsenic Hazards to Fish, Wildlife and Invertebrates: A Synoptic Review. Biological Report 85(1.12) USFWS Patuxent Wildlife Research Center, Laurel, MD.

EPA, 1980a. Manual of Analytical Methods for the Analyses of Pesticides in Humans and Environmental Samples. EPA 600/18-80-038.

EPA, 1980b. Ambient Water Quality Criteria for Chloroform. EPA 440/5-80-033. Office of Water Regulations and Standards. Washington, D.C.

EPA, 1984a. Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act; Final Rule and Interium Final Rule and Proposed Rule. Fed. Reg. 40 CFR Part 136. Vol. 49 No. 209.

EPA, 1984b. Test Methods for Evaluating Solid Waste.

EPA, 1985a. Contract Laboratory Program Statement of Work, No. 785 July, 1985.

EPA, 1985b. Water Quality Screening Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water- Part 1. EPA 600/6-85/002a. Environmental Research Laboratory, Athens, Ga.

EPA, 1986. Quality Criteria for Water 1986. EPA 440/5-86-001. Office of Regulations and Standards, Washington, D.C..

EPA, 1988. Draft Method 1625 revision C, February 15, 1988.

Faigenblum, 1988. Chemicals and Bacteriological Organisms in Recreational Shellfish. Prepared by Wash. St. Dept. of Social and Health Services and EPA Region X Office of Puget Sound.

Frost, 1987. Review of Metals and Organics data on McNeil Island Clams. Letter to John DeMeyer Manager of Aquatic Lands Wash. St. Dept. of Natural Resources, Dated July 30, 1987.

Hart Crowser, 1987. Preliminary Contaminant Assessment McNeil Island Corrections Center Vol. 1. Prepared for the Washington State Department of General Administration. Report No. J-1893-02

Holme, N.A. and A.D. McIntyre, 1971. Methods for Study of the Marine Benthos. Internat. Biol. Prog. Handbook No. 16.

Jamison, D.W., 1987. McNeil Island Clam Study: Survey of Possible Contamination of Beach and Subtidal Clams. Wash. St. Dept. of Natural Resources. 10 pp plus appendices.

PTI, 1988. Sediment Quality Values Refinement: Vol. 1 Update and evaluation of Puget Sound AET. Prepared for Tetra Tech, Inc. and EPA Region X Office of Puget Sound, Seattle, Wa.

Tetra Tech, 1986. Users Guide for the Pollutants of Concern Matrix. Prepared for EPA; Puget Sound Estuary Program. 64 pp plus appendices.

Yake, W.E, J. Joy and A. Johnson, 1984. Chemical Contaminants in Clams and Crabs from Eagle Harbor, Washington State, with emphasis on Polynuclear Aromatic Hydrocarbons. Wash. St. Dept. of Ecology 28 pp.

APPENDIX

ANALYTICAL
RESOURCES
INCORPORATED

nalytical
Chemists &
Consultants

333 Ninth Ave North
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Eden Creek @ Outlet (water)

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 178230

Lab Sample ID: 1504A
Sample Matrix: Waters

QC Report No: 1504-WDOE
Project No: McNeil
Date Received: 04/21/88

Data Release Authorized: Brian R. Dobe

Instrument: FINN III
Date Analyzed: 04/28/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**2.0 B**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	**Chloroform**	**0.5 J**
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-01-5	cis-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-02-6	Trans-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

***Volatile Organic Surrogate Recoveries**

d8-Toluene	104%
Bromofluorobenzene	108%
d4-1,2-Dichloroethane	101%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 04/29/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
J	Indicates an estimated value when result is less than specified detection limit.

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
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(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 1625

Sample No: 178231

Lab Sample ID No: 1504G
Sample Matrix: Soils/Sediments

QC Report No: 1504-WDOE
Project No: McNeil Island
Date Received: 04/21/88

Date Release Authorized: [signature]

Amount extracted: 2.8 gm (Dry Weight)
Percent Moisture: 93.4%
pH: 6.6
Conc/Dilution: 2 to 1 after GPC (total 1 to 1)

Date extracted: 04/29/88
Date Analyzed: 05/14/88
GPC Clean-up: YES (1 of 2)

CAS Number		µg/Kg	Rec
108-95-2	Phenol	360 U	74.1%
111-44-4	bis(2-Chloroethyl)Ether	360 U	55.5%
95-57-8	2-Chlorophenol	360 U	67.4%
541-73-1	1,3-Dichlorobenzene	360 U	59.3%
106-46-7	1,4-Dichlorobenzene	360 U	61.9%
100-51-6	Benzyl Alcohol	1800 U	IS
95-50-1	1,2-Dichlorobenzene	360 U	60.2%
95-48-7	2-Methylphenol	360 U	82.4%
39638-32-9	bis(2-chloroisopropyl)Ether	570 U	64.6%
106-44-5	4-Methylphenol	360 U	82.4%
621-64-7	N-Nitroso-Di-n-Propylamine	360 U	IS
67-72-1	Hexachloroethane	390 UC	50.9%
98-95-3	Nitrobenzene	360 U	67.8%
78-59-1	Isophorone	360 U	119%
88-75-5	2-Nitrophenol	360 U	69.6%
105-67-9	2,4-Dimethylphenol	360 UC	86.1%
65-85-0	Benzoic Acid	3600 U	IS
111-91-1	bis(2-Chloroethoxy)Methane	360 U	74.5%
120-83-2	2,4-Dichlorophenol	360 U	83.2%
120-82-1	1,2,4-Trichlorobenzene	360 U	66.2%
87-61-6	1,2,3-Trichlorobenzene	360 U	71.7%
91-20-3	Naphthalene	360 U	73.5%
106-47-8	4-Chloroaniline	1100 U	IS
87-68-3	Hexachlorobutadiene	390 U	66.3%
59-50-7	4-Chloro-3-Methylphenol	360 UC	93.8%
91-57-6	2-Methylnaphthalene	360 U	IS
77-47-4	Hexachlorocyclopentadiene	360 UR	0.0%
88-06-2	2,4,6-Trichlorophenol	360 U	76.6%
95-95-4	2,4,5-Trichlorophenol	360 U	78.5%
91-58-7	2-Chloronaphthalene	360 U	88.2%
88-74-4	2-Nitroaniline	1800 U	IS
131-11-3	Dimethyl Phthalate	360 U	99.0%
208-96-8	Acenaphthylene	360 U	89.4%
99-09-2	3-Nitroaniline	1800 U	IS
83-32-9	Acenaphthene	360 U	88.7%

CAS Number		µg/Kg	Rec
51-28-5	2,4-Dinitrophenol	890 U	74.5%
100-02-7	4-Nitrophenol	430 U	105%
132-64-9	Dibenzofuran	360 U	IS
121-14-2	2,4-Dinitrotoluene	360 U	114%
606-20-2	2,6-Dinitrotoluene	360 UJ	58.4%
84-66-2	Diethylphthalate	360 U	93.5%
7005-72-3	4-Chlorophenyl-phenylether	360 U	97.1%
86-73-7	Fluorene	360 U	91.9%
100-01-6	4-Nitroaniline	1800 U	IS
534-52-1	4,6-dinitro-2-methylphenol	360 U	99.4%
86-30-6	N-Nitrosodiphenylamine(1)	360 U	91.2%
122-39-4	Diphenylamine	360 U	107%
122-66-7	1,2-Diphenylhydrazine *	360 U	99.0%
101-55-3	4-Bromophenyl-phenylether	360 U	93.2%
118-74-1	Hexachlorobenzene	360 U	115%
87-86-5	Pentachlorophenol	570 U	44.9%
85-01-8	**Phenanthrene**	**6400**	94.8%
120-12-7	**Anthracene**	**360**	78.7%
86-74-8	**Carbazole ***	**1100**	89.1%
84-74-2	Di-n-Butylphthalate	360 U	91.0%
206-44-0	**Fluoranthene**	**20000**	91.4%
129-00-0	**Pyrene**	**14000**	88.9%
85-68-7	Butylbenzylphthalate	360 U	95.5%
91-94-1	3,3'-Dichlorobenzidine	360 U	20.8%
56-55-3	**Benzo(a)Anthracene**	**1700**	83.7%
117-81-7	**bis(2-Ethylhexyl)Phthal**	**420**	88.8%
218-01-9	**Chrysene**	**5600**	88.1%
117-84-0	Di-n-Octyl Phthalate	360 U	81.3%
205-99-2	**Benzo(b)Fluoranthene**	**3600**	80.6%
207-08-9	**Benzo(k)Fluoranthene**	**3100**	89.1%
50-32-8	**Benzo(a)Pyrene**	**1600**	79.5%
193-39-5	**Indeno(1,2,3-cd)Pyrene**	**1500**	85.7%
53-70-3	**Dibenz(a,h)Anthracene**	**350 T**	85.7%
191-24-2	**Benzo(ghi)Perylene**	**1500**	86.6%

60 ppm Total PAH

IS Value relative to 2-Fluorobiphenyl Internal Std
* Value calculated from 1:1 response to labeled analog
T Less than DL but considered real by analyst
C Corrected for analog contribution to quant ion
(1) Cannot be separated from diphenylamine
** Labeled Dibenz(a,h) anthracene used for surrogate
B Analyte found in the blank as well as sample
Values not corrected for analog recoveries

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
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Eden Creek @ Outlet (sediment)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 1782 31

Lab Sample ID: 1504 G
Matrix: Soil
VTSR: 4/21/88

Date Extracted: 04/25/88
Date Analyzed: 04/30/88
Conc/Dil Factor: 1:10
Dry Weight Extracted: 2.59

QC Report No.: 1504-WDOE
Project No.: NA
GPC Cleanup: NO
Alumina Cleanup: YES

Data Release Authorized: Peter M. Ziegler

CAS Number		ug/Kg
319-84-6	Alpha-BHC	20 U
319-85-7	Beta-BHC	20 U
319-86-8	Delta-BHC	20 U
58-89-9	Gamma-BHC (Lindane)	20 U
76-44-8	Heptachlor	20 U
309-00-2	Aldrin	20 U
1024-57-3	Heptachlor Epoxide	20 U
959-98-8	Endosulfan I	20 U
60-57-1	Dieldrin	40 U
72-55-9	4,4'-DDE	40 U
72-20-8	Endrin	40 U
33212-65-9	Endosulfan II	40 U
72-54-8	4,4'-DDD	40 U
1031-07-8	Endosulfan Sulfate	40 U
50-29-3	4,4'-DDT	40 U
72-43-5	Methoxychlor	40 U
53494-70-5	Endrin Ketone	40 U
57-74-9	Chlordane	200 U
8001-35-2	Toxaphene	2000 U
12674-11-2	Aroclor-1016	400 U
53469-21-9	Aroclor-1242	400 U
12672-29-6	Aroclor-1248	400 U
11097-69-1	Aroclor-1254	400 U
11096-82-5	Aroclor-1260	400 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	**89%**

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

Eden Creek @ Outlet (clams)

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

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ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178232

Lab Sample ID: 1524A
Sample Matrix: Clam Tissues

QC Report No: 1524-WDOE
Project No: [Araki]
Date Received: 04/28/88

Date Release Authorized: Brian W. Culver

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 57.0 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

CAS Number		µg/Kg
108-95-2	Phenol	70 U
111-44-4	bis(2-Chloroethyl)Ether	70 U
95-57-8	2-Chlorophenol	70 U
541-73-1	1,3-Dichlorobenzene	70 U
106-46-7	1,4-Dichlorobenzene	70 U
100-51-6	Benzyl Alcohol	350 U
95-50-1	1,2-Dichlorobenzene	70 U
95-48-7	2-Methylphenol	70 U
39638-32-9	bis(2-chloroisopropyl)Ether	70 U
106-44-5	4-Methylphenol	70 U
621-64-7	N-Nitroso-Di-n-Propylamine	70 U
67-72-1	Hexachloroethane	140 U
98-95-3	Nitrobenzene	70 U
78-59-1	Isophorone	70 U
88-75-5	2-Nitrophenol	350 U
105-67-9	2,4-Dimethylphenol	140 U
65-85-0	**Benzoic Acid**	**260 M**
111-91-1	bis(2-Chloroethoxy)Methane	70 U
120-83-2	2,4-Dichlorophenol	210 U
120-82-1	1,2,4-Trichlorobenzene	70 U
91-20-3	Naphthalene	70 U
106-47-8	4-Chloroaniline	210 U
87-68-3	Hexachlorobutadiene	140 U
59-50-7	4-Chloro-3-Methylphenol	140 U
91-57-6	2-Methylnaphthalene	70 U
77-47-4	Hexachlorocyclopentadiene	350 U
88-06-2	2,4,6-Trichlorophenol	350 U
95-95-4	2,4,5-Trichlorophenol	350 U
91-58-7	2-Chloronaphthalene	70 U
88-74-4	2-Nitroaniline	350 U
131-11-3	Dimethyl Phthalate	70 U
208-96-8	Acenaphthylene	70 U
99-09-2	3-Nitroaniline	350 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	70 U
51-28-5	2,4-Dinitrophenol	700 U
100-02-7	4-Nitrophenol	350 U
132-64-9	Dibenzofuran	70 U
121-14-2	2,4-Dinitrotoluene	350 U
606-20-2	2,6-Dinitrotoluene	350 U
84-66-2	Diethylphthalate	70 U
7005-72-3	4-Chlorophenyl-phenylether	70 U
86-73-7	Fluorene	70 U
100-01-6	4-Nitroaniline	350 U
534-52-1	4,6-Dinitro-2-Methylphenol	700 U
86-30-6	N-Nitrosodiphenylamine(1)	70 U
101-55-3	4-Bromophenyl-phenylether	70 U
118-74-1	Hexachlorobenzene	70 U
87-86-5	Pentachlorophenol	350 U
85-01-8	Phenanthrene	70 U
120-12-7	Anthracene	70 U
84-74-2	Di-n-Butylphthalate	70 U
206-44-0	Fluoranthene	70 U
129-00-0	Pyrene	70 U
85-68-7	Butylbenzylphthalate	70 U
91-94-1	3,3'-Dichlorobenzidine	350 U
56-55-3	Benzo(a)Anthracene	70 U
117-81-7	bis(2-Ethylhexyl)Phthalate	70 U
218-01-9	Chrysene	70 U
117-84-0	Di-n-Octyl Phthalate	70 U
205-99-2	Benzo(b)Fluoranthene	70 U
207-08-9	Benzo(k)Fluoranthene	70 U
50-32-8	Benzo(a)Pyrene	70 U
193-39-5	Indeno(1,2,3-cd)Pyrene	70 U*
53-70-3	Dibenz(a,h)Anthracene	70 U
191-24-2	Benzo(ghi)Perylene	70 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	76.1%
2-Fluorobiphenyl	83.1%
d14-p-Terphenyl	90.3%

***Acid surrogate recoveries**

d5-Phenol	80.1%
2-Fluorophenol	52.2%
2,4,6-Tribromophenol	89.5%

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Eden Creek @ Outlet (clams)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 178232

Lab Sample ID: 1524 A
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/10/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 61.67

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: Peter M. Kepler

CAS Number		ug/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	**109%**

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NR — Indicates not reported due to chromatographic interference and/or dilution.

Marine Yard storm drain (water)

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ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 178234

Lab Sample ID: 1504RB
Sample Matrix: Waters

QC Report No: 1504-WDOE
Project No: McNeil
Date Received: 04/21/88

Data Release Authorized: _____

Instrument: FINN III
Date Analyzed: 04/28/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**1.3 B**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	**Chloroform**	**2.1**
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-01-5	cis-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-02-6	Trans-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	**Tetrachloroethene**	**0.6 J**
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

***Volatile Organic Surrogate Recoveries**

d8-Toluene	98.5%
Bromofluorobenzene	102%
d4-1,2-Dichloroethane	95.2%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 04/29/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
J	Indicates an estimated value when result is less than specified detection limit.

Marine Yard storm drain (sediment)

ANALYTICAL RESOURCES INCORPORATED

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ORGANICS ANALYSIS DATA SHEET - METHOD 1625

Sample No: 178235

Lab Sample ID No: 1504H
Sample Matrix: Soils/Sediments

QC Report No: 1504-WDOE
Project No: McNeil Island
Date Received: 04/21/88

Date Release Authorized: [signature]

Amount extracted: 38.4 gm (Dry Weight)
Percent Moisture: 24.3%
pH: 6.5
Conc/Dilution: 2 to 1 after GPC (total 1 to 1)

Date extracted: 04/29/88
Date Analyzed: 05/14/88
GPC Clean-up: YES (1 of 2)

CAS Number		µg/Kg	Rec
108-95-2	Phenol	26 U	85.2%
111-44-4	bis(2-Chloroethyl)Ether	26 U	74.2%
95-57-8	2-Chlorophenol	26 U	83.2%
541-73-1	1,3-Dichlorobenzene	26 U	85.9%
106-46-7	1,4-Dichlorobenzene	26 U	87.4%
100-51-6	Benzyl Alcohol	130 U	IS
95-50-1	1,2-Dichlorobenzene	26 U	84.2%
95-48-7	2-Methylphenol	26 U	90.4%
39638-32-9	bis(2-chloroisopropyl)Ether	42 U	84.4%
106-44-5	4-Methylphenol	26 U	90.4%
621-64-7	N-Nitroso-Di-n-Propylamine	26 U	IS
67-72-1	Hexachloroethane	29 UC	71.6%
98-95-3	Nitrobenzene	26 U	90.4%
78-59-1	Isophorone	26 U	151%
88-75-5	2-Nitrophenol	26 U	82.3%
105-67-9	2,4-Dimethylphenol	26 UC	94.5%
65-85-0	Benzoic Acid	260 U	IS
111-91-1	bis(2-Chloroethoxy)Methane	26 U	92.1%
120-83-2	2,4-Dichlorophenol	26 U	87.5%
120-82-1	1,2,4-Trichlorobenzene	26 U	80.1%
87-61-6	1,2,3-Trichlorobenzene	26 U	86.9%
91-20-3	Naphthalene	26 U	90.5%
106-47-8	4-Chloroaniline	78 U	IS
87-68-3	Hexachlorobutadiene	29 U	79.9%
59-50-7	4-Chloro-3-Methylphenol	26 UC	94.8%
91-57-6	2-Methylnaphthalene	26 U	IS
77-47-4	Hexachlorocyclopentadiene	26 UR	0.0%
88-06-2	2,4,6-Trichlorophenol	26 U	71.0%
95-95-4	2,4,5-Trichlorophenol	26 U	82.8%
91-58-7	2-Chloronaphthalene	26 U	96.1%
88-74-4	2-Nitroaniline	130 U	IS
131-11-3	Dimethyl Phthalate	26 U	91.4%
208-96-8	Acenaphthylene	26 U	95.3%
99-09-2	3-Nitroaniline	130 U	IS
83-32-9	Acenaphthene	26 U	92.2%

CAS Number		µg/Kg	Rec
51-28-5	2,4-Dinitrophenol	65 U	66.2%
100-02-7	4-Nitrophenol	31 U	91.7%
132-64-9	Dibenzofuran	26 U	IS
121-14-2	2,4-Dinitrotoluene	26 U	121%
606-20-2	2,6-Dinitrotoluene	26 UJ	63.1%
84-66-2	Diethylphthalate	26 U	118%
7005-72-3	4-Chlorophenyl-phenylether	26 U	98.6%
86-73-7	Fluorene	26 U	96.5%
100-01-6	4-Nitroaniline	130 U	IS
534-52-1	4,6-Dinitro-2-Methylphenol	26 U	95.0%
86-30-6	N-Nitrosodiphenylamine(1)	26 U	94.2%
122-39-4	Diphenylamine	26 U	114%
122-66-7	1,2-Diphenylhydrazine *	26 U	94.5%
101-55-3	4-Bromophenyl-phenylether	26 U	93.1%
118-74-1	Hexachlorobenzene	26 U	112%
87-86-5	Pentachlorophenol	42 U	48.8%
85-01-8	**Phenanthrene**	**39**	91.1%
120-12-7	Anthracene	26 U	90.1%
86-74-8	Carbazole *	26 U	88.1%
84-74-2	**Di-n-Butylphthalate**	**54**	95.8%
206-44-0	**Fluoranthene**	**83**	93.2%
129-00-0	**Pyrene**	**50** UJ	87.6%
85-68-7	Butylbenzylphthalate	26 U	95.0%
91-94-1	3,3'-Dichlorobenzidine	26 U	53.9%
56-55-3	Benzo(a)Anthracene	26 U	85.9%
117-81-7	**bis(2-Ethylhexyl)Phthala**	**83** UJ	88.6%
218-01-9	**Chrysene**	**29**	93.4%
117-84-0	Di-n-Octyl Phthalate	26 U	85.4%
205-99-2	**Benzo(b)Fluoranthene**	**24** UJ	80.5%
207-08-9	**Benzo(k)Fluoranthene**	**18** UJ	98.7%
50-32-8	Benzo(a)Pyrene	26 U	85.9%
193-39-5	Indeno(1,2,3-cd)Pyrene **	26 U	98.2%
53-70-3	Dibenz(a,h)Anthracene	26 U	98.2%
191-24-2	**Benzo(ghi)Perylene**	**13** UJ	101%

IS Value relative to 2-Fluorobiphenyl Internal Std
* Value calculated from 1:1 response to labeled analog
T Less than DL but considered real by analyst
C Corrected for analog contribution to quant ion

(1) Cannot be separated from diphenylamine
** Labeled Dibenz(a,h) anthracene used for surrogate
B Analyte found in the blank as well as sample
Values not corrected for analog recoveries

Marine Yard storm drain (sediment)

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ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 1782 35

Lab Sample ID: 1504 H
Matrix: Soil
VTSR: 4/21/88

Date Extracted: 04/25/88
Date Analyzed: 04/30/88
Conc/Dil Factor: 1:10
Dry Weight Extracted: 28.27

QC Report No.. 1504-WDOE
Project No.: NA
GPC Cleanup: NO
Alumina Cleanup: YES

Data Release Authorized

CAS Number		ug/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	**100%**

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

Main Inst. (clams)

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ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178233

Lab Sample ID: 1524B
Sample Matrix: Clam Tissues

QC Report No: 1524-WDOE
Project No: [Aroki]
Date Received: 04/28/88

Date Release Authorized: [signature]

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 61.7 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

CAS Number		µg/Kg
108-95-2	Phenol	65 U
111-44-4	bis(2-Chloroethyl)Ether	65 U
95-57-8	2-Chlorophenol	65 U
541-73-1	1,3-Dichlorobenzene	65 U
106-46-7	1,4-Dichlorobenzene	65 U
100-51-6	Benzyl Alcohol	320 U
95-50-1	1,2-Dichlorobenzene	65 U
95-48-7	2-Methylphenol	65 U
39638-32-9	bis(2-chloroisopropyl)Ether	65 U
106-44-5	4-Methylphenol	65 U
621-64-7	N-Nitroso-Di-n-Propylamine	65 U
67-72-1	Hexachloroethane	130 U
98-95-3	Nitrobenzene	65 U
78-59-1	Isophorone	65 U
88-75-5	2-Nitrophenol	320 U
105-67-9	2,4-Dimethylphenol	130 U
65-85-0	Benzoic Acid	650 U
111-91-1	bis(2-Chloroethoxy)Methane	65 U
120-83-2	2,4-Dichlorophenol	190 U
120-82-1	1,2,4-Trichlorobenzene	65 U
91-20-3	Naphthalene	65 U
106-47-8	4-Chloroaniline	190 U
87-68-3	Hexachlorobutadiene	130 U
59-50-7	4-Chloro-3-Methylphenol	130 U
91-57-6	2-Methylnaphthalene	65 U
77-47-4	Hexachlorocyclopentadiene	320 U
88-06-2	2,4,6-Trichlorophenol	320 U
95-95-4	2,4,5-Trichlorophenol	320 U
91-58-7	2-Chloronaphthalene	65 U
88-74-4	2-Nitroaniline	320 U
131-11-3	Dimethyl Phthalate	65 U
208-96-8	Acenaphthylene	65 U
99-09-2	3-Nitroaniline	320 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	65 U
51-28-5	2,4-Dinitrophenol	650 U
100-02-7	4-Nitrophenol	320 U
132-64-9	Dibenzofuran	65 U
121-14-2	2,4-Dinitrotoluene	320 U
606-20-2	2,6-Dinitrotoluene	320 U
84-66-2	Diethylphthalate	65 U
7005-72-3	4-Chlorophenyl-phenylether	65 U
86-73-7	Fluorene	65 U
100-01-6	4-Nitroaniline	320 U
534-52-1	4,6-Dinitro-2-Methylphenol	650 U
86-30-6	N-Nitrosodiphenylamine(1)	65 U
101-55-3	4-Bromophenyl-phenylether	65 U
118-74-1	Hexachlorobenzene	65 U
87-86-5	Pentachlorophenol	320 U
85-01-8	Phenanthrene	65 U
120-12-7	Anthracene	65 U
84-74-2	Di-n-Butylphthalate	65 U
206-44-0	Fluoranthene	65 U
129-00-0	Pyrene	65 U
85-68-7	Butylbenzylphthalate	65 U*
91-94-1	3,3'-Dichlorobenzidine	320 U
56-55-3	Benzo(a)Anthracene	65 U
117-81-7	bis(2-Ethylhexyl)Phthalate	65 U
218-01-9	Chrysene	65 U
117-84-0	Di-n-Octyl Phthalate	65 U
205-99-2	Benzo(b)Fluoranthene	65 U
207-08-9	Benzo(k)Fluoranthene	65 U
50-32-8	Benzo(a)Pyrene	65 U
193-39-5	Indeno(1,2,3-cd)Pyrene	65 U*
53-70-3	Dibenz(a,h)Anthracene	65 U
191-24-2	Benzo(ghi)Perylene	65 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	49.6%
2-Fluorobiphenyl	67.4%
d14-p-Terphenyl	127%

***Acid surrogate recoveries**

d5-Phenol	77.3%
2-Fluorophenol	69.3%
2,4,6-Tribromophenol	92.1%

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Main Inst. (clams)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 178233

Lab Sample ID: 1524 B
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/10/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 59.07

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: Peter M Kyle

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	146%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NR — Indicates not reported due to chromatographic interference and/or dilution.

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Hyde Point (sediment)

ORGANICS ANALYSIS DATA SHEET - METHOD 1625

Sample No: 178239

Lab Sample ID No: 15041
Sample Matrix: Soils/Sediments

QC Report No: 1504-WDOE
Project No: McNeil Island
Date Received: 04/21/88

Date Release Authorized: Brian N. Beber

Amount extracted: 48.5 gm (Dry Weight)
Percent Moisture: 32.5%
pH: 6.9
Conc/Dilution: 2 to 1 after GPC (total 1 to 1)

Date extracted: 04/29/88
Date Analyzed: 05/14/88
GPC Clean-up: YES (1 of 2)

CAS Number		µg/Kg	Rec
108-95-2	**Phenol**	**60**	88.0%
111-44-4	bis(2-Chloroethyl)Ether	21 U	67.9%
95-57-8	2-Chlorophenol	21 U	84.4%
541-73-1	1,3-Dichlorobenzene	21 U	76.0%
106-46-7	1,4-Dichlorobenzene	21 U	75.9%
100-51-6	Benzyl Alcohol	100 U	IS
95-50-1	1,2-Dichlorobenzene	21 U	74.7%
95-48-7	2-Methylphenol	21 U	96.8%
39638-32-9	bis(2-chloroisopropyl)Ether	33 U	78.7%
106-44-5	**4-Methylphenol**	**33**	96.8%
621-64-7	N-Nitroso-Di-n-Propylamine	21 U	IS
67-72-1	Hexachloroethane	23 UC	57.4%
98-95-3	Nitrobenzene	21 U	85.3%
78-59-1	Isophorone	21 U	143%
88-75-5	2-Nitrophenol	21 U	87.8%
105-67-9	2,4-Dimethylphenol	21 UC	101%
65-85-0	Benzoic Acid	210 U	IS
111-91-1	bis(2-Chloroethoxy)Methane	21 U	87.7%
120-83-2	2,4-Dichlorophenol	21 U	95.0%
120-82-1	1,2,4-Trichlorobenzene	21 U	78.9%
87-61-6	1,2,3-Trichlorobenzene	21 U	84.6%
91-20-3	Naphthalene	21 U	85.9%
106-47-8	4-Chloroaniline	62 U	IS
87-68-3	Hexachlorobutadiene	23 UR	78.3%
59-50-7	4-Chloro-3-Methylphenol	21 UC	99.1%
91-57-6	2-Methylnaphthalene	21 U	IS
77-47-4	Hexachlorocyclopentadiene	21 U	0.0%
88-06-2	2,4,6-Trichlorophenol	21 U	88.0%
95-95-4	2,4,5-Trichlorophenol	21 U	71.4%
91-58-7	2-Chloronaphthalene	21 U	96.4%
88-74-4	2-Nitroaniline	100 U	IS
131-11-3	Dimethyl Phthalate	21 U	93.9%
208-96-8	Acenaphthylene	21 U	96.5%
99-09-2	3-Nitroaniline	100 U	IS
83-32-9	Acenaphthene	21 U	95.3%

CAS Number		µg/Kg	Rec
51-28-5	2,4-Dinitrophenol	52 U	55.8%
100-02-7	4-Nitrophenol	25 U	87.9%
132-64-9	Dibenzofuran	21 U	IS
121-14-2	2,4-Dinitrotoluene	21 U	120%
606-20-2	2,6-Dinitrotoluene	21 UJ	46.3%
84-66-2	Diethylphthalate	21 U	92.7%
7005-72-3	4-Chlorophenyl-phenylether	21 U	102%
86-73-7	Fluorene	21 U	96.2%
100-01-6	4-Nitroaniline	100 U	IS
534-52-1	4,6-Dinitro-2-Methylphenol	21 U	81.2%
86-30-6	N-Nitrosodiphenylamine(1)	21 U	71.8%
122-39-4	Diphenylamine	21 U	85.3%
122-66-7	1,2-Diphenylhydrazine *	21 U	96.3%
101-55-3	4-Bromophenyl-phenylether	21 U	74.0%
118-74-1	Hexachlorobenzene	21 U	93.2%
87-86-5	Pentachlorophenol	33 U	67.4%
85-01-8	Phenanthrene	21 U	95.6%
120-12-7	Anthracene	21 U	84.8%
86-74-8	Carbazole *	21 U	82.7%
84-74-2	Di-n-Butylphthalate	21 U	85.8%
206-44-0	**Fluoranthene**	**23 UJ**	89.5%
129-00-0	**Pyrene**	**15 UJ**	89.3%
85-68-7	Butylbenzylphthalate	21 U	96.2%
91-94-1	3,3'-Dichlorobenzidine	21 U	23.7%
56-55-3	Benzo(a)Anthracene	21 U	93.9%
117-81-7	**bis(2-Ethylhexyl)Phthala**	**57 UJ**	87.8%
218-01-9	**Chrysene**	**13 T**	93.9%
117-84-0	Di-n-Octyl Phthalate	21 U	89.7%
205-99-2	Benzo(b)Fluoranthene	21 U	80.4%
207-08-9	Benzo(k)Fluoranthene	21 U	99.0%
50-32-8	Benzo(a)Pyrene	21 U	87.9%
193-39-5	Indeno(1,2,3-cd)Pyrene **	21 U	93.1%
53-70-3	Dibenz(a,h)Anthracene	21 U	93.1%
191-24-2	**Benzo(ghi)Perylene**	**12 UJ**	87.4%

IS Value relative to 2-Fluorobiphenyl Internal Std
* Value calculated from 1:1 response to labeled analog
T Less than DL but considered real by analyst
C Corrected for analog contribution to quant ion

(1) Cannot be separated from diphenylamine
** Labeled Dibenz(a,h) anthracene used for surrogate
B Analyte found in the blank as well as sample
Values not corrected for analog recoveries

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Hyde Point (sediment)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 1782 39

Lab Sample ID: 15041
Matrix: Soil
VTSR: 4/21/88

Date Extracted: 04/25/88
Date Analyzed: 04/30/88
Conc/Dil Factor: 1:10
Dry Weight Extracted: 22.88

QC Report No.: 1504-WDOE
Project No.: NA
GPC Cleanup: NO
Alumina Cleanup: YES

Data Release Authorized: Peter M. Kegler

CAS Number		ug/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	**100%**

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

Hyde Point (clams)

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ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178240

Lab Sample ID: 1524C
Sample Matrix: Clam Tissues

Date Release Authorized: _____

QC Report No: 1524-WDOE
Project No: [Aroki]
Date Received: 04/28/88

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 57.0 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

CAS Number		µg/Kg
108-95-2	Phenol	70 U
111-44-4	bis(2-Chloroethyl)Ether	70 U
95-57-8	2-Chlorophenol	70 U
541-73-1	1,3-Dichlorobenzene	70 U
106-46-7	1,4-Dichlorobenzene	70 U
100-51-6	Benzyl Alcohol	350 U
95-50-1	1,2-Dichlorobenzene	70 U
95-48-7	2-Methylphenol	70 U
39638-32-9	bis(2-chloroisopropyl)Ether	70 U
106-44-5	4-Methylphenol	70 U
621-64-7	N-Nitroso-Di-n-Propylamine	70 U
67-72-1	Hexachloroethane	140 U
98-95-3	Nitrobenzene	70 U
78-59-1	Isophorone	70 U
88-75-5	2-Nitrophenol	350 U
105-67-9	2,4-Dimethylphenol	140 U
65-85-0	Benzoic Acid	700 U
111-91-1	bis(2-Chloroethoxy)Methane	70 U
120-83-2	2,4-Dichlorophenol	210 U
120-82-1	1,2,4-Trichlorobenzene	70 U
91-20-3	Naphthalene	70 U
106-47-8	4-Chloroaniline	210 U
87-68-3	Hexachlorobutadiene	140 U
59-50-7	4-Chloro-3-Methylphenol	140 U
91-57-6	2-Methylnaphthalene	70 U
77-47-4	Hexachlorocyclopentadiene	350 U
88-06-2	2,4,6-Trichlorophenol	350 U
95-95-4	2,4,5-Trichlorophenol	350 U
91-58-7	2-Chloronaphthalene	70 U
88-74-4	2-Nitroaniline	350 U
131-11-3	Dimethyl Phthalate	70 U
208-96-8	Acenaphthylene	70 U
99-09-2	3-Nitroaniline	350 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	70 U
51-28-5	2,4-Dinitrophenol	700 U
100-02-7	4-Nitrophenol	350 U
132-64-9	Dibenzofuran	70 U
121-14-2	2,4-Dinitrotoluene	350 U
606-20-2	2,6-Dinitrotoluene	350 U
84-66-2	Diethylphthalate	70 U
7005-72-3	4-Chlorophenyl-phenylether	70 U
86-73-7	Fluorene	70 U
100-01-6	4-Nitroaniline	350 U
534-52-1	4,6-Dinitro-2-Methylphenol	700 U
86-30-6	N-Nitrosodiphenylamine(1)	70 U
101-55-3	4-Bromophenyl-phenylether	70 U
118-74-1	Hexachlorobenzene	70 U
87-86-5	Pentachlorophenol	350 U
85-01-8	Phenanthrene	70 U
120-12-7	Anthracene	70 U
84-74-2	Di-n-Butylphthalate	70 U
206-44-0	Fluoranthene	70 U
129-00-0	Pyrene	70 U
85-68-7	Butylbenzylphthalate	70 U*
91-94-1	3,3'-Dichlorobenzidine	350 U
56-55-3	Benzo(a)Anthracene	70 U
117-81-7	bis(2-Ethylhexyl)Phthalate	70 U*
218-01-9	Chrysene	70 U
117-84-0	Di-n-Octyl Phthalate	70 U
205-99-2	Benzo(b)Fluoranthene	70 U
207-08-9	Benzo(k)Fluoranthene	70 U
50-32-8	Benzo(a)Pyrene	70 U
193-39-5	Indeno(1,2,3-cd)Pyrene	70 U*
53-70-3	Dibenz(a,h)Anthracene	70 U
191-24-2	Benzo(ghi)Perylene	70 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	58.6%
2-Fluorobiphenyl	77.6%
d14-p-Terphenyl	149%

***Acid surrogate recoveries**

d5-Phenol	82.4%
2-Fluorophenol	38.4%
2,4,6-Tribromophenol	156%

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ORGANICS ANALYSIS DATA SHEET - Method 8080

Hyde Point (clams)

Sample No: 178240

Lab Sample ID: 1524 C
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/10/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 56.97

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: Peter M. Cagle

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	72%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NR — Indicates not reported due to chromatographic interference and/or dilution.

Still Harbor (water)

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ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 178241

Lab Sample ID: 1504C
Sample Matrix: Waters

QC Report No: 1504-WDOE
Project No: McNeil
Date Received: 04/21/88

Data Release Authorized: [signature]

Instrument: FINN III
Date Analyzed: 04/28/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**0.5 JB**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	**Chloroform**	**0.4 J**
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	Bromodichloromethane	0.2 U

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-01-5	cis-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-02-6	Trans-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	0.6 U
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

***Volatile Organic Surrogate Recoveries**

d8-Toluene	99.3%
Bromofluorobenzene	101%
d4-1,2-Dichloroethane	95.5%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 04/29/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
J	Indicates an estimated value when result is less than specified detection limit.

Still Harbor (sediment)

ANALYTICAL RESOURCES INCORPORATED

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ORGANICS ANALYSIS DATA SHEET - METHOD 1625

Sample No: 178242

Lab Sample ID No: 1504J
Sample Matrix: Soils/Sediments

QC Report No: 1504-WDOE
Project No: McNeil Island
Date Received: 04/21/88

Date Release Authorized: [signature]

Date extracted: 04/29/88
Date Analyzed: 05/14/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 37.9 gm (Dry Weight)
Percent Moisture: 24.4%
pH: 6.9
Conc/Dilution: 2 to 1 after GPC (total 1 to 1)

CAS Number		µg/Kg	Rec
108-95-2	**Phenol**	**17 T**	92.1%
111-44-4	bis(2-Chloroethyl)Ether	26 U	75.6%
95-57-8	2-Chlorophenol	26 U	90.1%
541-73-1	1,3-Dichlorobenzene	26 U	82.9%
106-46-7	1,4-Dichlorobenzene	26 U	83.6%
100-51-6	Benzyl Alcohol	130 U	IS
95-50-1	1,2-Dichlorobenzene	26 U	81.7%
95-48-7	2-Methylphenol	26 U	101%
39638-32-9	bis(2-chloroisopropyl)Ether	42 U	86.6%
106-44-5	**4-Methylphenol**	**26**	101%
621-64-7	N-Nitroso-Di-n-Propylamine	26 U	IS
67-72-1	Hexachloroethane	29 UC	63.6%
98-95-3	Nitrobenzene	26 U	89.4%
78-59-1	Isophorone	26 U	147%
88-75-5	2-Nitrophenol	26 U	92.8%
105-67-9	2,4-Dimethylphenol	26 UC	101%
65-85-0	Benzoic Acid	260 U	IS
111-91-1	bis(2-Chloroethoxy)Methane	26 U	90.6%
120-83-2	2,4-Dichlorophenol	26 U	96.7%
120-82-1	1,2,4-Trichlorobenzene	26 U	77.8%
87-61-6	1,2,3-Trichlorobenzene	26 U	85.1%
91-20-3	Naphthalene	26 U	87.3%
106-47-8	4-Chloroaniline	79 U	IS
87-68-3	Hexachlorobutadiene	29 U	79.1%
59-50-7	4-Chloro-3-Methylphenol	26 UC	97.4%
91-57-6	2-Methylnaphthalene	26 U	IS
77-47-4	Hexachlorocyclopentadiene	26 UR	0.0%
88-06-2	2,4,6-Trichlorophenol	26 U	71.1%
95-95-4	2,4,5-Trichlorophenol	26 U	80.3%
91-58-7	2-Chloronaphthalene	26 U	92.8%
88-74-4	2-Nitroaniline	130 U	IS
131-11-3	Dimethyl Phthalate	26 U	81.5%
208-96-8	Acenaphthylene	26 U	90.9%
99-09-2	3-Nitroaniline	130 U	IS
83-32-9	Acenaphthene	26 U	86.2%

CAS Number		µg/Kg	Rec
51-28-5	2,4-Dinitrophenol	66 U	71.1%
100-02-7	4-Nitrophenol	32 U	92.0%
132-64-9	Dibenzofuran	26 U	IS
121-14-2	2,4-Dinitrotoluene	26 U	107%
606-20-2	2,6-Dinitrotoluene	26 UJ	58.0%
84-66-2	Diethylphthalate	26 U	96.8%
7005-72-3	4-Chlorophenyl-phenylether	26 U	86.8%
86-73-7	**Fluorene**	**21 T**	84.5%
100-01-6	4-Nitroaniline	130 U	IS
534-52-1	4,6-Dinitro-2-Methylphenol	26 U	84.0%
86-30-6	N-Nitrosodiphenylamine(1)	26 U	83.0%
122-39-4	Diphenylamine	26 U	87.4%
122-66-7	1,2-Diphenylhydrazine *	26 U	82.1%
101-55-3	4-Bromophenyl-phenylether	26 U	79.6%
118-74-1	Hexachlorobenzene	26 U	97.1%
87-86-5	Pentachlorophenol	42 U	34.3%
85-01-8	**Phenanthrene**	**130**	79.0%
120-12-7	**Anthracene**	**79**	83.3%
86-74-8	**Carbazole**	**27**	79.9%
84-74-2	Di-n-Butylphthalate	26 U	81.9%
206-44-0	**Fluoranthene**	**250**	86.4%
129-00-0	**Pyrene**	**300**	82.0%
85-68-7	Butylbenzylphthalate	26 U	85.3%
91-94-1	3,3'-Dichlorobenzidine	26 U	33.0%
56-55-3	**Benzo(a)Anthracene**	**160**	78.4%
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**49** UJ	79.8%
218-01-9	**Chrysene**	**240**	79.3%
117-84-0	Di-n-Octyl Phthalate	26 U	74.9%
205-99-2	**Benzo(b)Fluoranthene**	**140**	65.8%
207-08-9	**Benzo(k)Fluoranthene**	**130**	87.1%
50-32-8	**Benzo(a)Pyrene**	**120**	74.3%
193-39-5	**Indeno(1,2,3-cd)Pyrene****	**38**	81.3%
53-70-3	Dibenz(a,h)Anthracene	26 U	81.3%
191-24-2	**Benzo(ghi)Perylene**	**30** UJ	81.2%

IS Value relative to 2-Fluorobiphenyl Internal Std
* Value calculated from 1:1 response to labeled analog
T Less than DL but considered real by analyst
C Corrected for analog contribution to quant ion

(1) Cannot be separated from diphenylamine
** Labeled Dibenz(a,h) anthracene used for surrogate
B Analyte found in the blank as well as sample
Values not corrected for analog recoveries

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ORGANICS ANALYSIS DATA SHEET - Method 8080

Still Harbor (sediment)

Sample No: 1782 42

Lab Sample ID: 1504 J
Matrix: Soil
VTSR: 4/21/88

Date Extracted: 04/25/88
Date Analyzed: 04/30/88
Conc/Dil Factor: 1:10
Dry Weight Extracted: 28.12

QC Report No.: 1504-WDOE
Project No: NA
GPC Cleanup: NO
Alumina Cleanup: YES

Data Release Authorized: [signature]

CAS Number		ug/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	**96%**

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates a hit below the calculated detection limit but considered real by the analyst.

Still Harbor (sediment)- duplicate

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Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 1625

Sample No: 178243

Lab Sample ID No: 1504K
Sample Matrix: Soils/Sediments

QC Report No: 1504-WDOE
Project No: McNeil Island
Date Received: 04/21/88

Date Release Authorized: Susan N. Peterson

Amount extracted: 38.6 gm (Dry Weight)
Percent Moisture: 22.5%
pH: 7.5
Conc/Dilution: 2 to 1 after GPC (total 1 to 1)

Date extracted: 04/29/88
Date Analyzed: 05/14/88
GPC Clean-up: YES (1 of 2)

CAS Number		µg/Kg	Rec
108-95-2	**Phenol**	**14 T**	91.0%
111-44-4	bis(2-Chloroethyl)Ether	26 U	76.2%
95-57-8	2-Chlorophenol	26 U	89.0%
541-73-1	1,3-Dichlorobenzene	26 U	85.7%
106-46-7	1,4-Dichlorobenzene	26 U	87.9%
100-51-6	Benzyl Alcohol	130 U	IS
95-50-1	1,2-Dichlorobenzene	26 U	85.9%
95-48-7	2-Methylphenol	26 U	97.5%
39638-32-9	bis(2-chloroisopropyl)Ether	42 U	91.0%
106-44-5	**4-Methylphenol**	**56**	97.5%
621-64-7	N-Nitroso-Di-n-Propylamine	26 U	IS
67-72-1	Hexachloroethane	29 UC	64.5%
98-95-3	Nitrobenzene	26 U	92.2%
78-59-1	Isophorone	26 U	149%
88-75-5	2-Nitrophenol	26 U	91.6%
105-67-9	2,4-Dimethylphenol	26 UC	100%
65-85-0	Benzoic Acid	260 U	IS
111-91-1	bis(2-Chloroethoxy)Methane	26 U	92.3%
120-83-2	2,4-Dichlorophenol	26 U	97.0%
120-82-1	1,2,4-Trichlorobenzene	26 U	82.3%
87-61-6	1,2,3-Trichlorobenzene	26 U	88.7%
91-20-3	Naphthalene	26 U	93.6%
106-47-8	4-Chloroaniline	78 U	IS
87-68-3	Hexachlorobutadiene	29 U	82.9%
59-50-7	4-Chloro-3-Methylphenol	26 UC	105%
91-57-6	2-Methylnaphthalene	26 U	IS
77-47-4	Hexachlorocyclopentadiene	26 UR	0.0%
88-06-2	2,4,6-Trichlorophenol	26 U	80.9%
95-95-4	2,4,5-Trichlorophenol	26 U	81.9%
91-58-7	2-Chloronaphthalene	26 U	96.0%
88-74-4	2-Nitroaniline	130 U	IS
131-11-3	Dimethyl Phthalate	26 U	91.5%
208-96-8	Acenaphthylene	26 U	101%
99-09-2	3-Nitroaniline	130 U	IS
83-32-9	Acenaphthene	26 U	96.5%

CAS Number		µg/Kg	Rec
51-28-5	2,4-Dinitrophenol	65 U	91.9%
100-02-7	4-Nitrophenol	31 U	110%
132-64-9	Dibenzofuran	26 U	IS
121-14-2	2,4-Dinitrotoluene	26 U	131%
606-20-2	2,6-Dinitrotoluene	26 UJ	64.5%
84-66-2	**Diethylphthalate**	**12 T**	110%
7005-72-3	4-Chlorophenyl-phenylether	26 U	102%
86-73-7	Fluorene	26 U	103%
100-01-6	4-Nitroaniline	130 U	IS
534-52-1	4,6-Dinitro-2-Methylphenol	26 U	116%
86-30-6	N-Nitrosodiphenylamine(1)	26 U	94.2%
122-39-4	Diphenylamine	26 U	117%
122-66-7	1,2-Diphenylhydrazine *	26 U	97.3%
101-55-3	4-Bromophenyl-phenylether	26 U	101%
118-74-1	Hexachlorobenzene	26 U	130%
87-86-5	Pentachlorophenol	42 U	49.0%
85-01-8	**Phenanthrene**	**82**	102%
120-12-7	**Anthracene**	**20 T**	99.6%
86-74-8	Carbazole *	26 U	94.7%
84-74-2	Di-n-Butylphthalate	26 U	105%
206-44-0	**Fluoranthene**	**180**	105%
129-00-0	**Pyrene**	**140**	98.8%
85-68-7	Butylbenzylphthalate	26 U	105%
91-94-1	3,3'-Dichlorobenzidine	26 U	50.1%
56-55-3	**Benzo(a)Anthracene**	**76**	99.3%
117-81-7	**bis(2-Ethylhexyl)Phthala**	**29** UJ	88.2%
218-01-9	**Chrysene**	**130**	104%
117-84-0	Di-n-Octyl Phthalate	26 U	91.6%
205-99-2	**Benzo(b)Fluoranthene**	**65** UJ	96.3%
207-08-9	**Benzo(k)Fluoranthene**	**63** UJ	95.7%
50-32-8	**Benzo(a)Pyrene**	**58** UJ	95.6%
193-39-5	Indeno(1,2,3-cd)Pyrene **	26 U	97.3%
53-70-3	Dibenz(a,h)Anthracene	26 U	97.3%
191-24-2	Benzo(ghi)Perylene	26 U	94.5%

IS Value relative to 2-Fluorobiphenyl Internal Std
* Value calculated from 1:1 response to labeled analog
T Less than DL but considered real by analyst
C Corrected for analog contribution to quant ion

(1) Cannot be separated from diphenylamine
** Labeled Dibenz(a,h) anthracene used for surrogate
B Analyte found in the blank as well as sample
Values not corrected for analog recoveries

Still Harbor (sediment)- duplicate

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 1782 43

Lab Sample ID: 1504 K
Matrix: Soil
VTSR: 4/21/88

Date Extracted: 04/25/88
Date Analyzed: 04/30/88
Conc/Dil Factor: 1:10
Dry Weight Extracted: 30.14

QC Report No.: 1504-WDOE
Project No.: NA
GPC Cleanup: NO
Alumina Cleanup: YES

Data Release Authorized: [signature]

CAS Number		ug/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	**97%**

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

J — Indicates a hit below the calculated detection limit but considered real by the analyst.

Still Harbor (sediment)- replicate

ANALYTICAL RESOURCES INCORPORATED

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ORGANICS ANALYSIS DATA SHEET - METHOD 1625

Sample No: 178244

Lab Sample ID No: 1504L
Sample Matrix: Soils/Sediments

QC Report No: 1504-WDOE
Project No: McNeil Island
Date Received: 04/21/88

Date Release Authorized: Brian N. Beber

Date extracted: 04/29/88
Date Analyzed: 05/14/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 44.4 gm (Dry Weight)
Percent Moisture: 19.6%
pH: 7.9
Conc/Dilution: 2 to 1 after GPC (total 1 to 1)

CAS Number		µg/Kg	Rec
108-95-2	**Phenol**	**36**	98.2%
111-44-4	bis(2-Chloroethyl)Ether	23 U	80.4%
95-57-8	2-Chlorophenol	23 U	93.1%
541-73-1	1,3-Dichlorobenzene	23 U	89.2%
106-46-7	1,4-Dichlorobenzene	23 U	90.3%
100-51-6	Benzyl Alcohol	110 U	IS
95-50-1	1,2-Dichlorobenzene	23 U	87.9%
95-48-7	2-Methylphenol	23 U	103%
39638-32-9	bis(2-chloroisopropyl)Ether	36 U	90.7%
106-44-5	**4-Methylphenol**	**46**	103%
621-64-7	N-Nitroso-Di-n-Propylamine	23 U	IS
67-72-1	Hexachloroethane	25 UC	70.0%
98-95-3	Nitrobenzene	23 U	91.1%
78-59-1	Isophorone	23 U	151%
88-75-5	2-Nitrophenol	23 U	92.5%
105-67-9	2,4-Dimethylphenol	23 UC	103%
65-85-0	Benzoic Acid	230 U	IS
111-91-1	bis(2-Chloroethoxy)Methane	23 U	93.7%
120-83-2	2,4-Dichlorophenol	23 U	96.0%
120-82-1	1,2,4-Trichlorobenzene	23 U	83.6%
87-61-6	1,2,3-Trichlorobenzene	23 U	88.2%
91-20-3	Naphthalene	23 U	92.2%
106-47-8	4-Chloroaniline	68 U	IS
87-68-3	Hexachlorobutadiene	25 U	82.5%
59-50-7	4-Chloro-3-Methylphenol	23 UC	102%
91-57-6	2-Methylnaphthalene	23 U	IS
77-47-4	Hexachlorocyclopentadiene	23 UR	0.0%
88-06-2	2,4,6-Trichlorophenol	23 U	73.7%
95-95-4	2,4,5-Trichlorophenol	23 U	84.5%
91-58-7	2-Chloronaphthalene	23 U	93.7%
88-74-4	2-Nitroaniline	110 U	IS
131-11-3	Dimethyl Phthalate	23 U	85.6%
208-96-8	Acenaphthylene	23 U	95.7%
99-09-2	3-Nitroaniline	110 U	IS
83-32-9	Acenaphthene	23 U	90.7%

CAS Number		µg/Kg	Rec
51-28-5	2,4-Dinitrophenol	56 U	67.0%
100-02-7	4-Nitrophenol	27 U	97.4%
132-64-9	Dibenzofuran	23 U	IS
121-14-2	2,4-Dinitrotoluene	23 U	116%
606-20-2	2,6-Dinitrotoluene	23 UJ	63.2%
84-66-2	Diethylphthalate	23 U	104%
7005-72-3	4-Chlorophenyl-phenylether	23 U	94.7%
86-73-7	Fluorene	23 U	92.3%
100-01-6	4-Nitroaniline	110 U	IS
534-52-1	4,6-Dinitro-2-Methylphenol	23 U	85.6%
86-30-6	N-Nitrosodiphenylamine(1)	23 U	85.6%
122-39-4	Diphenylamine	23 U	110%
122-66-7	1,2-Diphenylhydrazine *	23 U	91.4%
101-55-3	4-Bromophenyl-phenylether	23 U	89.0%
118-74-1	Hexachlorobenzene	23 U	110%
87-86-5	Pentachlorophenol	36 U	41.7%
85-01-8	**Phenanthrene**	**66**	82.2%
120-12-7	**Anthracene**	**65**	86.4%
86-74-8	Carbazole *	23 U	82.6%
84-74-2	Di-n-Butylphthalate	23 U	85.1%
206-44-0	**Fluoranthene**	**150**	91.4%
129-00-0	**Pyrene**	**250**	86.6%
85-68-7	Butylbenzylphthalate	23 U	93.1%
91-94-1	3,3'-Dichlorobenzidine	23 U	42.3%
56-55-3	**Benzo(a)Anthracene**	**140**	88.6%
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**44** UJ	81.4%
218-01-9	**Chrysene**	**190**	92.6%
117-84-0	Di-n-Octyl Phthalate	23 U	82.2%
205-99-2	**Benzo(b)Fluoranthene**	**140**	80.8%
207-08-9	**Benzo(k)Fluoranthene**	**120**	97.9%
50-32-8	**Benzo(a)Pyrene**	**110**	88.5%
193-39-5	**Indeno(1,2,3-cd)pyrene****	**39**	95.2%
53-70-3	**Dibenz(a,h)Anthracene**	**11 T**	95.2%
191-24-2	**Benzo(ghi)Perylene**	**34** UJ	95.1%

IS Value relative to 2-Fluorobiphenyl Internal Std
* Value calculated from 1:1 response to labeled analog
T Less than DL but considered real by analyst
C Corrected for analog contribution to quant ion

(1) Cannot be separated from diphenylamine
** Labeled Dibenz(a,h) anthracene used for surrogate
B Analyte found in the blank as well as sample
Values not corrected for analog recoveries

Still Harbor (sediment)- replicate

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333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 1782 44

Lab Sample ID: 1504 L
Matrix: Soil
VTSR: 4/21/88

Date Extracted: 04/25/88
Date Analyzed: 04/30/88
Conc/Dil Factor: 1:10
Dry Weight Extracted: 29.31

QC Report No.: 1504-WDOE
Project No.: NA
GPC Cleanup: NO
Alumina Cleanup: YES

Data Release Authorized: [signature]

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	**98%**

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates a hit below the calculated detection limit but considered real by the analyst.

Still Harbor (clams)

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178245

Lab Sample ID: 1524D
Sample Matrix: Clam Tissues

QC Report No: 1524-WDOE
Project No: [Aroki]
Date Received: 04/28/88

Date Release Authorized: _____

Amount extracted: 57.4 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

CAS Number		µg/Kg
108-95-2	Phenol	70 U
111-44-4	bis(2-Chloroethyl)Ether	70 U
95-57-8	2-Chlorophenol	70 U
541-73-1	1,3-Dichlorobenzene	70 U
106-46-7	1,4-Dichlorobenzene	70 U
100-51-6	Benzyl Alcohol	350 U
95-50-1	1,2-Dichlorobenzene	70 U
95-48-7	2-Methylphenol	70 U
39638-32-9	bis(2-chloroisopropyl)Ether	70 U
106-44-5	4-Methylphenol	70 U
621-64-7	N-Nitroso-Di-n-Propylamine	70 U
67-72-1	Hexachloroethane	140 U
98-95-3	Nitrobenzene	70 U
78-59-1	Isophorone	70 U
88-75-5	2-Nitrophenol	350 U
105-67-9	2,4-Dimethylphenol	140 U
65-85-0	**Benzoic Acid**	**640 M**
111-91-1	bis(2-Chloroethoxy)Methane	70 U
120-83-2	2,4-Dichlorophenol	210 U
120-82-1	1,2,4-Trichlorobenzene	70 U
91-20-3	Naphthalene	70 U
106-47-8	4-Chloroaniline	210 U
87-68-3	Hexachlorobutadiene	140 U
59-50-7	4-Chloro-3-Methylphenol	140 U
91-57-6	2-Methylnaphthalene	70 U
77-47-4	Hexachlorocyclopentadiene	350 U
88-06-2	2,4,6-Trichlorophenol	350 U
95-95-4	2,4,5-Trichlorophenol	350 U
91-58-7	2-Chloronaphthalene	70 U
88-74-4	2-Nitroaniline	350 U
131-11-3	Dimethyl Phthalate	70 U
208-96-8	Acenaphthylene	70 U
99-09-2	3-Nitroaniline	350 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	70 U
51-28-5	2,4-Dinitrophenol	700 U
100-02-7	4-Nitrophenol	350 U
132-64-9	Dibenzofuran	70 U
121-14-2	2,4-Dinitrotoluene	350 U
606-20-2	2,6-Dinitrotoluene	350 U
84-66-2	Diethylphthalate	70 U
7005-72-3	4-Chlorophenyl-phenylether	70 U
86-73-7	Fluorene	70 U
100-01-6	4-Nitroaniline	350 U
534-52-1	4,6-Dinitro-2-Methylphenol	700 U
86-30-6	N-Nitrosodiphenylamine(1)	70 U
101-55-3	4-Bromophenyl-phenylether	70 U
118-74-1	Hexachlorobenzene	70 U
87-86-5	Pentachlorophenol	350 U
85-01-8	Phenanthrene	70 U
120-12-7	Anthracene	70 U
84-74-2	Di-n-Butylphthalate	70 U
206-44-0	Fluoranthene	70 U
129-00-0	Pyrene	70 U
85-68-7	Butylbenzylphthalate	70 U
91-94-1	3,3'-Dichlorobenzidine	350 U
56-55-3	Benzo(a)Anthracene	70 U
117-81-7	bis(2-Ethylhexyl)Phthalate	70 U
218-01-9	Chrysene	70 U
117-84-0	Di-n-Octyl Phthalate	70 U
205-99-2	Benzo(b)Fluoranthene	70 U
207-08-9	Benzo(k)Fluoranthene	70 U
50-32-8	Benzo(a)Pyrene	70 U
193-39-5	Indeno(1,2,3-cd)Pyrene	70 U
53-70-3	Dibenz(a,h)Anthracene	70 U
191-24-2	Benzo(ghi)Perylene	70 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	87.5%
2-Fluorobiphenyl	82.7%
d14-p-Terphenyl	74.6%

***Acid surrogate recoveries**

d5-Phenol	79.0%
2-Fluorophenol	53.5%
2,4,6-Tribromophenol	123%

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333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

Still Harbor (clams)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 178245

Lab Sample ID: 1524 D
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/10/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 57.43

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: [signature]

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	105%

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

NR Indicates not reported due to chromatographic interference and/or dilution.

Still Harbor (clams)- duplicate

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178246

Lab Sample ID: 1524E
Sample Matrix: Clam Tissues

QC Report No: 1524-WDOE
Project No: [Aroki]
Date Received: 04/28/88

Date Release Authorized: _____

Amount extracted: 60.7 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

CAS Number		µg/Kg
108-95-2	Phenol	66 U
111-44-4	bis(2-Chloroethyl)Ether	66 U
95-57-8	2-Chlorophenol	66 U
541-73-1	1,3-Dichlorobenzene	66 U
106-46-7	1,4-Dichlorobenzene	66 U
100-51-6	Benzyl Alcohol	330 U
95-50-1	1,2-Dichlorobenzene	66 U
95-48-7	2-Methylphenol	66 U
39638-32-9	bis(2-chloroisopropyl)Ether	66 U
106-44-5	4-Methylphenol	66 U
621-64-7	N-Nitroso-Di-n-Propylamine	66 U
67-72-1	Hexachloroethane	130 U
98-95-3	Nitrobenzene	66 U
78-59-1	Isophorone	66 U
88-75-5	2-Nitrophenol	330 U
105-67-9	2,4-Dimethylphenol	130 U
65-85-0	**Benzoic Acid**	**750 M**
111-91-1	bis(2-Chloroethoxy)Methane	66 U
120-83-2	2,4-Dichlorophenol	200 U
120-82-1	1,2,4-Trichlorobenzene	66 U
91-20-3	Naphthalene	66 U
106-47-8	4-Chloroaniline	200 U
87-68-3	Hexachlorobutadiene	130 U
59-50-7	4-Chloro-3-Methylphenol	130 U
91-57-6	2-Methylnaphthalene	66 U
77-47-4	Hexachlorocyclopentadiene	330 U
88-06-2	2,4,6-Trichlorophenol	330 U
95-95-4	2,4,5-Trichlorophenol	330 U
91-58-7	2-Chloronaphthalene	66 U
88-74-4	2-Nitroaniline	330 U
131-11-3	Dimethyl Phthalate	66 U
208-96-8	Acenaphthylene	66 U
99-09-2	3-Nitroaniline	330 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	66 U
51-28-5	2,4-Dinitrophenol	660 U
100-02-7	4-Nitrophenol	330 U
132-64-9	Dibenzofuran	66 U
121-14-2	2,4-Dinitrotoluene	330 U
606-20-2	2,6-Dinitrotoluene	330 U
84-66-2	Diethylphthalate	66 U
7005-72-3	4-Chlorophenyl-phenylether	66 U
86-73-7	Fluorene	66 U
100-01-6	4-Nitroaniline	330 U
534-52-1	4,6-Dinitro-2-Methylphenol	660 U
86-30-6	N-Nitrosodiphenylamine(1)	66 U
101-55-3	4-Bromophenyl-phenylether	66 U
118-74-1	Hexachlorobenzene	66 U
87-86-5	Pentachlorophenol	330 U
85-01-8	Phenanthrene	66 U
120-12-7	Anthracene	66 U
84-74-2	Di-n-Butylphthalate	66 U
206-44-0	Fluoranthene	66 U
129-00-0	Pyrene	66 U
85-68-7	Butylbenzylphthalate	66 U
91-94-1	3,3'-Dichlorobenzidine	330 U
56-55-3	Benzo(a)Anthracene	66 U
117-81-7	bis(2-Ethylhexyl)Phthalate	66 U*
218-01-9	Chrysene	66 U
117-84-0	Di-n-Octyl Phthalate	66 U
205-99-2	Benzo(b)Fluoranthene	66 U
207-08-9	Benzo(k)Fluoranthene	66 U
50-32-8	Benzo(a)Pyrene	66 U
193-39-5	Indeno(1,2,3-cd)Pyrene	66 U
53-70-3	Dibenz(a,h)Anthracene	66 U
191-24-2	Benzo(ghi)Perylene	66 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	90.1%
2-Fluorobiphenyl	82.3%
d14-p-Terphenyl	87.7%

***Acid surrogate recoveries**

d5-Phenol	81.5%
2-Fluorophenol	58.1%
2,4,6-Tribromophenol	124%

Still Harbor (clams)- duplicate

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 178246

Lab Sample ID: 1524 E
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/10/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 60.71

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: Peter M. Kepler

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	105%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NR — Indicates not reported due to chromatographic interference and/or dilution.

nc146

Still Harbor (clams)- replicate

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178247

Lab Sample ID: 1524F
Sample Matrix: Clam Tissues

QC Report No: 1524-WDOE
Project No: [Aroki]
Date Received: 04/28/88

Date Release Authorized: Brian M. Beber

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 55.2 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

CAS Number		µg/Kg
108-95-2	Phenol	73 U
111-44-4	bis(2-Chloroethyl)Ether	73 U
95-57-8	2-Chlorophenol	73 U
541-73-1	1,3-Dichlorobenzene	73 U
106-46-7	1,4-Dichlorobenzene	73 U
100-51-6	Benzyl Alcohol	360 U
95-50-1	1,2-Dichlorobenzene	73 U
95-48-7	2-Methylphenol	73 U
39638-32-9	bis(2-chloroisopropyl)Ether	73 U
106-44-5	4-Methylphenol	73 U
621-64-7	N-Nitroso-Di-n-Propylamine	73 U
67-72-1	Hexachloroethane	140 U
98-95-3	Nitrobenzene	73 U
78-59-1	Isophorone	73 U
88-75-5	2-Nitrophenol	360 U
105-67-9	2,4-Dimethylphenol	140 U
65-85-0	**Benzoic Acid**	**380 M**
111-91-1	bis(2-Chloroethoxy)Methane	73 U
120-83-2	2,4-Dichlorophenol	220 U
120-82-1	1,2,4-Trichlorobenzene	73 U
91-20-3	Naphthalene	73 U
106-47-8	4-Chloroaniline	220 U
87-68-3	Hexachlorobutadiene	140 U
59-50-7	4-Chloro-3-Methylphenol	140 U
91-57-6	2-Methylnaphthalene	73 U
77-47-4	Hexachlorocyclopentadiene	360 U
88-06-2	2,4,6-Trichlorophenol	360 U
95-95-4	2,4,5-Trichlorophenol	360 U
91-58-7	2-Chloronaphthalene	73 U
88-74-4	2-Nitroaniline	360 U
131-11-3	Dimethyl Phthalate	73 U
208-96-8	Acenaphthylene	73 U
99-09-2	3-Nitroaniline	360 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	73 U
51-28-5	2,4-Dinitrophenol	720 U
100-02-7	4-Nitrophenol	360 U
132-64-9	Dibenzofuran	73 U
121-14-2	2,4-Dinitrotoluene	360 U
606-20-2	2,6-Dinitrotoluene	360 U
84-66-2	Diethylphthalate	73 U
7005-72-3	4-Chlorophenyl-phenylether	73 U
86-73-7	Fluorene	73 U
100-01-6	4-Nitroaniline	360 U
534-52-1	4,6-Dinitro-2-Methylphenol	720 U
86-30-6	N-Nitrosodiphenylamine(1)	73 U
101-55-3	4-Bromophenyl-phenylether	73 U
118-74-1	Hexachlorobenzene	73 U
87-86-5	Pentachlorophenol	360 U
85-01-8	Phenanthrene	73 U
120-12-7	Anthracene	73 U
84-74-2	Di-n-Butylphthalate	73 U
206-44-0	Fluoranthene	73 U
129-00-0	Pyrene	73 U
85-68-7	Butylbenzylphthalate	73 U
91-94-1	3,3'-Dichlorobenzidine	360 U
56-55-3	Benzo(a)Anthracene	73 U
117-81-7	bis(2-Ethylhexyl)Phthalate	73 U
218-01-9	Chrysene	73 U
117-84-0	Di-n-Octyl Phthalate	73 U
205-99-2	Benzo(b)Fluoranthene	73 U
207-08-9	Benzo(k)Fluoranthene	73 U
50-32-8	Benzo(a)Pyrene	73 U
193-39-5	Indeno(1,2,3-cd)Pyrene	73 U*
53-70-3	Dibenz(a,h)Anthracene	73 U
191-24-2	Benzo(ghi)Perylene	73 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	90.9%
2-Fluorobiphenyl	79.5%
d14-p-Terphenyl	81.6%

***Acid surrogate recoveries**

d5-Phenol	78.1%
2-Fluorophenol	57.6%
2,4,6-Tribromophenol	127%

Still Harbor (clams)- replicate

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 178247

Lab Sample ID: 1524 F
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/11/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 55.18

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: Peter M. Kaplan

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	126%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NR — Indicates not reported due to chromatographic interference and/or dilution.

Camp/Farm (water)

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 178248

Lab Sample ID: 1504D
Sample Matrix: Waters

QC Report No: 1504-WDOE
Project No: McNeil
Date Received: 04/21/88

Data Release Authorized: Brian N. Bebee

Instrument: FINN III
Date Analyzed: 04/28/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L	
74-87-3	Chloromethane	2.9 U	
74-83-9	Bromomethane	0.9 U	
75-01-4	Vinyl Chloride	1.1 U	
75-00-3	Chloroethane	0.9 U	
75-09-2	**Methylene Chloride**	**1.8 B**	
67-64-1	**Acetone**	**7.7**	B
75-15-0	Carbon Disulfide	2.0 U	
75-35-4	1,1-Dichloroethene	1.3 U	
75-34-3	1,1-Dichloroethane	1.1 U	
156-60-5	Trans-1,2-Dichloroethene	1.1 U	
156-59-2	Cis-1,2-Dichloroethene	1.2 U	
67-66-3	**Chloroform**	**22**	
107-06-2	1,2-Dichloroethane	0.6 U	
78-93-3	2-Butanone	1.0 U	
71-55-6	1,1,1-Trichloroethane	1.0 U	
56-23-5	Carbon Tetrachloride	0.5 U	
108-05-4	Vinyl Acetate	1.7 U	
75-27-4	**Bromodichloromethane**	**2.5**	

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-01-5	cis-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-02-6	Trans-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	**Toluene**	**4.7**
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

***Volatile Organic Surrogate Recoveries**

d8-Toluene	103%
Bromofluorobenzene	91.1%
d4-1,2-Dichloroethane	99.2%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 04/29/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
J	Indicates an estimated value when result is less than specified detection limit.

Camp/Farm (water)- duplicate

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 178248 Matrix Spike

Lab Sample ID: 1504DMS
Sample Matrix: Waters

QC Report No: 1504-WDOE
Project No: McNeil
Date Received: 04/21/88

Data Release Authorized: Brian N. Silver

Instrument: FINN III
Date Analyzed: 04/29/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L	
74-87-3	Chloromethane	2.9 U	
74-83-9	Bromomethane	0.9 U	
75-01-4	Vinyl Chloride	1.1 U	
75-00-3	Chloroethane	0.9 U	
75-09-2	**Methylene Chloride**	**4.1 B**	
67-64-1	**Acetone**	**5.4**	B
75-15-0	Carbon Disulfide	2.0 U	
75-35-4	1,1-Dichloroethene	-	
75-34-3	1,1-Dichloroethane	1.1 U	
156-60-5	Trans-1,2-Dichloroethene	1.1 U	
156-59-2	Cis-1,2-Dichloroethene	1.2 U	
67-66-3	**Chloroform**	**25**	
107-06-2	1,2-Dichloroethane	0.6 U	
78-93-3	2-Butanone	1.0 U	
71-55-6	1,1,1-Trichloroethane	1.0 U	
56-23-5	Carbon Tetrachloride	0.5 U	
108-05-4	Vinyl Acetate	1.7 U	
75-27-4	**Bromodichloromethane**	**2.2**	

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-01-5	cis-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	-
10061-02-6	Trans-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

***Volatile Organic Surrogate Recoveries**

d8-Toluene	101%
Bromofluorobenzene	101%
d4-1,2-Dichloroethane	104%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 04/29/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
J	Indicates an estimated value when result is less than specified detection limit.

Camp/Farm (water)- duplicate

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 178248 Spike Duplicate

Lab Sample ID: 1504DMSD
Sample Matrix: Waters

QC Report No: 1504-WDOE
Project No: McNeil
Date Received: 04/21/88

Data Release Authorized: Ryan N. Bolce

Instrument: FINN III
Date Analyzed: 04/29/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**5.0 B**
67-64-1	Acetone	0.6 U
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	-
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	**Chloroform**	**24**
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	**Bromodichloromethane**	**2.0**

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-01-5	cis-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	-
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	-
10061-02-6	Trans-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	Toluene	-
108-90-7	Chlorobenzene	-
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

***Volatile Organic Surrogate Recoveries**

d8-Toluene	97.8%
Bromofluorobenzene	96.2%
d4-1,2-Dichloroethane	100%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 04/29/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
J	Indicates an estimated value when result is less than specified detection limit.

Camp/Farm (water)- replicate

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, Wa 98109-5187
(206) 621-6490

ORGANICS ANALYSIS DATA SHEET - METHOD 624

Sample No: 178250

Lab Sample ID: 1504E
Sample Matrix: Waters

QC Report No: 1504-WDOE
Project No: McNeil
Date Received: 04/21/88

Data Release Authorized: Brian N Bohee

Instrument: FINN III
Date Analyzed: 04/28/88

Amount Analyzed: 5 mls
Conc/Dil: 1 to 1

CAS Number		µg/L
74-87-3	Chloromethane	2.9 U
74-83-9	Bromomethane	0.9 U
75-01-4	Vinyl Chloride	1.1 U
75-00-3	Chloroethane	0.9 U
75-09-2	**Methylene Chloride**	**0.7 JB**
67-64-1	**Acetone**	**5.1** B
75-15-0	Carbon Disulfide	2.0 U
75-35-4	1,1-Dichloroethene	1.3 U
75-34-3	1,1-Dichloroethane	1.1 U
156-60-5	Trans-1,2-Dichloroethene	1.1 U
156-59-2	Cis-1,2-Dichloroethene	1.2 U
67-66-3	**Chloroform**	**21**
107-06-2	1,2-Dichloroethane	0.6 U
78-93-3	2-Butanone	1.0 U
71-55-6	1,1,1-Trichloroethane	1.0 U
56-23-5	Carbon Tetrachloride	0.5 U
108-05-4	Vinyl Acetate	1.7 U
75-27-4	**Bromodichloromethane**	**2.3**

CAS Number		µg/L
78-87-5	1,2-Dichloropropane	0.6 U
10061-01-5	cis-1,3-Dichloropropene	0.5 U
79-01-6	Trichloroethene	0.8 U
124-48-1	Dibromochloromethane	0.9 U
79-00-5	1,1,2-Trichloroethane	0.3 U
71-43-2	Benzene	0.4 U
10061-02-6	Trans-1,3-Dichloropropene	0.6 U
110-75-8	2-Chloroethylvinylether	1.5 U
75-25-2	Bromoform	0.3 U
108-10-1	4-Methyl-2-Pentanone	1.8 U
591-78-6	2-Hexanone	1.3 U
127-18-4	Tetrachloroethene	0.6 U
79-34-5	1,1,2,2-Tetrachloroethane	0.6 U
108-88-3	**Toluene**	**4.1**
108-90-7	Chlorobenzene	0.6 U
100-41-4	Ethylbenzene	1.0 U
100-42-5	Styrene	0.5 U
	Total Xylenes	1.5 U

***Volatile Organic Surrogate Recoveries**

d8-Toluene	98.9%
Bromofluorobenzene	102%
d4-1,2-Dichloroethane	96.4%

*Surrogate recoveries indicate the validity of a given analysis

Report prepared 04/29/88 - MAC:B

Data Reporting Qualifiers

Value	If the result is a value greater than or equal to the detection limit, report the value.
U	Indicates compound was analyzed for but not detected at the given detection limit.
M	Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match parameters.
B	This flag is used when the analyte is found in the blank as well as a sample. Indicates possible/probable blank contamination.
K	This flag is used when quantitated value falls above the limit of the calibration curve and dilution should be run.
J	Indicates an estimated value when result is less than specified detection limit.

Camp/Farm (sediment)

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ORGANICS ANALYSIS DATA SHEET - METHOD 1625

Sample No: 178251

Lab Sample ID No: 1504M
Sample Matrix: Soils/Sediments

QC Report No: 1504-WDOE
Project No: McNeil Island
Date Received: 04/21/88

Date Release Authorized: [signature]

Date extracted: 04/29/88
Date Analyzed: 05/14/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 41.7 gm (Dry Weight)
Percent Moisture: 21.5%
pH: 7.6
Conc/Dilution: 2 to 1 after GPC (total 1 to 1)

CAS Number		ug/Kg	Rec
108-95-2	Phenol	24 U	83.6%
111-44-4	bis(2-Chloroethyl)Ether	24 U	69.3%
95-57-8	2-Chlorophenol	24 U	79.1%
541-73-1	1,3-Dichlorobenzene	24 U	76.9%
106-46-7	1,4-Dichlorobenzene	24 U	76.4%
100-51-6	Benzyl Alcohol	120 U	IS
95-50-1	1,2-Dichlorobenzene	24 U	74.8%
95-48-7	2-Methylphenol	24 U	89.6%
39638-32-9	bis(2-chloroisopropyl)Ether	38 U	77.2%
106-44-5	**4-Methylphenol**	**17 T**	89.6%
621-64-7	N-Nitroso-Di-n-Propylamine	24 U	IS
67-72-1	Hexachloroethane	26 UC	58.7%
98-95-3	Nitrobenzene	24 U	82.9%
78-59-1	Isophorone	24 U	137%
88-75-5	2-Nitrophenol	24 U	82.3%
105-67-9	2,4-Dimethylphenol	24 UC	94.2%
65-85-0	Benzoic Acid	240 U	IS
111-91-1	bis(2-Chloroethoxy)Methane	24 U	83.0%
120-83-2	2,4-Dichlorophenol	24 U	89.7%
120-82-1	1,2,4-Trichlorobenzene	24 U	74.7%
87-61-6	1,2,3-Trichlorobenzene	24 U	81.2%
91-20-3	Naphthalene	24 U	82.6%
106-47-8	4-Chloroaniline	72 U	IS
87-68-3	Hexachlorobutadiene	26 U	75.6%
59-50-7	4-Chloro-3-Methylphenol	24 UC	103%
91-57-6	2-Methylnaphthalene	24 U	IS
77-47-4	Hexachlorocyclopentadiene	24 UR	0.0%
88-06-2	2,4,6-Trichlorophenol	24 U	77.0%
95-95-4	2,4,5-Trichlorophenol	24 U	83.6%
91-58-7	2-Chloronaphthalene	24 U	93.0%
88-74-4	2-Nitroaniline	120 U	IS
131-11-3	Dimethyl Phthalate	24 U	88.8%
208-96-8	Acenaphthylene	24 U	95.5%
99-09-2	3-Nitroaniline	120 U	IS
83-32-9	Acenaphthene	24 U	91.3%

CAS Number		ug/Kg	Re
51-28-5	2,4-Dinitrophenol	60 U	69.6
100-02-7	4-Nitrophenol	29 U	100
132-64-9	Dibenzofuran	24 U	IS
121-14-2	2,4-Dinitrotoluene	24 U	117
606-20-2	2,6-Dinitrotoluene	24 UJ	61.7
84-66-2	Diethylphthalate	24 U	105
7005-72-3	4-Chlorophenyl-phenylether	24 U	97.0
86-73-7	Fluorene	24 U	92.7
100-01-6	4-Nitroaniline	120 U	IS
534-52-1	4,6-Dinitro-2-Methylphenol	24 U	87.9
86-30-6	N-Nitrosodiphenylamine(1)	24 U	87.5
122-39-4	Diphenylamine	24 U	91.2
122-66-7	1,2-Diphenylhydrazine *	24 U	91.7
101-55-3	4-Bromophenyl-phenylether	24 U	89.4
118-74-1	Hexachlorobenzene	24 U	109
87-86-5	Pentachlorophenol	38 U	61.8
85-01-8	Phenanthrene	24 U	84.8
120-12-7	Anthracene	24 U	87.8
86-74-8	Carbazole *	24 U	87.4
84-74-2	Di-n-Butylphthalate	24 U	85.8
206-44-0	**Fluoranthene**	**20** UJ	91.2
129-00-0	**Pyrene**	**18** UJ	88.5
85-68-7	Butylbenzylphthalate	24 U	95.5
91-94-1	3,3'-Dichlorobenzidine	24 U	39.9
56-55-3	Benzo(a)Anthracene	24 U	86.7
117-81-7	**bis(2-Ethylhexyl)Phthalate**	**34** UJ	87.3
218-01-9	Chrysene	24 U	91.1
117-84-0	Di-n-Octyl Phthalate	24 U	82.2
205-99-2	Benzo(b)Fluoranthene	24 U	77.1
207-08-9	Benzo(k)Fluoranthene	24 U	91.8
50-32-8	Benzo(a)Pyrene	24 U	82.0
193-39-5	Indeno(1,2,3-cd)Pyrene **	24 U	88.3
53-70-3	Dibenz(a,h)Anthracene	24 U	88.3
191-24-2	Benzo(ghi)Perylene	24 U	85.0

IS Value relative to 2-Fluorobiphenyl Internal Std
* Value calculated from 1:1 response to labeled analog
T Less than DL but considered real by analyst
C Corrected for analog contribution to quant ion

(1) Cannot be separated from diphenylamine
** Labeled Dibenz(a,h) anthracene used for surrogate
B Analyte found in the blank as well as sample
Values not corrected for analog recoveries

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Camp/Farm (sediment)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 1782 51

Lab Sample ID: 1504 M
Matrix: Soil
VTSR: 4/21/88

Date Extracted: 04/25/88
Date Analyzed: 04/30/88
Conc/Dil Factor: 1:10
Dry Weight Extracted: 28.79

QC Report No.: 1504-WDOE
Project No NA
GPC Cleanup: NO
Alumina Cleanup: YES

Data Release Authorized: Peter M. Kegler

CAS Number		ug/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-	**Aroclor-1254**	**25 J**
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	**81%**

Data Qualifiers

U Indicates compound was analyzed for but not detected at the given detection limit.

J Indicates a hit below the calculated detection limit but considered real by the analyst.

Camp/Farm (clams)

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ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178252

Lab Sample ID: 1524G
Sample Matrix: Clam Tissues

QC Report No: 1524-WDOE
Project No: [Aroki]
Date Received: 04/28/88

Date Release Authorized: Allan R. Baker

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 58.5 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

CAS Number		µg/Kg
108-95-2	Phenol	68 U
111-44-4	bis(2-Chloroethyl)Ether	68 U
95-57-8	2-Chlorophenol	68 U
541-73-1	1,3-Dichlorobenzene	68 U
106-46-7	1,4-Dichlorobenzene	68 U
100-51-6	Benzyl Alcohol	340 U
95-50-1	1,2-Dichlorobenzene	68 U
95-48-7	2-Methylphenol	68 U
39638-32-9	bis(2-chloroisopropyl)Ether	68 U
106-44-5	4-Methylphenol	68 U
621-64-7	N-Nitroso-Di-n-Propylamine	68 U
67-72-1	Hexachloroethane	140 U
98-95-3	Nitrobenzene	68 U
78-59-1	Isophorone	68 U
88-75-5	2-Nitrophenol	340 U
105-67-9	2,4-Dimethylphenol	140 U
65-85-0	**Benzoic Acid**	**460 M**
111-91-1	bis(2-Chloroethoxy)Methane	68 U
120-83-2	2,4-Dichlorophenol	210 U
120-82-1	1,2,4-Trichlorobenzene	68 U
91-20-3	Naphthalene	68 U
106-47-8	4-Chloroaniline	210 U
87-68-3	Hexachlorobutadiene	140 U
59-50-7	4-Chloro-3-Methylphenol	140 U
91-57-6	2-Methylnaphthalene	68 U
77-47-4	Hexachlorocyclopentadiene	340 U
88-06-2	2,4,6-Trichlorophenol	340 U
95-95-4	2,4,5-Trichlorophenol	340 U
91-58-7	2-Chloronaphthalene	68 U
88-74-4	2-Nitroaniline	340 U
131-11-3	Dimethyl Phthalate	68 U
208-96-8	Acenaphthylene	68 U
99-09-2	3-Nitroaniline	340 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	68 U
51-28-5	2,4-Dinitrophenol	680 U
100-02-7	4-Nitrophenol	340 U
132-64-9	Dibenzofuran	68 U
121-14-2	2,4-Dinitrotoluene	340 U
606-20-2	2,6-Dinitrotoluene	340 U
84-66-2	Diethylphthalate	68 U
7005-72-3	4-Chlorophenyl-phenylether	68 U
86-73-7	Fluorene	68 U
100-01-6	4-Nitroaniline	340 U
534-52-1	4,6-Dinitro-2-Methylphenol	680 U
86-30-6	N-Nitrosodiphenylamine(1)	68 U
101-55-3	4-Bromophenyl-phenylether	68 U
118-74-1	Hexachlorobenzene	68 U
87-86-5	Pentachlorophenol	340 U
85-01-8	Phenanthrene	68 U
120-12-7	Anthracene	68 U
84-74-2	Di-n-Butylphthalate	68 U
206-44-0	Fluoranthene	68 U
129-00-0	Pyrene	68 U
85-68-7	Butylbenzylphthalate	68 U
91-94-1	3,3'-Dichlorobenzidine	340 U
56-55-3	Benzo(a)Anthracene	68 U
117-81-7	bis(2-Ethylhexyl)Phthalate	68 U
218-01-9	Chrysene	68 U
117-84-0	Di-n-Octyl Phthalate	68 U
205-99-2	Benzo(b)Fluoranthene	68 U
207-08-9	Benzo(k)Fluoranthene	68 U
50-32-8	Benzo(a)Pyrene	68 U
193-39-5	Indeno(1,2,3-cd)Pyrene	68 U*
53-70-3	Dibenz(a,h)Anthracene	68 U
191-24-2	Benzo(ghi)Perylene	68 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	86.5%
2-Fluorobiphenyl	79.9%
d14-p-Terphenyl	76.1%

***Acid surrogate recoveries**

d5-Phenol	77.7%
2-Fluorophenol	26.4%
2,4,6-Tribromophenol	82.9%

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Camp/Farm (clams)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 178252

Lab Sample ID: 1524 G
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/11/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 58.47

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: Peter M. Kepler

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	113%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NR — Indicates not reported due to chromatographic interference and/or dilution.

Horsehead Bay (clams)

ANALYTICAL RESOURCES INCORPORATED

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ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178253

Lab Sample ID: 1524H
Sample Matrix: Clam Tissues

QC Report No: 1524-WDOE
Project No: [Aroki]
Date Received: 04/28/88

Date Release Authorized: _____

Amount extracted: 59.4 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

CAS Number		µg/Kg
108-95-2	Phenol	67 U
111-44-4	bis(2-Chloroethyl)Ether	67 U
95-57-8	2-Chlorophenol	67 U
541-73-1	1,3-Dichlorobenzene	67 U
106-46-7	1,4-Dichlorobenzene	67 U
100-51-6	Benzyl Alcohol	340 U
95-50-1	1,2-Dichlorobenzene	67 U
95-48-7	2-Methylphenol	67 U
39638-32-9	bis(2-chloroisopropyl)Ether	67 U
106-44-5	4-Methylphenol	67 U
621-64-7	N-Nitroso-Di-n-Propylamine	67 U
67-72-1	Hexachloroethane	130 U
98-95-3	Nitrobenzene	67 U
78-59-1	Isophorone	67 U
88-75-5	2-Nitrophenol	340 U
105-67-9	2,4-Dimethylphenol	130 U
65-85-0	Benzoic Acid	670 U
111-91-1	bis(2-Chloroethoxy)Methane	67 U
120-83-2	2,4-Dichlorophenol	200 U
120-82-1	1,2,4-Trichlorobenzene	67 U
91-20-3	Naphthalene	67 U
106-47-8	4-Chloroaniline	200 U
87-68-3	Hexachlorobutadiene	130 U
59-50-7	4-Chloro-3-Methylphenol	130 U
91-57-6	2-Methylnaphthalene	67 U
77-47-4	Hexachlorocyclopentadiene	340 U
88-06-2	2,4,6-Trichlorophenol	340 U
95-95-4	2,4,5-Trichlorophenol	340 U
91-58-7	2-Chloronaphthalene	67 U
88-74-4	2-Nitroaniline	340 U
131-11-3	Dimethyl Phthalate	67 U
208-96-8	Acenaphthylene	67 U
99-09-2	3-Nitroaniline	340 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	67 U
51-28-5	2,4-Dinitrophenol	670 U
100-02-7	4-Nitrophenol	340 U
132-64-9	Dibenzofuran	67 U
121-14-2	2,4-Dinitrotoluene	340 U
606-20-2	2,6-Dinitrotoluene	340 U
84-66-2	Diethylphthalate	67 U
7005-72-3	4-Chlorophenyl-phenylether	67 U
86-73-7	Fluorene	67 U
100-01-6	4-Nitroaniline	340 U
534-52-1	4,6-Dinitro-2-Methylphenol	670 U
86-30-6	N-Nitrosodiphenylamine(1)	67 U
101-55-3	4-Bromophenyl-phenylether	67 U
118-74-1	Hexachlorobenzene	67 U
87-86-5	Pentachlorophenol	340 U
85-01-8	Phenanthrene	67 U
120-12-7	Anthracene	67 U
84-74-2	Di-n-Butylphthalate	67 U
206-44-0	Fluoranthene	67 U
129-00-0	Pyrene	67 U
85-68-7	Butylbenzylphthalate	67 U
91-94-1	3,3'-Dichlorobenzidine	340 U
56-55-3	Benzo(a)Anthracene	67 U
117-81-7	bis(2-Ethylhexyl)Phthalate	67 U
218-01-9	Chrysene	67 U
117-84-0	Di-n-Octyl Phthalate	67 U
205-99-2	Benzo(b)Fluoranthene	67 U
207-08-9	Benzo(k)Fluoranthene	67 U
50-32-8	Benzo(a)Pyrene	67 U
193-39-5	Indeno(1,2,3-cd)Pyrene	67 U*
53-70-3	Dibenz(a,h)Anthracene	67 U
191-24-2	Benzo(ghi)Perylene	67 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	105%
2-Fluorobiphenyl	93.4%
d14-p-Terphenyl	76.4%

***Acid surrogate recoveries**

d5-Phenol	88.3%
2-Fluorophenol	64.2%
2,4,6-Tribromophenol	128%

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Horsehead Bay (clams)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 178253

Lab Sample ID: 1524 H
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/11/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 59.40

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: Peter M. Kepler

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	150%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NR — Indicates not reported due to chromatographic interference and/or dilution.

Cutts Island (clams)

ANALYTICAL RESOURCES INCORPORATED

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ORGANICS ANALYSIS DATA SHEET - METHOD 625

Sample No: 178255

Lab Sample ID: 15241
Sample Matrix: Clam Tissues

QC Report No: 1524-WDOE
Project No: [Aroki]
Date Received: 04/28/88

Date Release Authorized: [signature]

Date extracted: 05/04/88
Date Analyzed: 05/11/88
GPC Clean-up: YES (1 of 2)

Amount extracted: 60.3 gm (Wet Weight Equivalent)
Percent Moisture: NA
pH: NA
Conc/Dilution: 1 to 2 after GPC (1 to 4 total)

CAS Number		µg/Kg
108-95-2	Phenol	66 U
111-44-4	bis(2-Chloroethyl)Ether	66 U
95-57-8	2-Chlorophenol	66 U
541-73-1	1,3-Dichlorobenzene	66 U
106-46-7	1,4-Dichlorobenzene	66 U
100-51-6	Benzyl Alcohol	330 U
95-50-1	1,2-Dichlorobenzene	66 U
95-48-7	2-Methylphenol	66 U
39638-32-9	bis(2-chloroisopropyl)Ether	66 U
106-44-5	4-Methylphenol	66 U
621-64-7	N-Nitroso-Di-n-Propylamine	66 U
67-72-1	Hexachloroethane	130 U
98-95-3	Nitrobenzene	66 U
78-59-1	Isophorone	66 U
88-75-5	2-Nitrophenol	330 U
105-67-9	2,4-Dimethylphenol	130 U
65-85-0	Benzoic Acid	660 U
111-91-1	bis(2-Chloroethoxy)Methane	66 U
120-83-2	2,4-Dichlorophenol	200 U
120-82-1	1,2,4-Trichlorobenzene	66 U
91-20-3	Naphthalene	66 U
106-47-8	4-Chloroaniline	200 U
87-68-3	Hexachlorobutadiene	130 U
59-50-7	4-Chloro-3-Methylphenol	130 U
91-57-6	2-Methylnaphthalene	66 U
77-47-4	Hexachlorocyclopentadiene	330 U
88-06-2	2,4,6-Trichlorophenol	330 U
95-95-4	2,4,5-Trichlorophenol	330 U
91-58-7	2-Chloronaphthalene	66 U
88-74-4	2-Nitroaniline	330 U
131-11-3	Dimethyl Phthalate	66 U
208-96-8	Acenaphthylene	66 U
99-09-2	3-Nitroaniline	330 U

CAS Number		µg/Kg
83-32-9	Acenaphthene	66 U
51-28-5	2,4-Dinitrophenol	660 U
100-02-7	4-Nitrophenol	330 U
132-64-9	Dibenzofuran	66 U
121-14-2	2,4-Dinitrotoluene	330 U
606-20-2	2,6-Dinitrotoluene	330 U
84-66-2	Diethylphthalate	66 U
7005-72-3	4-Chlorophenyl-phenylether	66 U
86-73-7	Fluorene	66 U
100-01-6	4-Nitroaniline	330 U
534-52-1	4,6-Dinitro-2-Methylphenol	660 U
86-30-6	N-Nitrosodiphenylamine(1)	66 U
101-55-3	4-Bromophenyl-phenylether	66 U
118-74-1	Hexachlorobenzene	66 U
87-86-5	Pentachlorophenol	330 U
85-01-8	Phenanthrene	66 U
120-12-7	Anthracene	66 U
84-74-2	Di-n-Butylphthalate	66 U*
206-44-0	Fluoranthene	66 U
129-00-0	Pyrene	66 U
85-68-7	Butylbenzylphthalate	66 U
91-94-1	3,3'-Dichlorobenzidine	330 U
56-55-3	Benzo(a)Anthracene	66 U
117-81-7	bis(2-Ethylhexyl)Phthalate	66 U
218-01-9	Chrysene	66 U
117-84-0	Di-n-Octyl Phthalate	66 U
205-99-2	Benzo(b)Fluoranthene	66 U
207-08-9	Benzo(k)Fluoranthene	66 U
50-32-8	Benzo(a)Pyrene	66 U
193-39-5	Indeno(1,2,3-cd)Pyrene	66 U*
53-70-3	Dibenz(a,h)Anthracene	66 U
191-24-2	Benzo(ghi)Perylene	66 U

(1) Cannot be separated from diphenylamine

U* Interference from non-HSL (steroid) compound

Report prepared 05/12/88 MAC:B

***Base/neutral surrogate recoveries**

d5-Nitrobenzene	95.4%
2-Fluorobiphenyl	83.8%
d14-p-Terphenyl	72.2%

***Acid surrogate recoveries**

d5-Phenol	78.9%
2-Fluorophenol	50.8%
2,4,6-Tribromophenol	114%

ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

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Seattle, Wa 98109-5187
(206) 621-6490

Cutts Island (clams)

ORGANICS ANALYSIS DATA SHEET - Method 8080

Sample No: 178255

Lab Sample ID: 1524 I
Matrix: Tissue
VTSR: 4/28/88

Date Extracted: 05/04/88
Date Analyzed: 05/11/88
Conc/Dil Factor: 1:20
Wet Weight Extracted: 60.28

QC Report No.: 1524-WDOE
Project No.: NA
GPC Cleanup: YES
Alumina Cleanup: YES

Data Release Authorized: Peter M. Kepler

CAS Number		µg/Kg
319-84-6	Alpha-BHC	2 U
319-85-7	Beta-BHC	2 U
319-86-8	Delta-BHC	2 U
58-89-9	Gamma-BHC (Lindane)	2 U
76-44-8	Heptachlor	2 U
309-00-2	Aldrin	2 U
1024-57-3	Heptachlor Epoxide	2 U
959-98-8	Endosulfan I	2 U
60-57-1	Dieldrin	4 U
72-55-9	4,4'-DDE	4 U
72-20-8	Endrin	4 U
33212-65-9	Endosulfan II	4 U
72-54-8	4,4'-DDD	4 U
1031-07-8	Endosulfan Sulfate	4 U
50-29-3	4,4'-DDT	4 U
72-43-5	Methoxychlor	4 U
53494-70-5	Endrin Ketone	4 U
57-74-9	Chlordane	20 U
8001-35-2	Toxaphene	200 U
12674-11-2	Aroclor-1016	40 U
53469-21-9	Aroclor-1242	40 U
12672-29-6	Aroclor-1248	40 U
11097-69-1	Aroclor-1254	40 U
11096-82-5	Aroclor-1260	40 U

*** Pesticide Surrogate Recovery**

Dibutylchlorendate	121%

Data Qualifiers

U — Indicates compound was analyzed for but not detected at the given detection limit.

NR — Indicates not reported due to chromatographic interference and/or dilution.