

PORTLAND HARBOR SEDIMENT MANAGEMENT PLAN

APPENDIX F

SITE DISCOVERY RESULTS TO DATE



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**PORTLAND HARBOR SEDIMENT MANAGEMENT PLAN
APPENDIX F
SITE DISCOVERY RESULTS TO DATE**

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Appendix F

Site Discovery Results To Date

1.0 SITE DISCOVERY EFFORTS

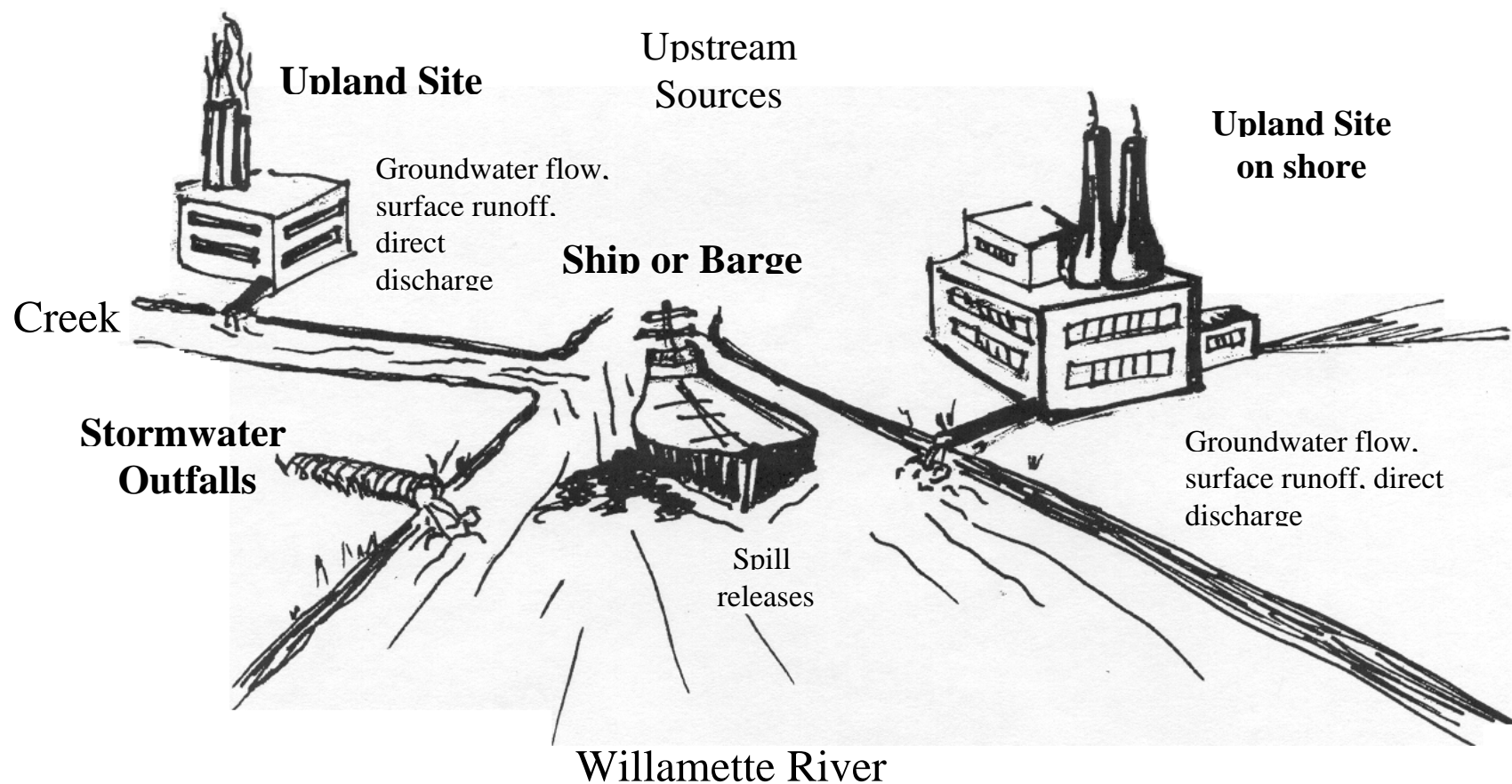
Site discovery is that part of the hazardous substance response process in which a release is detected and a source or sources for that release is identified. The Oregon Department of Environmental Quality (DEQ) discovers sites that potentially pose a threat to human health and the environment, where follow-up investigation and evaluation is required to determine if a threat actually exists. The discovery process itself does not result in a determination of the risk posed by the site.

Traditionally, DEQ has relied on a reactive process for discovering new sites; i.e., acting on information received from sources outside of the program. In July 1998, DEQ initiated a more proactive site discovery process, in which the Site Assessment Group initiates its own search for new sites that may be affecting vulnerable areas. Vulnerable areas have been defined as specific geographic areas that are vulnerable to hazardous substance releases, where such releases are reasonably likely and could cause, or already have caused, significant impacts to human health or the environment. Vulnerable areas have been identified by reference to other authorities and programs designed to establish areas particularly sensitive to contamination, where the potential for environmental or human health threats has been documented. The specific programs referenced in this definition include two that apply to Portland Harbor: surface water bodies in the National Estuary Program and surface water bodies that DEQ has identified as water quality limited for toxins.

In 1997, DEQ approached the U.S. Environmental Protection Agency (EPA) for assistance in identifying potential sources of elevated chemical concentrations detected at sites within the Harbor. The result of this request was a sediment investigation that covered 6 miles of the Portland Harbor considered likely to have the highest chemical concentrations based on the presence of a number of industrial sources. The findings of this study, documented in the *Portland Harbor Sediment Investigation Report*, suggested that there were several areas of elevated chemical concentrations in the sediments. Because of these findings and the fact that the area is considered vulnerable as described above, DEQ initiated a proactive site discovery approach in Portland Harbor. This approach has consisted of looking at the available information for the Harbor and using this information to identify likely sources of contamination. Potential sources of contamination were generally considered to be upland facilities; however, many of these facilities included docks and terminals where the contaminant source may have been a release directly to the river. The potential sources of contamination considered in the Portland Harbor site discovery (release identification and source identification) effort are illustrated in Figure F-1. Sources identified will become “sites” in DEQ’s Environmental Cleanup Site Info (ECSI) database.

The following sections describe the process used to identify potential sources of contamination to the Portland Harbor. Section 2.0 describes the various sources of information that were considered. Section 3.0 describes the process DEQ used to identify potential releases and then

Figure F-1. Sources of Contamination Considered in Portland Harbor Site Discovery



correlate those detections to likely sources. This constitutes the site discovery process that was applied in Portland Harbor.

2.0 SOURCES OF INFORMATION

2.1 Portland Harbor Site Investigation Report

In March 1997, DEQ and EPA began a joint study to sample near-shore, in-river sediments along the 6.0 mile reach of the Willamette River, known as Portland Harbor (approximately river mile 3.5 to 9.5). The study consisted of the collection of 150 surface sediment samples, 28 sediment porewater samples, and 37 subsurface (1 to 5 feet deep) sediment samples. All sediment samples were analyzed for metals, polycyclic aromatic hydrocarbons (PAHs), total organic carbon, and grain size. In addition, several samples were also analyzed for polychlorinated biphenyls (PCBs), pesticides, and organotins. A few samples were also analyzed for dioxins/furans and herbicides. Sediment porewater samples were analyzed for organotins and metals. The results of this study are summarized in the *Portland Harbor Sediment Investigation Report* (U.S. EPA, May 1998).

Preliminary review of the data suggested the following:

- Data show highly elevated chemical levels in discrete areas.
- The highest chemical levels generally occur near existing and pending DEQ cleanup sites.
- Some elevated areas are not associated with known sources. The concentrations of chemicals in these areas are generally lower than those associated with known sources.
- Chemical migration and resuspension appear to be limited within the study area.

Site discovery efforts in the harbor have been initiated based primarily on the results of this study and are aimed at identifying sources for areas of the harbor where elevated sediment concentrations were detected.

2.2 U.S. Army Corps of Engineers Channel Deepening Study

The U.S. Army Corps of Engineers (Corps) has been evaluating the feasibility of deepening the Columbia and lower Willamette Rivers navigation channel, currently authorized at a 40-foot depth and 600-foot width. The proposed deepening to 43 feet deep would extend through the Portland Harbor to river mile 11.6 on the Willamette River. As part of the evaluation of this project, the Corps collected sediment samples within the shipping channel for chemical analysis (U.S. ACOE, October 1998). Sixty-eight samples were collected from the area between the mouth of the river and river mile 11.6. Samples were analyzed for metals, PAHs, PCBs, DDT, and TBT. Concentrations were compared to dredge management screening concentrations in the Lower Columbia River Dredged Material Evaluation Framework (1998 ACOE). Exceedances of the dredge screening values were noted for lead (river mile .8 and 11.5), zinc (river mile .8, 10 – 11), DDT (river mile .8, 5 – 7, 10 – 11), PCBs (river mile 11.5), PAHs (river mile .8, 2 – 4, 5 – 6), and TBT (river mile 5 – 6). Based on sampling locations, most areas of contamination were adjacent to but not in the portions of the channel maintained for navigation. In some cases, data from the study suggests that shore area contamination may extend into the River. Further evaluation of this data was not considered pertinent for site discovery purposes; however, as

individual site investigations progress, the data may be helpful in delineating the extent of sediment contamination associated with particular releases.

2.3 Site-Specific Studies

DEQ is currently providing oversight of environmental response actions at 14 sites in the Portland Harbor and has completed strategy recommendations for three additional sites. The locations of these sites are shown in Figure F-2. Sediment samples have been collected at several of these sites. In some cases, bioassays have been performed in conjunction with chemical analysis. Of particular note are sediment studies completed at the McCormick and Baxter site, Portland Shipyard, and Terminal 4. The McCormick and Baxter remedial investigation (RI), conducted in 1990-1992, included sediment chemistry, two rounds of sediment bioassays, fish and crayfish tissue analyses, and fish histopathology. *Hyalloa azteca* bioassays were conducted at 56 stations, and *Microtox* pore water bioassays were conducted at 17 stations. The Portland Shipyard study, completed in May 1998, included the collection of 52 sediment samples for bioassay analysis (*Microtox*, *Hyalloa azteca*, and *Chironomus*) with synoptic chemistry from locations within the Swan Island Lagoon and west of Swan Island in the Willamette River. The Terminal 4 investigation has included collection of 20 sediment samples for bioassay analysis with synoptic chemistry.

In addition to sediment sampling conducted as part of remedial investigations, sediment sampling has also been completed during dredging activities in order to assess options for dredge material management. Sampling data are available for Port of Portland Terminals T-2 and T-4 and several private terminals, both within and outside the Portland Harbor as well as for other shipping facilities; e.g., ACOE Moorings, Columbia Steel.

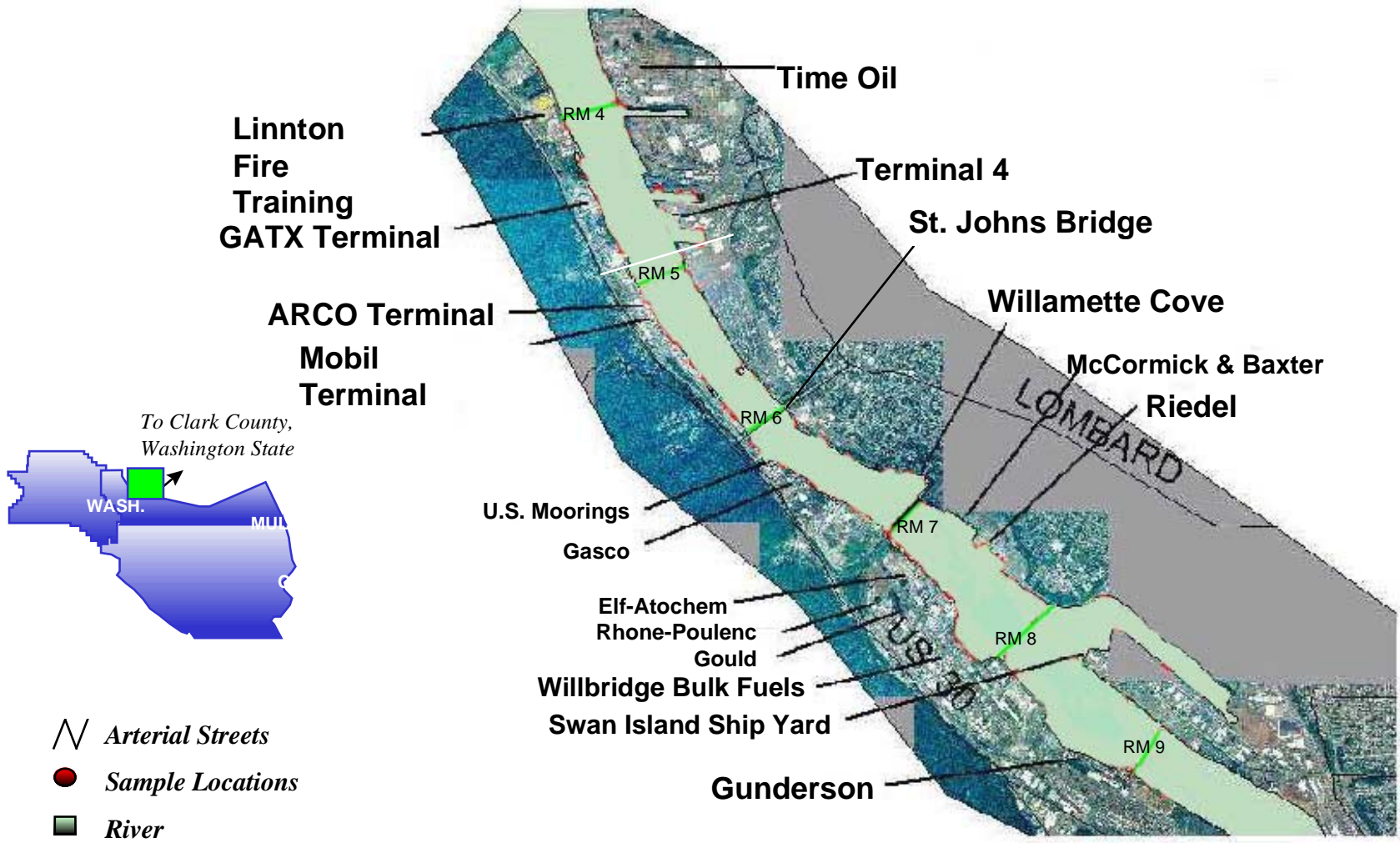
2.4 Water Quality/USGS/ODFW Studies

Fish tissue, benthic and fish community assessment, and sediment chemistry data have been collected throughout the Willamette River as part of several studies completed by DEQ's water quality program, the U.S. Geologic Survey (USGS), and Oregon Department of Fish and Wildlife (ODFW). These studies typically include 2 to 12 sampling sites within the Portland Harbor, often collected over a period of several years. While these studies provide useful trending information and a picture of the environmental conditions of the Willamette River as a whole, the sparseness of data points from within the Harbor make it difficult to draw conclusions regarding potential sources of contamination. (DEQ, July 1994; DEQ, June 1995)

2.5 City of Portland Stormwater Outfall Data

The City of Portland has records that indicate who is connected to main stormwater lines and they are in the process of identifying and mapping private outfalls. There are water and sediment data available from outfall investigations. Sediment data have also been collected adjacent to

Figure F-2: Location of Sites Currently Undergoing Cleanup



selected outfalls (Port of Portland, 1995). These data are currently being reviewed and will be used to help identify outfalls of concern within the Portland Harbor.

2.6 DEQ Files

Several DEQ files contain information pertinent to the evaluation of conditions in the Portland Harbor. The Environmental Cleanup Site Information (ECSI) database contains available records on all sites for which the state has received information suggesting that environmental contamination may be present. Spill reports and complaints data bases contain records of reported spills or other activities that may have resulted in environmental contamination. Hazardous waste permit files contain records on facilities that generate, treat, store, or dispose of hazardous wastes. Water quality permit files contain records on facilities discharging treated wastewater to the river and records related to private stormwater discharges. Underground storage tank (UST) files contain records on the locations of USTs and data on investigations associated with leaking USTs.

2.7 Other Files

In addition to DEQ files, files maintained by other agencies can provide useful information about environmental conditions in the Harbor area. The Oregon Department of Water Resources (ODWR) maintains well construction reports that can be used to identify areas where groundwater investigations have been completed and obtain data on subsurface stratigraphy and groundwater quality. Sandborne Insurance Maps and historical aerial photographs provide information on historical site use and possible contamination sources.

3.0 PORTLAND HARBOR SITE DISCOVERY APPROACH

3.1 Overview

As summarized in Section 2.1, one of the conclusions of the *Portland Harbor Site Investigation Report* was that most areas of elevated chemical concentrations in sediments are near known upland sources, but that there were some areas of the harbor where chemical concentrations in the sediment appeared to be elevated, which DEQ did not have an identified source. In addition, it appeared that contaminant migration and resuspension are very limited within the Harbor. The conclusions of this study formed the basis for DEQ site discovery efforts. Because areas of elevated concentration correlated well with known sites and contaminant migration appears limited, it can be expected that remaining areas of elevated concentration that are not currently associated with known sites reflect contributions from nearby sources. Support for the finding that contaminant migration within the harbor is limited is described in detail in Appendix G.

As described below, the Portland Harbor data generated by this study were used to identify a representative list of contaminants of interest. A method for determining what concentrations constituted “elevated” levels within the harbor was then devised and used to identify locations within the Harbor that appeared to reflect a potential upland source of contamination. Information sources described in Section 2.0 were then accessed to identify potential sources, focusing initially on existing or past shoreline or inwater sources adjacent to the elevated levels.

As noted above, establishing a baseline level of contaminant concentrations for the Harbor does not equate to establishing a concentration that can be used to determine if a threat exists. This type of risk based standard will be developed as described in Appendix G of the PHSMP. Elevated concentrations in the site discovery context are being used to determine where potential sources of contamination to the harbor may exist. In some cases, it may be determined that sediment investigation and cleanup are not warranted, but upland investigation and source control/remediation are required. (Additional background information and explanation on DEQ's site discovery approach in the Portland Harbor can be found in the Portland Harbor Site Discovery Report (November 1998)).

3.2 Identification of Contaminants of Concern.

The *Portland Harbor Sediment Investigation* collected data on a very broad range of chemicals that may contaminate sediments, including

- 24 metals (as both total and dissolved metals)
- 67 semi-volatile organic compounds
- 21 chlorinated pesticides
- 11 chlorinated herbicides
- 7 polychlorinated biphenyl (PCB) congeners, and
- isomers of chlorodibenzofurans and chlorodibenzodioxins
- isomers of tributyl tin

To streamline the site discovery process, initial data review focused on only a smaller subset of potential contaminants, which might be considered indicator parameters, or those which might have the greatest potential effects on human health or the environment:

- Polycyclic Aromatic Hydrocarbons (PAHs), as total Low Molecular Weight, and total High Molecular Weight, PAHs
- Individual toxic metals, as total antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc
- PCBs, as total PCBs (the sum of seven common Aroclors: 1016, 1221, 1232, 1242, 1248, 1254, and 1260)
- DDT, as total DDT-related compounds (4,4'-DDT, 4,4'-DDE, plus 4,4'-DDD)
- Tributyl tin (TBT), as the sum of TBT-related compounds (monobutyl-, dibutyl-, tributyl-, and tetra-n-butyl tin)
- Phthalates, as total phthalates (the sum of individual phthalate isomers)

Some of the potential contaminants were not examined because of a very limited number of analyses or detections. Dioxins and dibenzofurans, for example, were analyzed only near facilities that were already involved in active cleanup efforts, and were known or suspected to have dioxin contamination. With the exception of DDT-related compounds, chlorinated herbicides and pesticides were detected only infrequently and at concentrations that were typically below levels of significant concern. Although metals were analyzed as both total and leachable species, the site discovery effort focused only on total metals content of some of the

potentially more-toxic metals that were detected at relatively elevated concentrations. PAHs and phthalates were the most commonly detected semi-volatile organic contaminants. Rather than examine individual PAHs or phthalates, these contaminants were grouped together and examined as total low molecular weight PAHs, total high molecular weight PAHs, and total phthalates. The remaining semi-volatile organic detections (contaminants such as phenols, benzyl alcohol, benzoic acid, 2,4-D, and hexachloroethane) were generally either detected in relatively low concentrations, or were detected at facilities where other, more significant chemical concentrations were encountered.

3.3 Identification of Elevated Concentrations

Because of the difficulties inherent in defining true background conditions or truly elevated chemical concentrations within the Portland Harbor area, two separate approaches were used to evaluate sediment quality data from Portland Harbor – a graphical approach and a statistical evaluation. It was concluded that, for site discovery purposes, it might be most prudent to first focus efforts on areas where sediment chemical concentrations were noticeably elevated. To define such areas, the sediment data was examined graphically for indications of apparent increased chemical concentrations (baseline determination). The graphical evaluation provided the basis for identifying areas of elevated chemical concentrations. A statistical analysis was completed to characterize the data sets and further prioritize the graphically-identified elevations.

Before subjecting the raw sediment data to more rigorous examination, data from both shallow surface sediments and deeper core samples were combined into a single data set. The depth of the sample was not considered relevant to the determination of whether concentrations were elevated or not. (Depth of sample was considered later in the site discovery process in attempting to determine timing of release.) Data from colocated quality assurance/quality control duplicate samples were averaged. Because of potential contaminant stratification, data from both shallow surface sediment samples and deeper core samples collected at the same sampling location could not justifiably be averaged. For the purposes of statistical evaluation, undetected contaminants were assigned a concentration equal to one-half to one-twentieth of their respective analytical detection limits. (The range of values used was driven by the magnitude of the elevated detection limit.)

Without a clear definition of background contaminant concentrations in the Portland Harbor area, the sediment data was subjected to a graphical evaluation method that the USGS water resources division has previously used to define apparent elevated contaminant levels.¹

Apparent “baseline” chemical concentrations were developed by plotting individual chemical data sets on a single line graph from lowest concentration to highest. Horizontal and vertical asymptotes were then drawn on the individual line graphs, based on simple visual estimation. The point where the two asymptotes intersect was defined as the upper limit of the chemical’s

¹ The method was described by Frank Rinella, a Water Quality Specialist with USGS Water Resources Division, at a Contaminated Sediments Conference sponsored by The Environmental Law Education Center, at the Portland World Trade Center, January 30, 1998.

“baseline concentration range” (see Figure F-3). Any concentration above the graphically-developed baseline range was considered an elevated concentration.

For “normally distributed” data, the mean and median value of the data set will be equal with half the data lying above the mean and half below. The Portland Harbor sediment data, however, were not normally distributed. Most of the harbor sediment data were clustered around relatively low chemical concentrations, with significantly higher concentrations causing the overall data distributions to shift (skew) to the right. As a result, only about 17 to 36 percent of the chemical concentrations lay above the apparent “baseline ranges.” Because the elevated concentrations were so much higher than the rest of the data set, the mean tended to be higher than the median for the majority of the compounds. The rapid slope change evident in the plots of concentration level from lowest to highest value suggests that the higher concentrations may be “outliers” of what would otherwise be a normally distributed data set.

Although it was recognized that the Portland Harbor sediment data were not normally distributed, a simple statistical treatment of the data was applied to define elevated chemical concentrations. A simple arithmetic mean and corresponding standard deviation were calculated for each chemical data set (see Table F-1). Any chemical concentration more than one standard deviation above the calculated mean was considered significantly elevated.

With normally distributed data, approximately 15.8 percent of the data points are greater than one standard deviation above the arithmetic mean. However, because chemical data sets from the Portland Harbor sediment investigation were skewed, this data treatment commonly identified sediments having the highest 3 to 8 percent of the chemical concentrations.

As a quick check on the magnitude of the baseline values generated, they were compared to the Lower Columbia River Dredge Material Evaluation Framework screening values. All baseline ranges fell below the dredge screening values with the exception of the baseline range for PCBs, which was based on a detection limit and DDT for which there may be upstream sources.

3.4 Identifying Locations Where Baseline is Exceeded

Maps were prepared with the locations of samples with elevated concentration detections highlighted. These maps were created by hand; however, once harbor data has been input into SedQual, more refined versions of the maps can be generated. Project boundaries for upland sites active in the cleanup program were obtained from DEQ project managers and drawn onto expanded maps of the Portland Harbor upland.

These maps were provided to DEQ project managers working on active sites in the Portland Harbor. Project managers reviewed the findings and provided feedback on whether the elevations indicated by the data appeared to be related to sources on their site or whether another source may be present. Table F-2 provides a summary of the responses received and the follow-up actions that are being taken.

Figure F-3: Portland Harbor Sediment PAH Concentrations

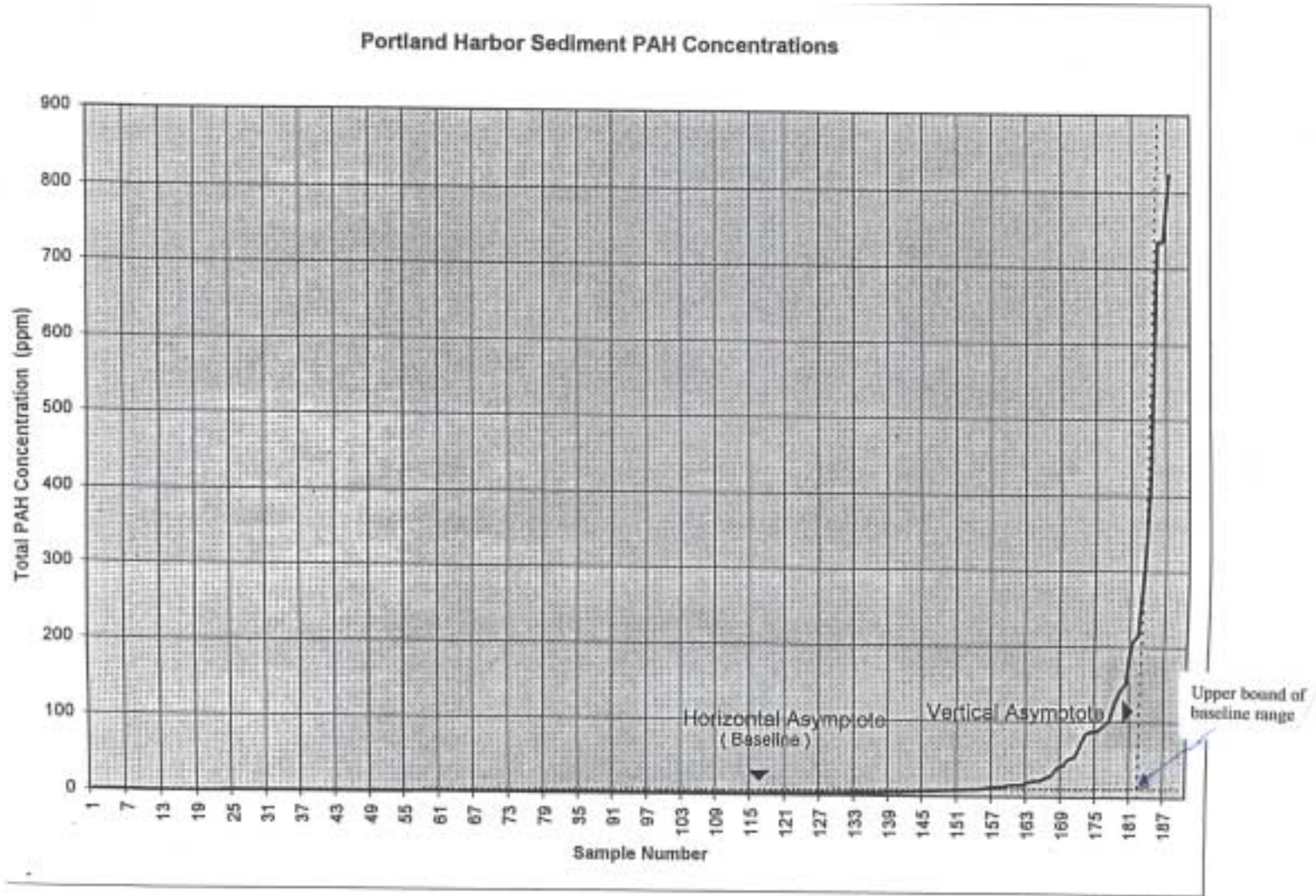


Table F-1. Data Evaluation Summary Table

	Mean	Mean +1SD	Median Value	Baseline Range	Dredge Screening Value
LMW PAHS	8539 ppb	46075 ppb	311 ppb	5.7-700 ppb	5200 ppb
HMW PAHS	18889 ppb	94046 ppb	1416 ppb	56.6-2400 ppb	12000 ppb
DDT	1226 ppb	7893 ppb	20 ppb	<6-20 ppb	6.9 ppb
PCB	101 ppb	429 ppb	<160 ppb	<100-<180 ppb	130 ppb
Phthalates	229 ppb	701 ppb	124 ppb	<76-250 ppb	[21970} calc
TBT (in porewater)	0.053 ppb	0.188 ppb	<0.1 ppb	<0.1-<0.19 ppb	0.15 ppb
TBT (in sediment)	1269 ppb	6904 ppb	87 ppb	300-48690 ppb	----
As	3.2 ppm	5.1 ppb	2.5 ppm	2-3.2 ppm	57 ppm
Cd	0.51 ppm	1.0 ppm	0.4 ppm	0.2-0.7 ppm	5.1 ppm
Cr	37.6 ppm	48.8 ppm	37.4 ppm	34-41 ppm	----
Pb	34.5 ppm	122 ppm	16.0 ppm	5-40 ppm	450 ppm
Hg	0.1 ppm	0.207 ppm	0.06 ppm	0.04-0.12 ppm	0.41 ppm
Cu	60.0 ppm	131 ppm	45.0 ppm	35-60 ppm	390 ppm
Ni	29.2 ppm	33.5 ppm	29.2 ppm	27-32.5 ppm	140 ppm
Zn	142 ppm	234 ppm	107 ppm	90-125 ppm	410 ppm
Ag	0.95 ppm	1.3 ppm	0.9 ppm	0.4-1.5 ppm	6.1 ppm
Al	37474 ppm	43600 ppm	39100 ppm	36500-44000 ppm	----
Be	0.62 ppm	0.71 ppm	0.63 ppm	0.6-0.7 ppm	----
Co	18.0 ppm	20.0 ppm	18.3 ppm	17.0-19.8 ppm	----
Fe	42019 ppm	46955 ppm	42300 ppm	40000-45000 ppm	----
Mn	645 ppm	776 ppm	668 ppm	545-780 ppm	----
Ni	29.2 ppm	33.5 ppm	29.2 ppm	27-32.5 ppm	140 ppm
Sb	4.0 ppm	6.6 ppm	2.5 ppm	<1.0-3.0 ppm	150 ppm
Se	10.5 ppm	14.4 ppm	11.0 ppm	8.0-15 ppm	----
Ti	1972 ppm	2227 ppm	1950 ppm	1800-2125 ppm	----
Tl	9.1 ppm	15.3 ppm	8.0 ppm	2.0-11.5 ppm	----
V	103 ppm	114 ppm	104 ppm	98-112 ppm	----
2-Methylnaphthalene	536 ppb	4132 ppb	<20 ppb	<19-100 ppb	670 ppb
Carbazole	369 ppb	1391 ppb	<20 ppb	<19-100 ppb	----
Dibenzofuran	157 ppb	666 ppb	<20 ppb	<19-100 ppb	540 ppb
Dimethylphthalate	<20 ppb	<20 ppb	<20 ppb	<20 ppb	1400 ppb
Di-n-butylphthalate	<20 ppb	24.5 ppb	<20 ppb	<20 ppb	5100 ppb
Butylbenzylphthalate	<20 ppb	26.5 ppb	<20 ppb	<20 ppb	970 ppb
bis(2-Ethylhexyl)phthalate	205 ppb	652 ppb	100 ppb	<20 ppb	8300 ppb
Di-n-octylphthalate	<20 ppb	27.5 ppb	<20 ppb	<20 ppb	6200 ppb
Phenol	<20 ppb	27.2 ppb	<20 ppb	<20 ppb	420 ppb
4-Methylphenol	293 ppb	593 ppb	210 ppb	<20-680 ppb	670 ppb
Pentachlorophenol	<97 ppb	<97 ppb	<97 ppb	<97 ppb	400 ppb
2,4-D	21.1 ppb	54.3 ppb	9.0 ppb	<3.3 ppb	----
2,4-DB	26.5 ppb	73.1 ppb	13.0 ppb	<5.0 ppb	----
Benzyl alcohol	<20 ppb	<20 ppb	<20 ppb	<20 ppb	57 ppb
Benzoic acid	66.8 ppb	321 ppb	<20 ppb	<20-950 ppb	650 ppb

Site discovery (source identification) work proceeded for those elevations outside areas adjacent to existing cleanup program sites and those elevations adjacent to existing sites for which site data suggests another source is present.

3.5 Identifying Potential Sources

For each area identified as elevated above baseline, available information was researched to identify potential sources for the elevations. Thirty areas (including 17 likely to be associated with existing sites) of elevated concentration have been identified for follow-up. Upland properties associated with the sediment areas determined to be of highest priority (see site prioritization discussion below) are listed in Table F-3. Note that several potential upland sources are often identified for one area of elevated concentration in the sediment.

File Review

Existing information for upland properties adjacent to the elevated areas has been gathered from the DEQ databases and the ODWR well log database. The file review process has been completed for 31 sites at this time. The types of records that are available on these properties have been listed on Table F-3. At this point in time, the upland sites identified include nine (9) hazardous waste generators, six (6) sites with historical leaking underground storage tanks, five (5) sites that have files in the ECSI data base, six (6) sites for which there are complaint records, seven (7) sites for which there are spill reports, seven (7) sites with NPDES permits, and six (6) sites with well log records. (As documented in Table F-3 a given facility may have information in more than one file.)

Drainage Patterns

Both natural and man-made drainages were considered in assessing potential source areas for elevated chemical concentrations detected in the sediments. A map of City of Portland stormwater outfalls was obtained from the City to help identify locations where outfalls may have contributed to the elevated concentrations. These locations were transferred to the Portland Harbor maps showing elevated contaminant concentrations to assess any correlations. It should be recognized that the Portland Harbor study was not designed to assess impacts from outfalls; consequently, sampling points were not always located in optimal locations for evaluating whether there may be contribution from outfalls. In addition, several parameters that would be useful for assessing elevations resulting from combined stormwater outfalls; e.g., chlorides, nitrates, phosphates, were not analyzed for in this study. The evaluation has shown that elevated chemical concentrations may be correlated to City outfalls in the Swan Island Lagoon, and at the Gunderson and Time Oil sites. Based on this and the fact that the Portland Harbor Study did not adequately assess impacts from outfalls, a more comprehensive evaluation, likely to include additional sediment sampling near outfalls, may be needed.

Natural drainages, creeks and ditches also exist throughout Portland Harbor. In many cases these drainages have been redirected as they approach the Willamette River. During field reconnaissance, particular effort was focused on locating drainages to the river to determine if properties further away from the river may be contributing to the contaminant load. Additional sediment sampling may also be warranted at several of these natural drainages.

Table F-2: Project Manager Evaluation (Active Sites)

Site	Project Manager Input	DEQ Follow-Up
Mobile Oil	PAHs, As, and Zn are likely site related.	Evaluation to be completed as part of Mobile site response.
Gunderson	Pb, Hg, Zn, and PCBs at SD151 likely attributed to site SD143 elevations likely attributed to City outfall.	Current project does not encompass portion of site that is likely source for SD151 contaminants – will be identified for follow-up in site discovery. DEQ to work with City to assess SD143 elevations.
Elf Atochem	DDT is likely site related.	Consider other sources for PAHs, metals, and phthalates in site discovery Evaluation of DDT and possibly contaminants identified above to occur as part of Elf Atochem site response.
Time Oil	PCP is currently only contaminant of concern at this site	Consider other sources for Zn, As, Cu, Hg, PAHs, and phthalates in site discovery work with City to assess impact from City sewer outfall.
GASCO	PAHs are site related, metals may be site related Phthalates and TBT do not appear to be site related.	Consider other sources for metals, phthalates and TBT in site discovery. Evaluation of PAHs and possibly metals to occur as part of site response.
GATX	PAHs likely site related.	Evaluate as part of site response.
Gould	Pb may be site related. Other compounds likely to be associated with other nearby active projects.	Evaluate as part of site response for this and other nearby sites.
Rhone Poulenc	PAHs do not appear to be site related. As and DDT are site related. Cr, phthalates, Ni, Zn are elevated at the site but it is currently unclear if source is on-site.	Evaluation of As, DDT and assessment of Cr, phthalates, Ni, Zn, to be completed as part of site response. Consider other sources for PAHs, Cr, phthalates, Ni, and Zn in site discovery.
Linnton	Extent of contamination limited to site – did not extend to river. PCP not a primary contaminant of concern for the site.	Other sources of contamination will be evaluated for sediment detections.
Terminal 4	PAHs and metals are associated with the site. Phthalates are not a known site contaminant.	Evaluation of PAHs, metals to be completed as part of site response. Consider other sources for phthalates in site discovery.
ARCO	PAHs likely site related. As may not be site related.	Evaluate as part of site response.
McCormick and Baxter	As likely site related. Note that some contaminants at adjacent Willamette Cove site are attributable to this site; however, Hg, DDT are not.	Contamination to be evaluated as part of site response. Additional evaluation of Willamette Cove warranted.
Riedel	Contaminants likely site-related. TBT	Contamination to be evaluated as part of

Site	Project Manager Input	DEQ Follow-Up
	may have an up river source as well. No known sources of DDT on site.	site response. Some TBT may be associated with Portland Shipyard. DDT may be harbor-wide issue.
U.S. Moorings	PAHs may be site related or related to other nearby active sites.	Evaluate as part of site response for this and other nearby sites.
Willamette Cove	Cr, Hg, Ni, Zn, Cu, TBT, and some PAHs likely site related.	Evaluate as part of site response.
Willbridge	Pb, Hg, and DDT likely to be site related. Phthalates not likely to be site related.	Pb, Hg, and DDT to be evaluated as part of site response. Consider other sources of phthalates through site discovery.
Swan Island	Contaminants likely site-related; however, other sources are present as well.	Portland Shipyard data has been reviewed as part of site discovery effort. Other potential sources in this area have been identified.

Historical Activities

Aerial photographs have been reviewed to identify historical site uses that may have caused contamination. Aerial photographs for the following years were reviewed: 1936, 1957, 1963, 1977, and 1983, and 1997. This review, combined with historical property records, allowed for an assessment of the level of activity at particular upland sites historically and whether certain structures were present that would suggest likely sources of contamination. Settling ponds were identified at several locations. Ships and barges were docked at many sites. Storage tanks, log storage areas, and historical drainage patterns were discerned. Site-specific details gleaned from the aerial photo reviews will be incorporated into the strategy recommendation for the site. A detailed summary of significant observations from the aerial photographs will be included in the *Portland Harbor Site Discovery Report*.

Field Reconnaissance

In order to document current site use and any obvious sources of contamination to the River, physical viewing of the Harbor was completed by both boat and car. Observation from a boat trip down the River was completed on February 2, 1999. While river levels were high at this point, it was considered useful to complete a survey during a high water period to better assess natural drainage patterns. The February boat tour resulted in the preparation of the map provided in Figure F-4 documenting significant observations related to drainage patterns. A photo log documenting this effort was prepared. Drainage pipes, drums, bank erosion, stained soil, and near shore site activities were noted.

Site visits by car were conducted on February 4, 1999, to document current upland site use on and in the vicinity of the Harbor. This effort was primarily focused on observing current conditions at properties adjacent to areas of elevated concentration in the sediment. A photo log documenting this effort was also prepared.

Information Requests

As a preliminary step in the Portland Harbor site assessment process, a letter describing the Portland Harbor project and DEQ efforts to identify potential contaminant sources was sent January 15, 1999, to all owners (90) of property that lay within 1,500 feet of Portland Harbor. This letter was provided to inform potentially affected property owners of DEQ's efforts. Follow-up letters were then sent to those property owners and, where appropriate, site lessees, for properties identified as potential sources of sediment contamination detected in the Harbor. This is a typical step in the Site assessment process to request assistance from potential responsible parties in providing site-specific historical and current use information that is not available through file reviews and site visits. Site Assessment questionnaires have been sent to all property owners identified in Table F-3. Responses have been received from several of these parties. Some of these responses have provided investigation reports or other documents providing information on site environmental conditions. These documents will be scanned for information that may affect the site's priority and will then be added to the site file for detailed review during the individual site assessment phase.

3.6 Follow-Up on Likely Sources

Potential sources were identified for each of the sediment areas where concentrations were elevated above baseline and available records for these sources were documented.

Approximately 50 potential sources were identified through the procedures described above. A file will be created in DEQ's ECSI database for each potential source. It is at this point that site discovery within the Harbor is essentially complete and DEQ moves on to the next phase of site evaluation, known as site assessment.

3.7 Site Screening/Prioritization

For the purposes of preliminary screening of sites for completing strategy recommendations, sediment samples were correlated with presumed upland sources. Sites were considered to be the potential upland source area as well as the area including the presumed associated sediment samples. (Ultimately a site will be considered to be the source area and those areas where associated contaminants have come to be located.) Sites identified to date are listed in Table F-3. The highest priority sites are those associated with sediment contaminant concentrations reflecting the top 5 percentile of chemical concentrations for a particular chemical. Priority will also be given to those sites where associated sediment concentrations were more than three times the baseline level or where baseline concentrations were exceeded for several different contaminants. Consideration will also be given to the toxicity of chemicals found to be elevated using EPA's water quality rankings. Lower priority will be given to upland sites associated with only a small subset of contaminants of interest that exceed baseline and where the magnitude of the exceedance was less than a factor of three for all constituents. Professional judgment will also be used to integrate other factors pertinent to the priority for follow-up. These factors include: evidence of an on-going release, observations made during field reconnaissance, concentration elevations that suggested a release but were below baseline, historical information that suggests a release not associated with a particular baseline exceedance, the quality of information linking a potential source to the elevated concentrations, the presence of other metals not considered of primary concern (e.g., iron, magnesium, thallium, cobalt, vanadium, and titanium), and an evaluation of the individual compounds within some of the contaminant groups (e.g., individual PAHs or phthalates).

The activities described below will be completed for the highest priority sites first. The prioritization process will continue through site assessment and subsequent phases of follow-up work as progress continues on other aspects of the PHSMP. In particular, once sediment quality guidelines (SQGs) are developed the priority for follow-up on individual sites will be re-evaluated. Since the screening process described above does not consider sediment toxicity of chemicals identified at particular sites, the SQGs will be used to further segregate and prioritize sites based on concentrations detected relative to the risk based SQG values.

3.8 Strategy Recommendations

The available information on potential sources, potential threat posed by the sources, and recommended DEQ action/priority will be summarized in a strategy recommendation for each

site. Any information provided in response to the information request letter and available file information will be reviewed in detail. Where historical site data is lacking a review of Sanborne Insurance Maps may be completed. The site will then be further prioritized for follow-up action. The prioritization that occurs at this stage is based on the magnitude of the release, the potential receptors, and the quality of the data linking the site to the release. At this point in time strategy recommendations have been initiated at 3 sites. Strategy recommendations will be completed for the highest priority sediment sites by late 1999.

Table F-2: Project Manager Evaluation (Active Sites)

Site	Project Manager Input	DEQ Follow-Up
Mobile Oil	PAHs, As, and Zn are likely site related.	Evaluation to be completed as part of Mobile site response.
Gunderson	Pb, Hg, Zn, and PCBs at SD151 likely attributed to site SD143 elevations likely attributed to City outfall.	Current project does not encompass portion of site that is likely source for SD151 contaminants – will be identified for follow-up in site discovery. DEQ to work with City to assess SD143 elevations.
Elf Atochem	DDT is likely site related.	Consider other sources for PAHs, metals, and phthalates in site discovery Evaluation of DDT and possibly contaminants identified above to occur as part of Elf Atochem site response.
Time Oil	PCP is currently only contaminant of concern at this site	Consider other sources for Zn, As, Cu, Hg, PAHs, and phthalates in site discovery work with City to assess impact from City sewer outfall.
GASCO	PAHs are site related, metals may be site related Phthalates and TBT do not appear to be site related.	Consider other sources for metals, phthalates and TBT in site discovery. Evaluation of PAHs and possibly metals to occur as part of site response.
GATX	PAHs likely site related.	Evaluate as part of site response.
Gould	Pb may be site related. Other compounds likely to be associated with other nearby active projects.	Evaluate as part of site response for this and other nearby sites.
Rhone Poulenc	PAHs do not appear to be site related. As and DDT are site related. Cr, phthalates, Ni, Zn are elevated at the site but it is currently unclear if source is on-site.	Evaluation of As, DDT and assessment of Cr, phthalates, Ni, Zn, to be completed as part of site response. Consider other sources for PAHs, Cr, phthalates, Ni, and Zn in site discovery.
Linnton	Extent of contamination limited to site – did not extend to river. PCP not a primary contaminant of concern for the site.	Other sources of contamination will be evaluated for sediment detections.

Terminal 4	PAHs and metals are associated with the site. Phthalates are not a known site contaminant.	Evaluation of PAHs, metals to be completed as part of site response. Consider other sources for phthalates in site discovery.
ARCO	PAHs likely site related. As may not be site related.	Evaluate as part of site response.
McCormick and Baxter	As likely site related. Note that some contaminants at adjacent Willamette Cove site are attributable to this site; however, Hg, DDT are not.	Contamination to be evaluated as part of site response. Additional evaluation of Willamette Cove warranted.
Riedel	Contaminants likely site-related. TBT may have an up river source as well. No known sources of DDT on site.	Contamination to be evaluated as part of site response. Some TBT may be associated with Portland Shipyard. DDT may be harbor-wide issue.
U.S. Moorings	PAHs may be site related or related to other nearby active sites.	Evaluate as part of site response for this and other nearby sites.
Willamette Cove	Cr, Hg, Ni, Zn, Cu, TBT, and some PAHs likely site related.	Evaluate as part of site response.
Willbridge	Pb, Hg, and DDT likely to be site related. Phthalates not likely to be site related.	Pb, Hg, and DDT to be evaluated as part of site response. Consider other sources of phthalates through site discovery.
Swan Island	Contaminants likely site-related; however, other sources are present as well.	Portland Shipyard data has been reviewed as part of site discovery effort. Other potential sources in this area have been identified.

Table F-3: Sites Identified in Site Discovery Process

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
ACF Industries 12160 NW St. Helens Rd, Portland	ECSI, well log report	Pentachlorophenol, PAHs, Arsenic, Thallium, Iron	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/15/99.	A.C.F. Industries 620 N Second St St Charles, MO 63301-5418
Babcock Land Company LLC NW Front Ave, Portland		Diocetylphthalate	File review and site screening to be completed. Site Assessment Review Notice sent 3/8/99. Response from Harmer Steel Products received 4/6/99.	Mr. George Webb Babcock Land Company LLC 9933 NW 107 th Ave Portland, OR 97231
Boydston Metal Works 9002 N Sever Rd, Portland	HW, Complaints, well log report	Total Organotins, Copper, Zinc, Antimony	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/2/99. Extension requested 3/22/99. Response from Boydston received March 5, 1999.	Mr. Robert D. Boydston IV Boydston Metal Works, Inc. 9002 N Sever Rd Portland, OR 97203-6479
C&T Quincy Foods 10400 N Burgard Rd, Portland	HW, TRI, ECSI, Complaints, well log report	Mercury, Cobalt, Antimony, PAHs, Carbazole, Dibenzofuran, bis(2-Ethylhexyl)phthalate, Copper, Zinc, Methyl naphthalene, Manganese, Arsenic, Barium	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/2/99.	Mr. Bob Masterson C&T Quincy Foods of Portland, L.L.C 10400 N Burgard Rd Portland, OR 97203
City of Portland Bureau of Environmental Services Water Pollution Lab – City CSO #50 Portland (RM 6.1)		Dibutylphthalate	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland		Antimony, PAHs	Portland Harbor Memo sent	Al Smith, Special Waste

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
City Slip 2-Terminal 4 (RM 6.8)			3/9/99.	Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall #M1 (@ Fred Devine Diving & Salvage)		Dibutylphthalate, Dimethylphthalate, bis(2-Ethylhexyl) phthalate, Cadmium, Copper, Zinc, Arsenic, Antimony	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Combined Sewer Outfall #23 (@ Mobil Terminal)		Thallium	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall S-1/M-2 (@ Swan Island Lagoon)		Selenium, Aluminum, Silver, Chromium, Copper, Zinc, Beryllium, Vanadium, Manganese, Iron, Dibutylphthalate, bis(2-Ethylhexyl)phthalate, Total DDTs, Cadmium, Mercury, Lead, Total Organotins, Cobalt, Nickel, PAHs, Arsenic, Antimony, 4-Methyl phenol, Barium	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall S-5 (@ Freightliner)		Diocetylphthalate, Total PCBs, Zinc, Dimethylphthalate, Antimony	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall #22C		Titanium, 2,4-D, 2,4-DB, Silver, Cobalt, Vanadium,	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
(@ Elf-Atochem)		Iron, Total DDTs, PAHs, Arsenic, Titanium, Methylphthalene, Carbazole, Dibenzofuran		City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall #22B (@ Elf-Atochem)		2,4-D, 2,4-DB, Total DDTs, bis(2-Ethylhexyl)phthalate, Arsenic, PAHs	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall #S-2/M-3 (@ Swan Island Shipyard)		Silver, 4-Methylphenol, bis(2-Ethylhexyl)phthalate, Copper, Mercury, Zinc	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Historic Outfall #21 (@ McCall Oil/Great Western)		PAHs, bis(2-Ethylhexyl)phthalate, Zinc, Manganese, Barium, 4-Methyl phenol, Dibenzofuran, Methylnaphthalene	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall #22 (@ Willbridge)		Diocetylphthalate, bis(2-Ethylhexyl)phthalate, Lead, Mercury, Total DDTs, Zinc, Phenol	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfalls #19 & 19A (@ Gunderson)		bis(2-Ethylhexyl)phthalate, Mercury, Zinc, Cadmium, Benzoic Acid	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
City of Portland Combined Sewer Outfall #50 (@ City of Portland)		Dibutylphthalate	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Combined Sewer Outfall #53 (@ Port of Portland, leased to Toyota Motor Sales)		Thallium, Manganese	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall #52 (@ City of Portland)		Pentachlorophenol, Dimethylphthalate, PAHs, Dibutylphthalate, bis(2-Ethylhexyl)phthalate, Total Organotins, Chromium, Copper, Lead, Thallium, Zinc, Carbazole, Dibenzofuran, Methylnaphthalene	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall #52A (@ City of Portland)		PAHs, bis(2-Ethylhexyl)phthalate, Thallium, Zinc, Arsenic, 4-Methyl phenol, Methylnaphthalene, Carbazole, Dibenzofuran	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
City of Portland Stormwater Outfall #18 (at Gunderson-4700 NW Front Ave., Portland (RM 8.5))		Arsenic, Barium, bis(2-Ethylhexyl)phthalate, Cadmium, Chromium, Copper, Lead, Mercury, Silver, PAHs, Zinc, Methylnaphthalene	Portland Harbor Memo sent 3/9/99.	Al Smith, Special Waste Manager City of Portland Env Services 1211 SW 5 th Ave, Room 800 Portland, OR 97204
Columbia River Sand &	Complaints,	PAHs, Methyl naphthalene,	File review completed. Site	Mr. Joel E. Peterson

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
Gravel 10504 NW St. Helens Rd, Portland	LUST, Spills, well log report	Carbazole, Dibenzofuran, Mercury, Total DDTs, Zinc, Thallium	screening scheduled. Site Assessment Review Notice sent 2/12/99.	Columbia River Sand & Gravel 4501 Tidewater Ave Oakland, CA 94601
Crawford Street Corp/Columbia Forge & Machine Works 8524 N Crawford St, Portland (RM 6.3)		Dibutylphthalate, Total Organotins, Mercury, PAHs, Arsenic	File review and site screening to be completed. Site Assessment Review Notice sent 3/3/99. Extension requested 3/22/99.	Mr. Robert Phillip Crawford Street Corporation 3200 NW Yeon St Portland, OR 97210
Foss Maritime/Brix Maritime 9030 NW St Helens Rd, Portland (RM 5.7)		PAHs	File review and site screening to be completed. Site Assessment Review Notice sent 3/3/99. Extension requested 3/24/99. Response from Foss Maritime received 3/31/99.	Mr. Bruce Reed Foss Maritime Company PO Box 83018 Portland, OR 97283-0018
Fred Devine Diving & Salvage 6211 N Ensign St, Portland (RM 8.5)	HW, UST, Complaints, well log report	Dibutylphthalate, Dimethylphtahalate, bis(2- Ethylhexyl) phthalate, Cadmium, Copper, Zinc, Arsenic, Antimony	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/3/99. Extension requested 3/29/99.	Mr. J.H. Leitz The Marine Salvage Consortium, Inc. 6211 N Ensign St Portland, OR 97217
Freightliner 6936 N Fathom St, Portland	ECSI, HW, TRIS, LUST, UST, Complaints, well log report	Zinc, 4-Methyl phenol, Dibutylphthalate, bis(2- Ethylhexyl)phthalate, Copper, Mercury, Iron, PAHs	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/3/99. Request for extension received 3/18/99.	Mr. James Hebe Freightliner Corporation PO Box 3849 Portland, OR 97208-3849
Front Avenue Corporation/Limited Partnerships (Zidell)(Tube Forgings)	ECSI, HW, LUST, Complaints, well log report	bis(2-Ethylhexyl)phthalate	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/4/99.	Mr. Jay Zidell Front Ave Corporation 3121 SW Moody Ave Portland, OR 97201

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
4950 – 5200 NW Front Ave, Portland				
GATX Petroleum Terminal 11400 NW St Helens Rd, Portland (RM 4.5)	HW, ECSI, Spill, WQ, well log report	Diocetylphthalate, Carbazole, Methyl naphthalene, Thallium, Dimethylphthalate, PAHs, Dibenzofuran, bis(2- Ethylhexyl)phthalate, Antimony, Barium	File review completed. Site screening scheduled. Site Assessment Review Notice sent 12/18/98.	Mr. Marco Ullmer GATX Tank Storage Terminals PO Box 83329
Georgia Pacific 12222 NW St Helens Rd, Portland (RM 3.8)	HW, LUST, UST, WQ, well log report	Arsenic, Iron, PAHs, Pentachlorophenol, Dibenzofuran, Carbazole, Thallium	File review completed. Site screening scheduled. Site Assessment Review Notice sent 2/11/99.	Mr. Robert C. Waldvogel Georgia-Pacific West, Inc. 900 SW Fifth Ave, Ste 1600 Portland, OR 97204-1283
Gunderson 4350 NW Front Ave, Portland (RM 8.5)		Cadmium, Chromium, Lead, Silver, bis(2- Ethylhexyl)phthalate, Mercury, Zinc, Arsenic, Copper, PAHs, Thallium, Antimony, Titanium, Barium, 4-Methyl phenol, Methylnaphthalene	File review and site screening to be completed. Site Assessment Review Notice sent 3/3/99. Extension requested 3/10/99. Response received from Gunderson 3/17/99 and 3/26/99.	Mr. L. Clark Wood Gunderson, Inc. 4350 NW Front Ave Portland, OR 97210-1422
Gunderson – Former American Ship Dismantlers 4012 NW Front Ave Portland (RM 8.5)		Total PCBs, Aluminum, Dibutylphthalate, bis(2- Ethylhexyl)phthalate, Mercury, Lead, Zinc, Nickel, Cobalt, Vanadium, Thallium, Antimony, Iron, 4- Methylphenol, Barium, Benzoic Acid	File review and site screening to be completed. Site Assessment Review Notice sent 3/3/99. Extension requested 3/10/99. Response received from Gunderson 3/17/99.	Mr. L. Clark Wood Gunderson, Inc. 4350 NW Front Ave Portland, OR 97210-1422
Hampton Lumber Sales/CMI Northwest 4950 NW Front Ave, Portland (RM 8.4)		bis(2-Ethylhexyl)phthalate, Mercury, Zinc, Antimony, Cadmium, Benzoic Acid	File review and site screening to be completed. Site Assessment Review Notice sent 3/4/99.	Mr. Michael Phillips CMI Northwest/Hampton Lumber Sales Company 9400 SW Barnes Rd #400

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
Hendren Tow Boats 8444 NW St Helens Rd Portland (RM 5.8)	HW, Complaints, LUST, UST, well log report	PAHs, Carbazole, Dibenzofuran, Methyl naphthalene, total DDTs, Copper, Mercury, Nickel, Zinc, Arsenic	File review completed. Site screening scheduled. Property owned by Marine Finance. Site also known as Rivergate Industrial Park. Site Assessment Review Notice sent 2/12/99. Response received 2/22/99.	Portland, OR 97225-6660 Mr. Floyd G. Hendren Jr. Hendren Tow-Boat Company, Inc. 12751 NW Springville Road Portland, OR 97229
Jefferson Smurfit 9040 N Burgard Way, Portland (RM 4.5)	Spills, well log report	Total Organotins, Copper, Zinc, Antimony	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/2/99. Response from Jefferson Smurfit received 3/22/99.	Mr. Terrell B. Bridges Jefferson Smurfit Corporation PO Box 83629 Portland, OR 97283-0629
Koppers Industries Inc 7540 NW St Helens Rd Portland (RM 6.4)	ECSI, HW, Complaints, Spills, well log report	PAHs, Cobalt, Selenium, Vanadium, Iron, bis(2-Ethylhexyl)phthalate, Zinc, Arsenic, Methyl Napthalene, Dibenzofuran, Carbazole	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/5/99. Response from Koppers received 3/16/99. Response from Koppers received 4/2/99.	Mr. Amos S. Kamerer Koppers Industries, Inc. 7540 NW Saint Helens Rd Portland, OR 97210
Lakeside Industries 4850 NW Front Ave, Portland (RM 8.5)	HW, Complaints, well log report	bis(2-Ethylhexyl)phthalate, Thallium, Antimony, phthalate,	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/3/99.	Mr. Charles W. Gaskill Lakeside Industries – Portland Division 4850 NW Front Ave Portland, OR 97210-1256
Lampros Steel 8524 N Crawford St, Portland		Dibutylphthalate, Total Organotins, Mercury, PAHs, Arsenic	File review and site screening to be completed. Site Assessment Review Notice sent 3/3/99. Response from Lampros Steel received 3/16/99.	Mr. Milton Lampros Lampros Steel, Inc. 8524 N Crawford St Portland, OR 97203-5406

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
Linnton Plywood Association 10504 NW St Helens Rd, Portland (RM 4.8)	LUST, Complaints, Spill, WQ, well log report	PAHs, Arsenic, Antimony, Dibenzofuran	File review completed, Site screening scheduled. Site Assessment Review Notice sent 2/12/99. Extension requested 3/8/99. Additional extension requested 4/2/99.	Mr. Jim Stahly Linnton Plywood Association 10504 NW Saint Helens Rd Portland, OR 97231-1049
Lone Star Northwest 5034 NW Front Ave, Portland (RM 8.2)		bis(2-Ethylhexyl)phthalate	File review and site screening to be completed. Site Assessment Review Notice sent 3/3/99. Extension requested 3/17/99.	Mr. James Repman Lone Star Northwest, Inc. PO Box 1730 Seattle, WA 98111
Mar Com Holding LLC/Marine Machine Works 9070 NW Bradford 8970 NW Bradford Portland (RM 5.8)	HW, Complaints, UST, Spills, well log report	PAHs Arsenic, Benzoic acid, Benzyl Alcohol, bis(2- Ethylhexyl)phthalate, Carbazole, Chromium, Copper, Dibenzofuran, Dibutylphthalate, Lead, Nickel, 4-Methyl phenol, Pentachlorophenol, Methyl naphthalene, Zinc, Thallium, TBT, PAHs, Mercury, Iron, Dimethylphthalate, Arsenic	File review completed. Site screening scheduled. Mar Com operates business as Mar Com Marine and Marine Machine Works. Site Assessment Review Notice sent 2/12/99. Response from Machine Works received 3/5/99.	Mr. Tom Maples Mar Com Inc. PO Box 1029 Vancouver, WA 98666 and Mr. Robert H. Prazeau Marine Machine Works 55 SE 71 st Ave Portland, OR 97215
Marine Finance 8444 NW St Helens Rd Portland (RM 5.8)	HW, Complaints, LUST, UST, well log report	Carbazole, Dibenzofuran, PAHs, Methyl naphthalene, Total DDTs, Copper, Mercury, Nickel, Zinc, Arsenic	File review completed. Site screening scheduled. Site known as Riverside Industrial Park. Hendren Tow Boats operates at this site. Site Assessment Review Notice sent 2/12/99. Response from Marine Finance received 3/3/99.	Mr. Douglas Watson Marine Finance Corporation 1500 NE Irving, Ste 110 Portland, OR 97232
McCall Oil/Great Western 5480 NW Front, Portland		Dioctylphthalate, PAHs, bis(2-Ethylhexyl)phthalate,	File review and site screening to be completed. Site	Mr. Robert H. McCall Great Western

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
(RM 8.1)		Lead, Mercury, Total DDTs, Zinc, Manganese, Phenol, Barium, 4-Methyl phenol, Methylnaphthalene	Assessment Review Notice sent 3/4/99.	Chemical/McCall Oil and Chemical Corporation 808 SW 15 th Ave Portland, OR 97205-1907
NW Pipe Company 12005 N Burgard Way, Portland (RM 4.5)	ECSI, HW, TRIS, Complaints, LUST, UST, well log report	Total Organotins, Antimony, Copper, Zinc	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/2/99. Extension requested 3/10/98.	Mr. William R Tagmyer Northwest Pipe Company PO Box 83149 Portland, OR 97283-0149
Olympic Pipeline		Historic petroleum leaks reported.	File review and site screening to be completed. Site Assessment Review Notice sent 3/5/99.	Mr. W.N. Harris Olympic Pipe Line Company 5005 Business Park North Bakersfield, CA 93309
<u>Oregon Steel Mills</u> 14400 N Rivergate, Portland (RM 2.7)	HW, UST, ECSI, Complaints, WQ, well log report	Creosote-like free product encountered during recent sediment dredgings	File review completed. Site screening scheduled. Site Assessment Review Notice sent 12/22/98. Response from OSM received 2/19/99.	Mr. Drew Gilpin Manager, Env Services Oregon Steel Mills, Inc. PO Box 2760 Portland, OR 97208
Owens- Corning Fiberglass (Linnton Planing Mill) 11444 NW St Helens Rd, Portland (RM 4)	ECSI, LUST, Complaints, well log report	Diocetylphthalate, Thallium, Total DDTs, PAHs, Arsenic, Methyl naphthalene	Multiple businesses operated at this site: Trumbull Asphalt, Paramount Petroleum, Former Northwest Field Services, file review completed, site screening scheduled. Site Assessment Review Notice sent 2/11/99.	Mr. Frank Burg Owens Corning/Trumbull Asphalt 3605 NW 35 th Ave Portland, OR 97210-1639

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
PGE–Harborton Substation/Columbia Petroleum 12430 NW St Helens Rd, Portland (RM 3.5)	Well log report	Mercury, Nickel, Antimony, Zinc, PCP, Thallium, Arsenic, Dibenzofuran, Carbazole, Dioctylphthalate, 4-Methyl phenol, Dimethylphthalate, DDT, PAHs, Methylnaphthalene	File review completed. Columbia Petroleum Company also operated at this site. Site screening scheduled. Site Assessment Review Notice sent 2/12/99. Extension requested 2/24/99. Response from PGE received 3/19/99.	Mr. Dennis Norton Portland General Electric 121 SW Salmon St, 1WTC-14 Portland, OR 97204-2980 and Mr. Don R. Buster Columbia Petroleum, Inc. PO Box 13040 Spokane, WA 99213
Port of Portland (Leased to Toyota Motor Sales) Port of Portland-Terminal 4 Berth 414/415/416 10400 N Lombard St 9040 N Bradford St Portland (RM 5.0)	Well log report	Benzoic acid, Thallium, PAHs, Dibenzofuran, Carbazole, Zinc, Antimony, Manganese	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/12/99.	Mr. Tom Bispham Environmental Services Division Port of Portland PO Box 3529 Portland, OR 97208
Port of Portland-Ft James/BPA Right-of-Way		Arsenic, Antimony	File review and site screening to be completed. Site Assessment Review Notice sent 3/12/99.	Mr. Tom Bispham Environmental Services Division Port of Portland PO Box 3529 Portland, OR 97208
Port of Portland-Grain Loading Dock		Antimony, Arsenic, Chromium, Nickel, Zinc, Iron	File review and site screening to be completed. Site Assessment Review Notice sent 3/12/99.	Mr. Tom Bispham Environmental Services Division Port of Portland PO Box 3529 Portland, OR 97208

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
Port of Portland-McCall Oil (Buffer strip through tank farm)		Diethylphthalate, PAHs, bis(2-Ethylhexyl)phthalate, Lead, Mercury, Total DDTs, Zinc, Manganese, Phenol, Barium, 4-Methyl phenol, Methylnaphthalene	File review and site screening to be completed. Site Assessment Review Notice sent 3/12/99.	Mr. Tom Bispham Environmental Services Division Port of Portland PO Box 3529 Portland, OR 97208
Port of Portland-Terminal 4 Slip 1 10400 N Lombard Portland (RM 4.5)	Well log report	Antimony, Arsenic, Cadmium, Carbazole, Chromium, Copper, Dibenzofuran, Lead, Manganese, Mercury, bis(2-Ethylhexyl)phthalate, Vanadium, Zinc, PAHs, Aluminum	Multiple businesses leasing property from POP. Site screening scheduled. Site Assessment Review Notice sent 3/12/99.	Mr. Tom Bispham Environmental Services Division Port of Portland PO Box 3529 Portland, OR 97208
Portland Container Repair Corp 9449 N Burgard Way Portland, OR 97203	Well log report	Total Organotins, Copper, Zinc, Antimony	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/2/99. Response from Portland Container Repair received 3/22/99.	Mr. Robert W. McClane Portland Container Repair Corporation PO Box 98951 Seattle, WA 98198
RK Storage 3841 N Columbia Blvd, Portland (RM 4.8)	Well log report	Diethylphthalate	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/8/99.	Mr. Roger W. Kroft R K Storage & Warehousing 10937 NW Front Ave Portland, OR 97231
Ro-Mar Transportation Systems 9333 N Time Oil Road, Portland (RM 3.8)		Mercury, Antimony, PAHs, Dibenzofuran, bis(2-Ethylhexyl)phthalate, Zinc, Methyl naphthalene, Arsenic, Barium	File review and site screening to be completed. Site Assessment Review Notice sent 3/8/99.	Mr. Michael Marden Ro-Mar Transportation Systems, Inc. 3500 S Kedzie Ave Chicago, IL 60632-2726

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
Ryerson Steel 9040 N Burgard Way Portland, OR		Mercury, Antimony, PAHs, Dibenzofuran, bis(2-Ethylhexyl)phthalate, Zinc, Methyl naphthalene, Arsenic, Barium	File review and site screening to be completed. Site Assessment Review Notice sent 3/2/99.	Mr. Bob Bellenghi Joseph T. Ryerson & Son, Inc. PO Box 3154 Portland, OR 97208-0629
Santa Fe Pipeline 6565 NW St. Helens Rd, and other local petroleum pipeline locations, Portland	ECSI, HW, WQ, well log report	Recent petroleum releases at pumping station. Other leaks possible.	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/5/99.	Mr. Thomas B. King Kinder Morgan G.P., Inc. 3 Houston Center 1301 McKinney, Ste 3450 Houston, TX 77010-3032
Schnitzer Front Avenue/Kittridge Site		bis(2-Ethylhexyl)phthalate, Mercury, Zinc, Antimony, Cadmium, Benzoic Acid	File review and site screening to be completed. Site Assessment Review Notice sent 3/5/99. Extension received 3/23/99. Response from Schnitzer received 4/5/99.	Mr. Kenneth M. Novack Schnitzer Investment Corporation 3200 NW Yeon Ave Portland, OR 97210-1594
Schnitzer Steel Works 122005 N Burgard Way 9945 N Burgard Way 10400 N Burgard Way 9040 N Burgard Way (RM 3.8 to RM 4.5)	HW, ECSI, LUST, Spill, WQ, well log report	Total Organotins, Antimony, Chromium, Cobalt, Arsenic, PAHs, Carbazole, Dibenzofuran, bis(2-Ethylhexyl)phthalate, Copper, Cadmium, Lead, Mercury, Zinc, Nickel, Methyl naphthalene, Manganese, Iron, Barium, Thallium	Multiple businesses leasing property from Schnitzer. File review completed of Western Machine Works, Schnitzer Steel Products, Premier Edible Oils, NW Pipe and Casing, Dunkin & Bush, and Hawkeye Construction. Site screening scheduled. Site Assessment Review Notice sent 2/12/99. Extension requested 3/2/99. Response from Schnitzer Steel received 3/19/99.	Mr. Robert W. Phillip Schnitzer Steel Industries, Inc. 3200 NW Yeon Ave Portland, OR 97210-1594

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
Shaver Transportation 4900 NW Front Ave, Portland (RM 8.4)	LUST, UST, well log report	bis(2-Ethylhexyl)phthalate, Mercury, Zinc, Cadmium, Benzoic Acid	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/3/99.	Mr. George H. Shaver Shaver Transportation Company PO Box 10324 Portland, OR 97210-0324
Swan Island Lagoon Berths 305/306/307 Portland (RM 8.2)		Selenium, Aluminum, Silver, Chromium, Copper, Zinc, Beryllium, Vanadium, Manganese, Iron, Dibutylphthalate, bis(2-Ethylhexyl)phthalate, Total DDTs, Cadmium, Mercury, Lead, Total Organotins, Cobalt, Nickel, PAHs, Arsenic, Antimony, 4-Methyl phenol, Barium, Phenol	File review and site screening to be completed. No Site Assessment Review Notice sent. Cascade General is currently under a Voluntary Agreement in VCP.	N/A
Swan Island Lagoon/Port of Portland Berth 311 Portland (RM 8.2)		Selenium, Aluminum, Silver, Chromium, Copper, Zinc, Beryllium, Vanadium, Manganese, Iron, Dibutylphthalate, bis(2-Ethylhexyl)phthalate, Total DDTs, Cadmium, Mercury, Lead, Total Organotins, Cobalt, Nickel, PAHs, Arsenic, Antimony, 4-Methyl phenol, Barium, Phenol	File review and site screening to be completed. No Site Assessment Review Notice sent.	Mr. Tom Bispham Environmental Services Division Port of Portland PO Box 3529 Portland, OR 97208
T.L.S. Steel 8514 N Crawford St, Portland		Dibutylphthalate, Total Organotins, Mercury, PAHs, Arsenic	File review and site screening to be completed. Site Assessment Review Notice sent 3/3/99. Response from T.L.S Steel received 3/22/99.	Mr. Gaylord Mink T.L.S Steel Products Co 8514 N Crawford St Portland, OR 97203
Texaco		Cadmium, Chromium, Lead,	File review and site screening	Mr. Anthony J. Palagyi

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
Terminal/Pipeline/Dock		Silver, bis(2-Ethylhexyl)phthalate, Mercury, Zinc, Arsenic, Copper, PAHs, Barium, Methylnaphthalene, 4-Methyl phenol	to be completed. Site Assessment Review Notice sent 3/3/99. Response from Equilon Enterprises LLC received 4/2/99.	Texaco Refining and Marketing, Inc. 3400 – 188 th St SW, Ste 630 Lynnwood, WA 98037
Time Oil (NW Terminal)		Mercury, Antimony, PAHs, Dibenzofuran, bis(2-Ethylhexyl)phthalate, Zinc, Methyl naphthalene, Arsenic, Barium	File review and site screening to be completed. Site Assessment Review Notice sent 3/5/99. Extension requested 3/12/99. Response from Time Oil received 4/2/99.	Mr. H.R. Holliday Time Oil Company 2737 W Commodore Way Seattle, WA 98119
Time Oil (St. Helens Rd Facility)		bis(2-Ethylhexyl)phthalate, Thallium, PAHs	File review and site screening to be completed. Site Assessment Review Notice sent 3/5/99. Extension requested 3/12/99. Response from Time Oil received 3/31/1999.	Mr. H. R. Holliday Time Oil Company 2737 W Commodore Way Seattle, WA 98119
U.S. Coast Guard 6767 N Basin Ave, Portland (RM 8.2)	HW, ECSI, LUST, UST, well log report	Dibutylphthalate, bis(2-Ethylhexyl)phthalate, Copper, Mercury, Zinc, PAHs, Iron, 4-Methyl phenol	File review completed. Site screening scheduled. Site Assessment Review Notice sent 3/3/99.	Chief Chad Wendt US Coast Guard – Portland Station 6767 N Basin Ave Portland, OR 97217-3992
Wacker Siltronic Corp 7200 NW Front Ave, Portland (RM 6.3)	HW, ECSI, Spill, WQ, well log report	Arsenic, Beryllium, Dibenzofuran, Manganese, Iron, Titanium, 2,4-D, 2,4-DB, Carbazole, Methyl naphthalene, Silver, Vanadium, Cobalt, Selenium, bis(2-Ethylhexyl)phthalate, Zinc, DDT, PAHs, Antimony	File review and site screening completed. Site Assessment Review Notice sent 12/18/98. Response received.	Mr. James R. Ellis Wacker Siltronic Corporation PO Box 83180 Portland, OR 97283-0180

Site name and address	Available files	Reason(s) for DEQ Concern	Follow-up Action Proposed or Initiated	Site Assessment Review Notice Contact
Wagner, Stanley (General Construction Company) NW St Helens Rd, Portland (RM 5.6)	HW, Complaints, LUST, UST, well log report	Carbazole, 4-Methyl phenol	File review completed. Site screening scheduled. Site Assessment Review Notice sent 2/12/99.	Mr. Stanley Wagner General Construction Company 2755 NW 31 st Ave Portland, OR 97210
Western Machine Works		Total Organotins, Copper, Zinc, Antimony	File review and site screening to be completed. Site Assessment Review Notice sent 3/2/99. Response from Western Machine Works received 3/12/99.	Mr. Gary W. Scorgie Western Machine Works, Inc. 12005 N Burgard Way Portland, OR 97203

REFERENCES

DEQ, Willamette River Toxics Study, July 1994.

DEQ, Willamette River Basin Water Quality Study, Phase II, Ecological Monitoring Component: Assessment of Aquatic Communities and Biological Indices, June 1995.

Port of Portland, Chemical Characterization of Sediments Adjacent to Storm Water Discharges in the Willamette River near Portland, OR 1995.

U.S. ACOE, Draft Integrated Feasibility Report for Channel Improvements and Environmental Impact Statement, Columbia and Lower Willamette Federal Navigation Channel, Portland District, October 1998.

U.S. ACOE, U.S. EPA, WA DoE, DEQ, WA DNR, Dredged Material Evaluation Framework, Lower Columbia River Management Area, Draft April 1998.

U.S. EPA, Portland Harbor Sediment Investigation Report, EPA Region X, Weston, May 1998.