



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10

1200 Sixth Avenue, Suite 900  
Seattle, WA 98101-3140

OFFICE OF  
ENVIRONMENTAL CLEANUP

September 9, 2009

**MEMORANDUM**

**SUBJECT:** EE/CA Approval Memorandum for Proposed Non-Time Critical Removal Action at Gasco and Siltronic Facilities, Portland, Oregon

**FROM:** Sean Sheldrake, Project Manager 

**THRU:** Deb Yamamoto, Unit Manager   
Site Cleanup Unit 2, Office of Environmental Cleanup

**TO:** Lori Cohen, Acting Director   
Office of Environmental Cleanup

The purpose of this memorandum is to request approval to proceed with an Engineering Evaluation/Cost Analysis (EE/CA) for a non-time critical removal of sediments at the Gasco and Siltronic (Gasco /Siltronic) site, located at 7900 and 7200 Northwest Front Avenue, respectively, Portland, Multnomah County, Oregon. The site is located along river mile 6.1 to 6.8 of the Willamette River and is within the known boundaries of the Portland Harbor Superfund Site. The purpose of the non-time critical removal is to eliminate principle threat material (PTM) source material from the river prior to the implementation of downstream remedial actions following completion of the Portland Harbor RI/FS and to coordinate sediment cleanup activities with upland source control measures being implemented through the separate cleanup actions being conducted by Siltronic Corporation and Northwest Natural with the State of Oregon Department of Environmental Quality (ODEQ). The federal action will focus on contaminated media offshore of Gasco and Siltronic and will be coordinated with Harbor-wide efforts so that it can be part of the Record of Decision. The AOC for this action covers EE/CA and design studies, to support remedial or removal action work in the future. Alternatives for the riverbank and river will be evaluated by and incorporated into the RI/FS to ensure that the action taken at this site is as close to a final remedy as possible and, ideally, are included in the Proposed Plan. Should the Proposed Plan and/or Harbor-wide Record of Decision (ROD) be delayed, an Action Memo will be considered to proceed with the EE/CA recommended alternative for PTM materials in the Willamette River.

I. Site Background

**A. Site Ownership History**

Gasco Property: The Gasco site is currently owned by the Northwest Natural Gas Company, which is the successor to the Portland Gas and Coke Company (Gasco). It is

currently used as a liquefied natural gas plant. Gasco purchased the site in approximately 1910. At that time, the site was larger, approximately 85 acres. Today the site is 44.65 acres. Gasco built and operated an oil gasification plant on the site between 1913 and 1956. Between 1913 and 1923, only gas and lampblack briquettes were produced. In 1923, by-products refining began. After 1925, when tar refining operations began, the quantity of tar within the waste stream would have decreased, but waste tar in the effluent continued to occur as suspended material and emulsions from the secondary tar box. Prior to 1941, all wastewater effluent and tar stills from the gasification process and by-product refining was discharged to a stream channel leading from the production area to the Willamette River, or to low lying areas of the site. After 1941, wastewater effluent and tar stills were disposed of into settling ponds adjacent to the Willamette River in the central portion of the Gasco facility including what is now part of the Siltronic property. Historic photographs suggest that the tar ponds periodically overflowed to the Willamette River. When the plant was shut down in 1956, an estimated 30,000 cubic yards of tar waste had accumulated in the ponds. The southern portion of the original Gasco property was sold and is now owned by Siltronic Corporation (Siltronic). The tar ponds on the northern portion of the site were buried under 10 feet of fill in 1973. Current uses of the Gasco site, other than as a liquefied natural gas plant, are bulk transfer of creosote oil and coal tar pitch, liquefied gas storage, and bulk petroleum storage.

Siltronic Property: In addition to historic waste materials from the Gasco operations, the Siltronic property has trichloroethene (TCE) releases. Current information indicates that tank leakage occurred at the Siltronic facility from 1980 to 1984 (Siltronic April 2007 RI). This leakage resulted in a TCE plume of groundwater contamination extending from the former TCE handling and storage areas to the Willamette River. Trichloroethene (TCE) leaked from an underground storage tank system operated by Siltronic at the northern portion of the property resulting in soil and groundwater impacts. Related COIs include TCE and degradation products such as vinyl chloride and, possibly, tetrachloroethene (PCE) as an impurity within TCE. Other releases associated with Siltronic operations (1980-1997), also on the northern portion of the property, include chromium solution, acids, caustics, and organic wastewater releases or spills.

Off-Site Releases: Contaminants related to identified sources located south of the Siltronic property have been detected within groundwater at the Siltronic site, indicative of on-site migration. Off-site contaminants include benzene, chlorobenzene isomers, dichlorobenzene isomers, MTBE, 2,4,5-TP, chloroform, TCE and degradation products.

## **B. Site Investigation and Cleanup Activities**

Gasco Property: A number of remedial investigation and risk assessment activities have been completed at the Gasco site to date pursuant to the Oregon Hazardous Cleanup law and under a voluntary agreement with the Oregon Department of Environmental Quality (“ODEQ”). During the first phase of the Remedial Investigation, widespread oil gasification and by-products refining waste contamination was identified in site soils, groundwater, and Willamette River sediments. Tars were identified to depths of 70 feet

in the vicinity of the former tar waste disposal area. In the former plant site area, dense non-aqueous-phase liquids (DNAPLs) were identified at three distinct locations. In subsequent RI phases, monitoring wells were installed adjacent to the Willamette River and detected elevated levels of benzene and naphthalene. Sediment samples extending from the site into the river were found to contain high concentrations of polynuclear aromatic hydrocarbons and pure tar waste. Groundwater contamination was detected up to 100 feet below the surface along the riverbank. Current site activities now under enforcement order are progressing toward hydraulic controls to limit migration of the extensive groundwater contamination. Bioassay results in front of both Siltronic and Gasco show high levels of toxicity (see River Mile 6-7 plot attached). Areas of transition zone water toxicity include the tar body and the 15,000 cubic yards of pure tar removed from the river in 2005, but occur much more broadly in front of both sites, indicating high levels of contamination still exist outside of the tar body area.

Siltronic Property: The Siltronic property has also undergone extensive characterization. Siltronic purchased approximately 40 acres of property formerly owned by Gasco in 1978 and constructed a silicon wafer manufacturing facility. Aerial photographs document that the Gasco tar ponds extended onto what is now the northern portion of the Siltronic property. In addition, tar products from the Gasco facility were disposed at various locations on the Siltronic site including adjacent to a drainage ditch along the southern boundary of the Siltronic property. Subsurface soil sampling on the vacant southern half of the site in 1985 found high levels of PAHs, plus lesser amounts of herbicides. Similar contamination was found in subsurface soil sampling on another portion of the site in 1990. The same year, groundwater contaminated with TPH and BTEX compounds was found near a fuel line corridor. In addition, there have been releases of solvents from Siltronic's operations.

In September and October 1997, EPA's contractor, Roy F. Weston Inc., collected sediment samples within the Portland Harbor (RM 3.5 to RM 9.5). Beryllium, cobalt, iron, manganese, selenium, silver, titanium, vanadium, zinc, carbazole, 2-methylnaphthalene, bis(2-Ethylhexyl)phthalate, dibenzofuran, Di-N-Butylphthalate, pentachlorophenol, PAHs, DDTs, 2,4-D, and 2,4-DB were detected in river sediments off of the Siltronic site.

Siltronic's groundwater investigations detected up to 575 mg/L TCE and 6.3 mg/L vinyl chloride in groundwater at the northern portion of the facility. In July 2003, TCE was detected at ~ 20 feet below ground surface in soil (557 mg/kg) beneath the location of former underground TCE storage tanks, also in the northern portion of the site. In 2004, the RI upland investigation consisted of direct-push and rotosonic drilling to collect soil and groundwater samples, and monitoring well installation and sampling. In 2004, in-water investigations looked at the groundwater/surface water interface to determine exposure point concentrations, as did a 2005 supplemental investigation. In soil, TCE, *cis*-1,2-DCE and 1,1-DCE were detected in WS-15, approximately 120 feet west and slightly down-gradient of the source area. TCE concentrations were 11,600 µg/kg and 3,830 µg/kg at 55 and 80 feet bgs, respectively. Three groundwater borings were completed in the source area. Twelve reconnaissance groundwater samples were

collected from approximately 52 to 109 feet bgs. TCE was detected at concentrations ranging from 760 µg/L to 592,000 µg/L. *Cis*-1,2-DCE was detected at concentrations ranging from 157 µg/L to 57,900 µg/L, and vinyl chloride (VC) was detected at concentrations ranging from non-detect to 54 µg/L. In the context of the evaluation criteria used in the document, *Evaluation of the Likelihood of DNAPL at NPL Sites* (USEPA, 1993), these dissolved-phase concentrations are characterized as indicative of a high probability that TCE could be present as DNAPL, although VOC related DNAPL has not been found to date. TCE and its degradation products were detected in TZW samples in the river, but were not detected in sediment samples at collocated stations (with the exception of LWG station 299). VOCs from Siltronic operations have been found to be impacting a range of site media, including upland and in water areas. Bioassay results in transition zone water in front of both Siltronic and Gasco show high levels of toxicity (see River Mile 6-7 plot attached). In conclusion, concentrations of *cis*-1,2-DCE, TCE, and VC were above drinking-water MCLs in surface water in front of the Siltronic site. Concentrations of TCE and VC in surface water in front of Siltronic also were above risk-based screening levels based on fish consumption. Similarly, TCE was detected at a concentration greater than the screening level for aquatic organisms in TZW at Siltronic.

### **C. Integration of In-Water Removal Action with Upland Source Control Actions**

Activities at this site will be coordinated closely between USEPA and DEQ to ensure that upland and in water efforts proceed seamlessly. To allow timely implementation of this action without undue risk of in water recontamination, EPA and ODEQ will need to closely coordinate efforts as the Agencies are for the Arkema site. ODEQ has already begun this higher level of coordination during AOC negotiations. Coordination with the overall Harbor-wide work will be necessary to build on RI/FS findings rather than duplicating these efforts.

## **II. Threat to Public Health, Welfare, or the Environment**

Contaminants known to be present at the Gasco/Siltronic facility that pose a substantial risk to human health or the environment include naphthalene, cyanide, benzene, tars, oil, creosote, phenols, polynuclear aromatic hydrocarbons (PAHs), BTEX, phthalates, Carbazole, chlorophenol, chrysene, cobalt, DDT, dibenzofuran, dimethylphenol, ethylbenzene, pyrenes, manganese, PCP, VOCs, (such as vinyl chloride, TCE, toluene, and others which are commingled with MGP wastes) and lead, starting in the uplands and continuing through the riverbank and into sediment in the river. Surface water monitoring conducted during the Gasco Removal Action (EPA, 2005) documented that baseline conditions at the site include chronic aquatic water quality criteria exceedance of many PAH constituents in the water column each day, simply due to ongoing dissolution of tar on the river bottom, in the riverbank, and in upland areas. Sampling in the vicinity of Gasco/Siltronic has produced cores full of pure product with strong odor. Cores removed from the river have dripped pure PAH material onto the boat deck after being collected, further exhibiting a gross level of material mobility. [Photo](#) of RI/FS Round 2 core with visible product:

[http://yosemite.epa.gov/R10/CLEANUP.NSF/6d62f9a16e249d7888256db4005fa293/88d69f66093017de88256e71006e1295/\\$FILE/Picture%20054.jpg](http://yosemite.epa.gov/R10/CLEANUP.NSF/6d62f9a16e249d7888256db4005fa293/88d69f66093017de88256e71006e1295/$FILE/Picture%20054.jpg)

Round 2 data show that materials off of the Gasco/Siltronic site exhibit the highest level of PAH contamination in all of Portland Harbor (NOAA Query Manager, 2007). Overall PEC exceedances are more than 100 times (see Figure). For west near shore sediments nearest Gasco/Siltronic, PAH levels are above 10 times PEC, approaching 100 times PEC throughout. Sediments in front of Gasco/Siltronic exceed PECs for other chemicals as well. Attached figures also describe the mean PEC hazard quotient by individual sediment sample, where the mean PEC quotient is the average of the PEC hazard quotient for all chemicals, not just PAHs. The Gasco/Siltronic site is shown to be the location of the most pervasive PEC quotient exceedances in all of the Portland Harbor initial study area. Concentrations of *cis*-1,2-DCE, TCE, and VC were above drinking-water MCLs in surface water in front of the Siltronic site. Concentrations of TCE and VC in surface water in front of Siltronic also were above risk-based screening levels based on fish consumption. Similarly, TCE was detected at a concentration greater than the screening level for aquatic organisms in TZW at Siltronic. In addition, removal action work has documented that material in the river in the area off of Gasco/Siltronic fails TCLP (Anchor 2004). These factors altogether show that the site presents an imminent and substantial threat to human health and the environment.

Therefore, sufficient evidence exists to justify proceeding with the preparation of an EE/CA to address principal threat sources from the Gasco/Siltronic facility to the Willamette River and human and ecological receptors, along with other contaminated sediments offshore of this site. The primary concerns are actual risks to the benthic community as a result of direct contact with contaminated sediments and potential risks to human health through direct contact and shellfish consumption exposure pathways. Additional reasons for high Gasco/Siltronic priority are overall Harbor wide cleanup sequencing to ensure high concentration material at the site is controlled as early as possible and that impacts from performing cleanup do not re-contaminate downstream sites after they are cleaned up.

The removal action will expedite site-specific alternatives analysis and cleanup work so that after completion of a Harbor-wide Remedial Investigation/Feasibility Study and Record of Decision (ROD), PTM will have been or will soon be dredged along with other necessary actions for the site in order to allow other Harbor cleanups to proceed in sequence (cleaning up sites with the highest concentrations first, among other factors, may help prevent recontamination). The current Portland Harbor RI/FS schedule specifies that the ROD will be completed in 2012. By conducting an early removal action, significant planning progress can be made for the high levels of contamination offshore of this site. Should cleanup work nearby proceed absent this work, re-suspended material of doing Gasco/Siltronic work later in the Harbor wide cleanup would likely be re-deposited on top of clean caps or surface sediments, requiring re-remediation of these areas. Likewise, inaction at the site would likely lead to re-deposition of contaminated sediment materials from the Gasco/Siltronic site onto other downstream properties. Work will be coordinated with ongoing ODEQ lead source control efforts to ensure that upland and in water sources would be controlled in a synchronized fashion. This will ensure that overall impact to the river is controlled in the shortest amount of time possible, and in a way that reflects overall Harbor wide cleanup sequencing needs. Lastly, early action at the Gasco/Siltronic site will abate or reduce ongoing, documented exposures, many fold above probable effect literature values, to Willamette River receptors.

### III. Statutory Basis for Action

Section 300.415(b)(2) of the National Contingency Plan (NCP) provides factors for determining the appropriateness of a removal action. The factors applicable to current conditions at the Gasco/Siltronic site are: (1) the actual or potential contamination of sensitive ecosystems; (2) actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants; and (3) high levels of hazardous substances in river sediment that may migrate throughout the river system. In accordance with 300.415(b)(4) of the NCP, EPA has determined that a planning period of at least six months exists before on-site activities could be initiated; therefore, an EE/CA must be conducted for a non-time critical removal action.

### IV. Factors for Determining Appropriateness of a Removal Action

Section 300.415(b)(2) of the National Contingency Plan (NCP) provides factors for determining the appropriateness of a removal action. The factor most applicable to current conditions at the Gasco/Siltronic site are the actual or potential contamination of sensitive ecosystems. Other factors that may be applicable include actual or potential exposure to nearby human populations or the food chain from hazardous substances or pollutants. In accordance with 300.415(b)(4) of the NCP, EPA has determined that a planning period of at least six months exists before on-site activities could be initiated; therefore, an EE/CA must be conducted for a non-time critical removal action.

### D. Enforcement/Proposed Actions/Cost Estimates

With approval of this memo, development of an EE/CA will proceed and information generated will be used in the Harbor wide RI/FS. EPA anticipates that some of the potential removal response options would likely include dredging of PTM followed by capping. EPA estimates that the very approximate cost of these various removal responses could range from thirty to seventy-five million dollars.

### E. Public Involvement

EPA expects to issue an EE/CA for public comment in 2012 and/or await the outcome of the information developed in this EE/CA via the Harbor wide Proposed Plan.

F. Approval/Disapproval

The conditions at the Gasco/Siltronic site meet the NCP criteria for a removal action, including imminent and substantial threat. Therefore, I am requesting approval to proceed with negotiations for a Non-Time Critical Removal Administrative Order on Consent. Your approval or disapproval should be indicated below.

Approve: *Joni Cahn* Date: 9/9/09

Disapprove: \_\_\_\_\_ Date: \_\_\_\_\_

Reasons for disapproval: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

References

NOAA Screening Quick Reference Table, 1999.  
Gasco Removal Action Documents:  
Siltronic Updated Phase I Characterization Report Summary July 22, 2005  
Siltronic Enhanced Bioremediation Pilot Study Workplan, July 28, 2006  
Siltronic Upland Remedial Investigation Report, April 16, 2007  
Gasco Upland Remedial Investigation Report, April 30, 2007  
Work products prepared for Portland Harbor Data Retreat, February 6 and 7, 2007. (All data obtained from Portland Harbor Query Manager Data Base, December 2006 update)

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Approve: \_\_\_\_\_ Date: \_\_\_\_\_

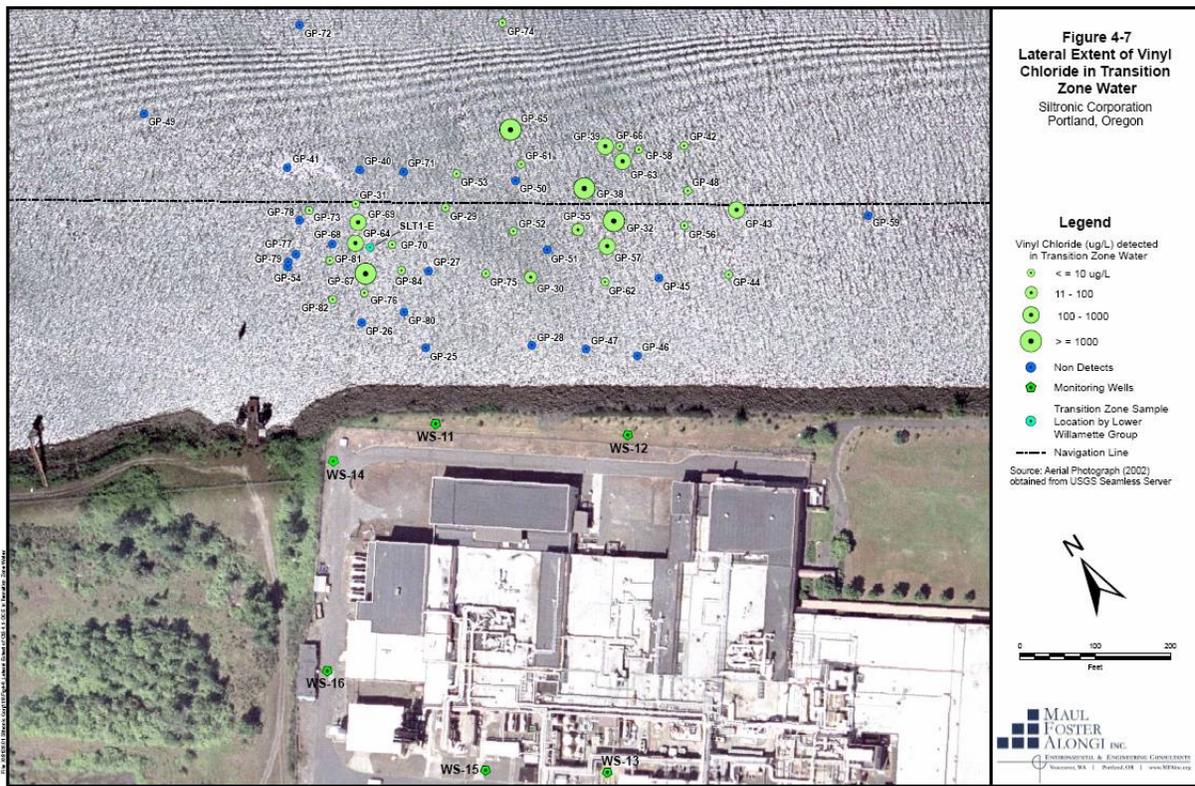
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Reasons for disapproval: \_\_\_\_\_  
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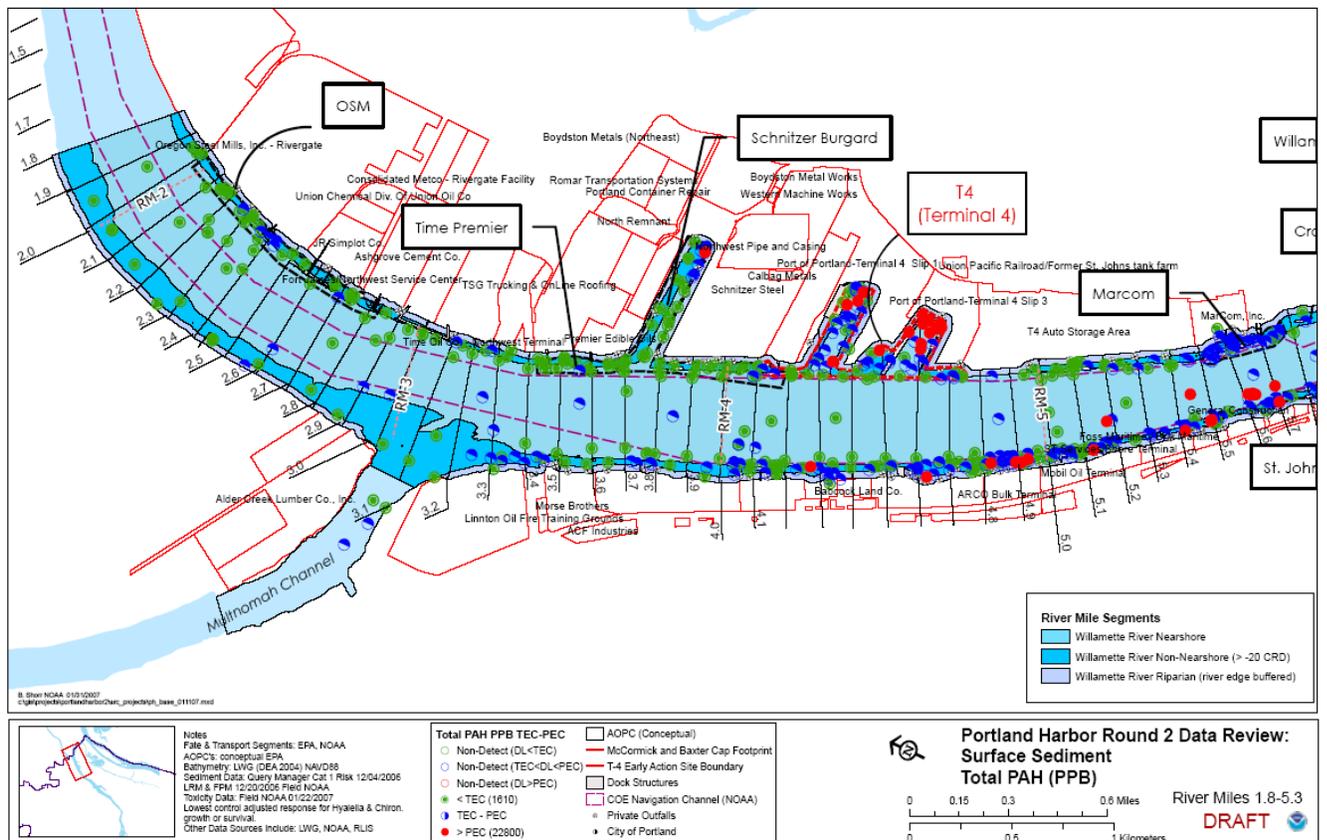
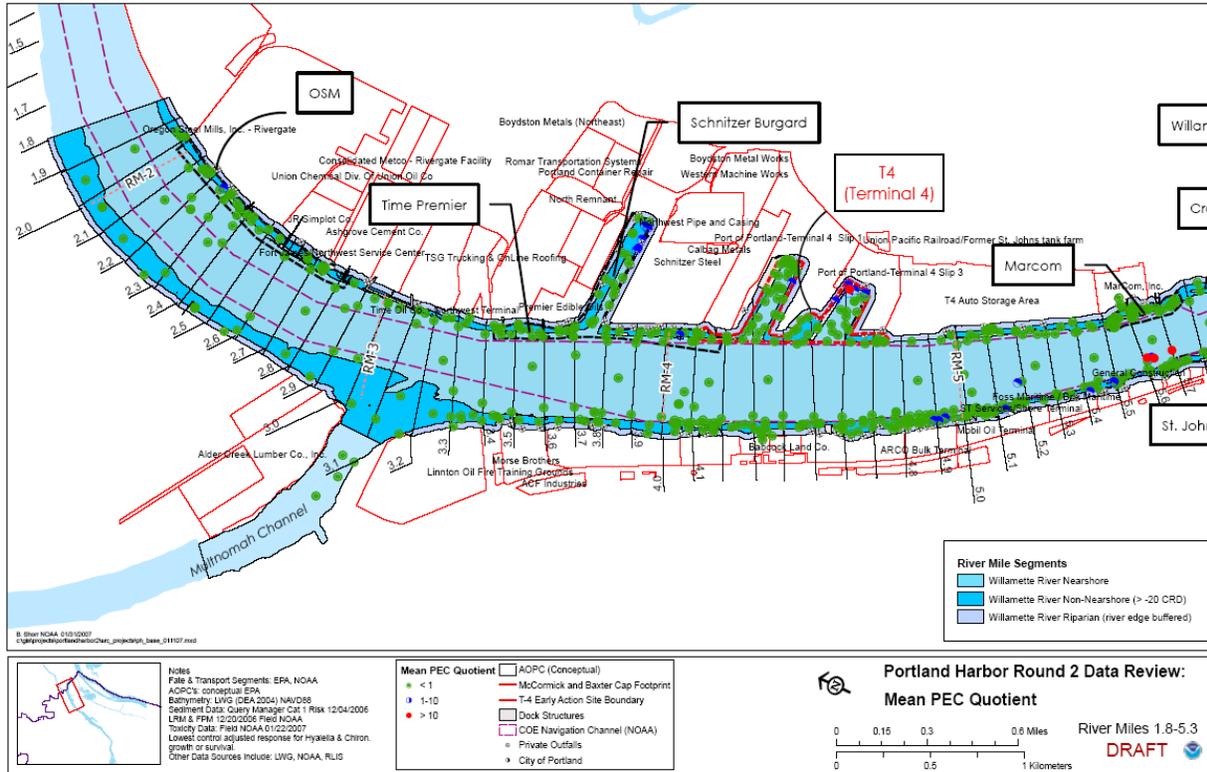
References

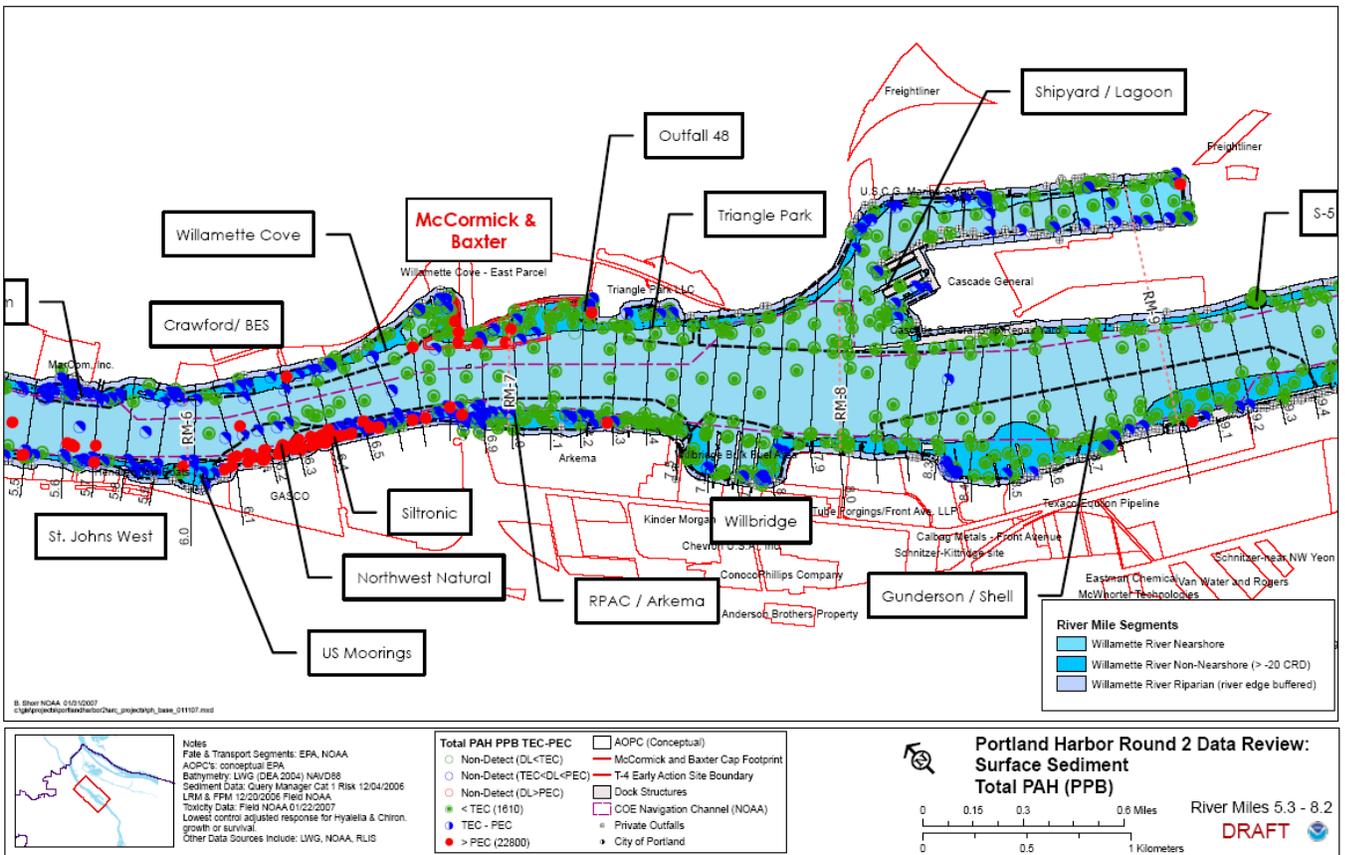
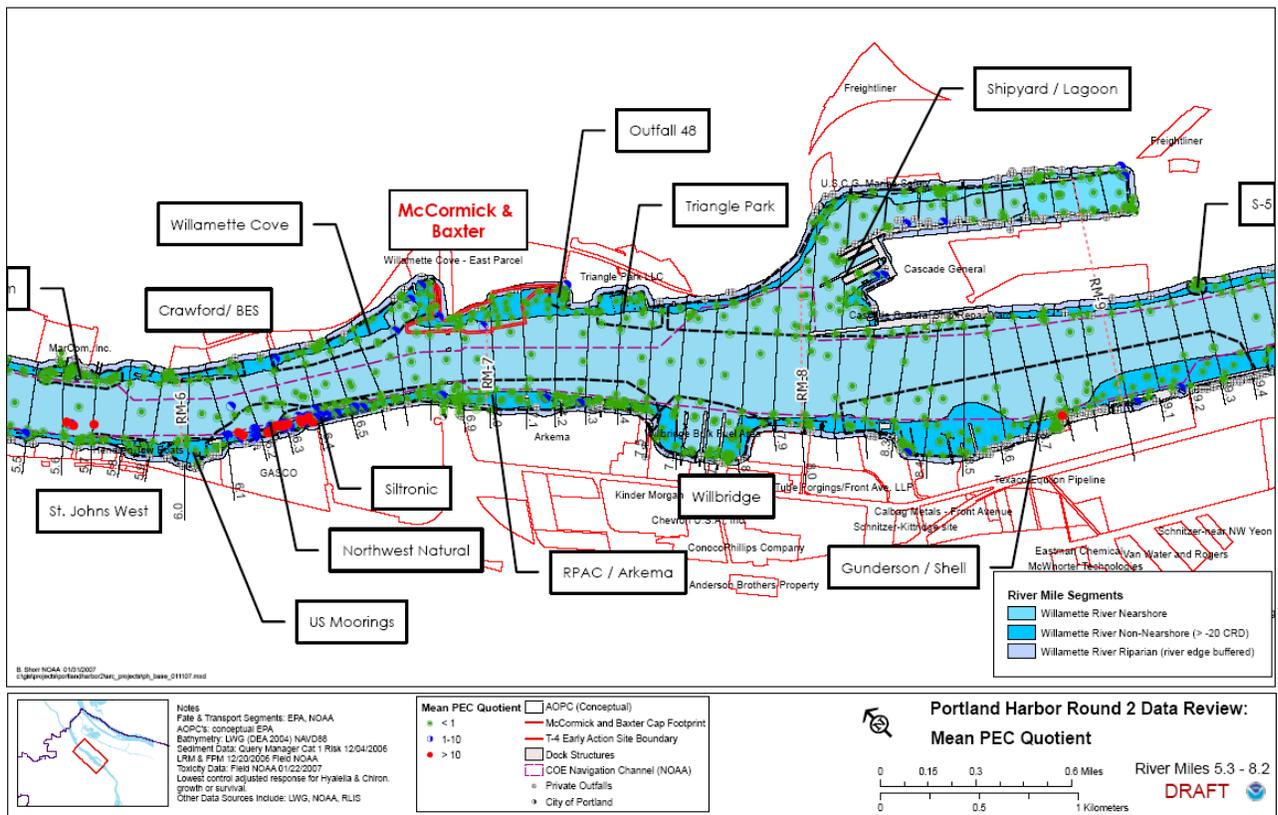
NOAA Screening Quick Reference Table, 1999.  
Gasco [Removal Action Documents](#):  
[Siltronic Updated Phase I Characterization Report Summary](#) July 22, 2005  
[Siltronic Enhanced Bioremediation Pilot Study Workplan](#), July 28, 2006  
[Siltronic Upland Remedial Investigation Report](#), April 16, 2007  
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Work products prepared for Portland Harbor Data Retreat, February 6 and 7, 2007. (All data obtained from Portland Harbor Query Manager Data Base, December 2006 update)

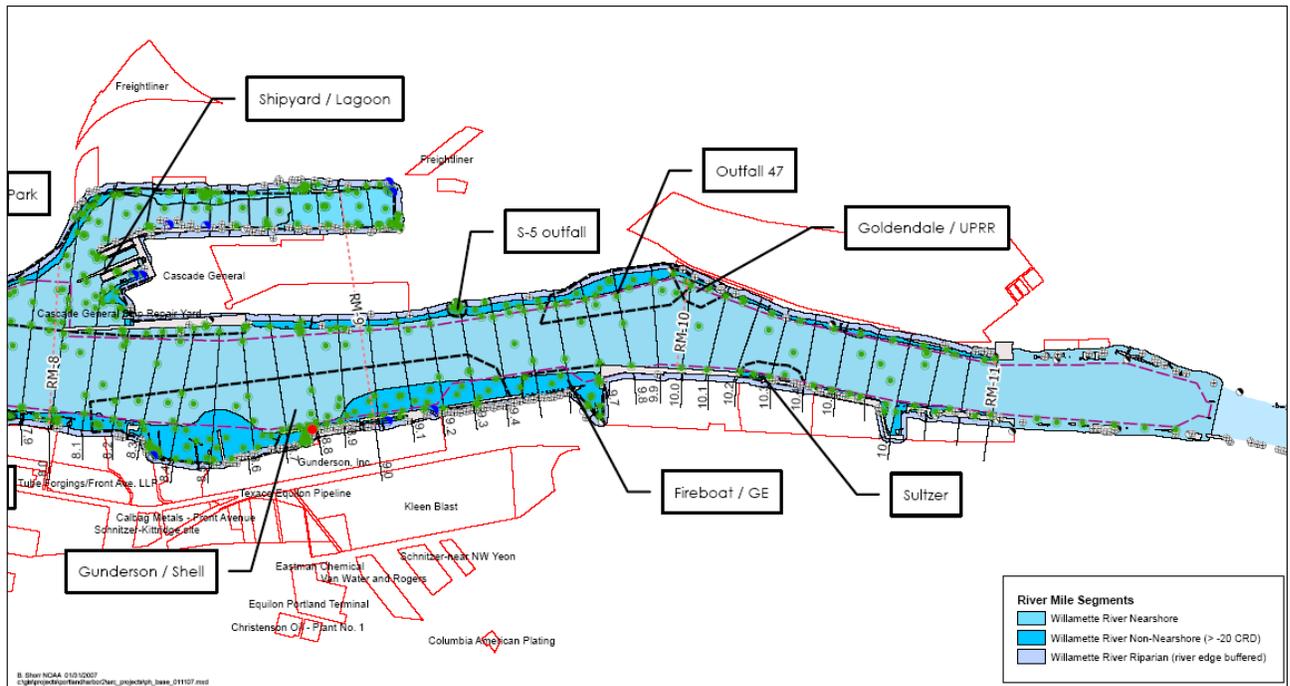
Figures  
 April 2007 Siltronic Upland RI Report, VC extent in TZW:



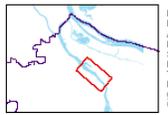
# Round 2 Data Review excerpts:







B. Shier NOAA 01/10/2007  
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Notes  
 Fate & Transport Segments: EPA, NOAA  
 AOPC's conceptual EPA  
 Bathymetry: LWG (DEA 2004) NAVD88  
 Sediment Data: Query Manager Cat: 1 Risk 12/04/2006  
 LRM & FRM 12/20/2006 Field NOAA  
 Toxicity Data: Field NOAA 01/22/2007  
 Lowest control adjusted response for Hyalella & Chiron.  
 growth or survival.  
 Other Data Sources include: LWG, NOAA, RLIS

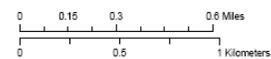
**Mean PEC Quotient**

- < 1
- 1-10
- > 10

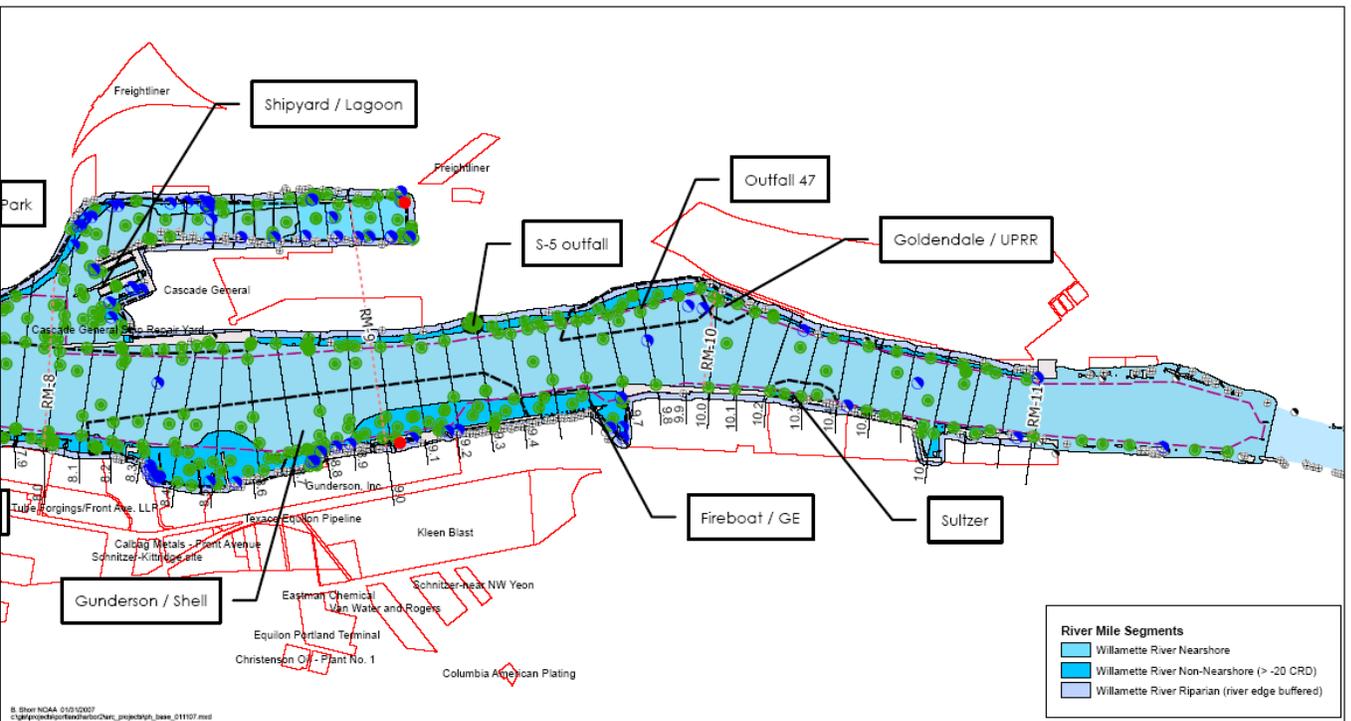
- AOPC (Conceptual)
- McCormick and Baxter Cap Footprint
- T-4 Early Action Site Boundary
- Dock Structures
- COE Navigation Channel (NOAA)
- Private Outfalls
- City of Portland



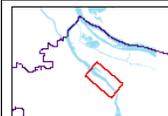
**Portland Harbor Round 2 Data Review:  
 Mean PEC Quotient**



River Miles 8.2 - 11  
**DRAFT**



B. Shier NOAA 01/10/2007  
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Notes  
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 AOPC's conceptual EPA  
 Bathymetry: LWG (DEA 2004) NAVD88  
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 LRM & FRM 12/20/2006 Field NOAA  
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 Lowest control adjusted response for Hyalella & Chiron.  
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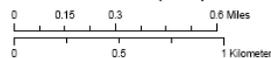
**Total PAH PPB TEC-PEC**

- Non-Detect (DL<TEC)
- Non-Detect (TEC<DL<PEC)
- Non-Detect (DL>PEC)
- < TEC (1610)
- TEC - PEC
- > PEC (22800)

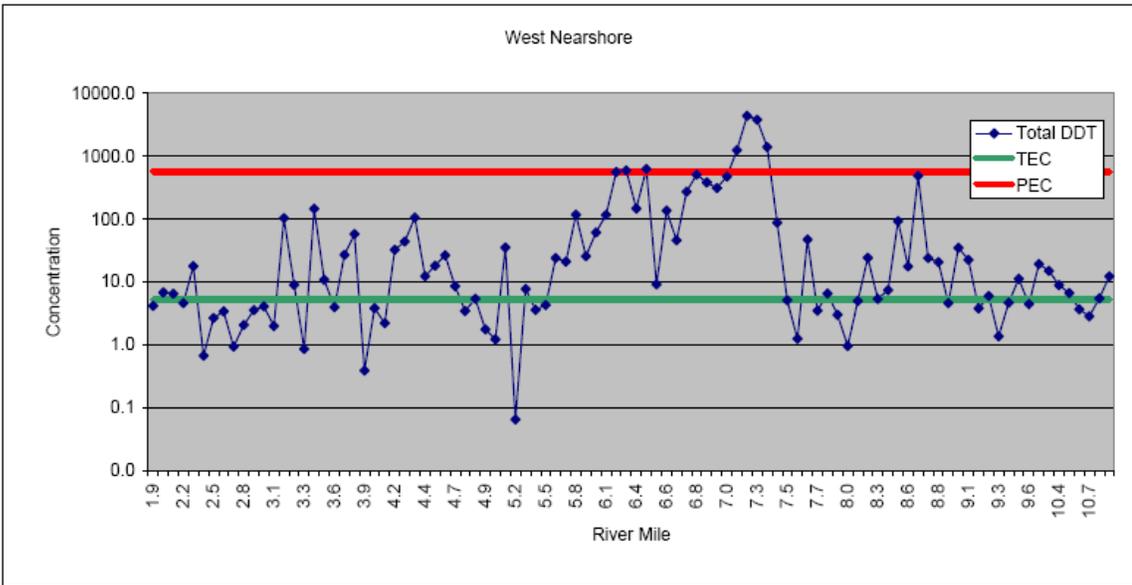
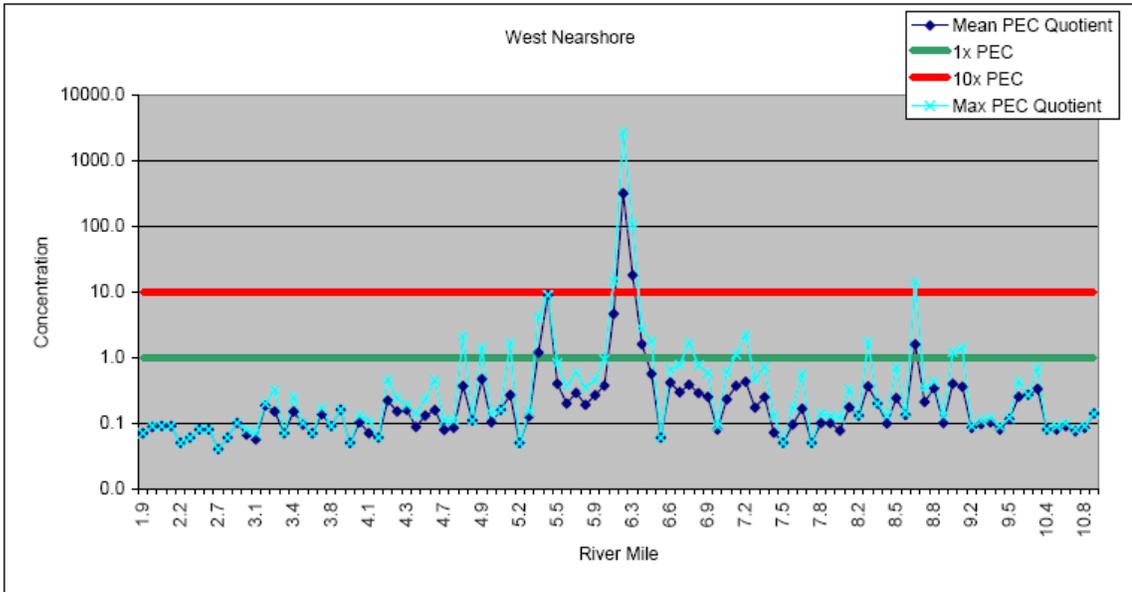
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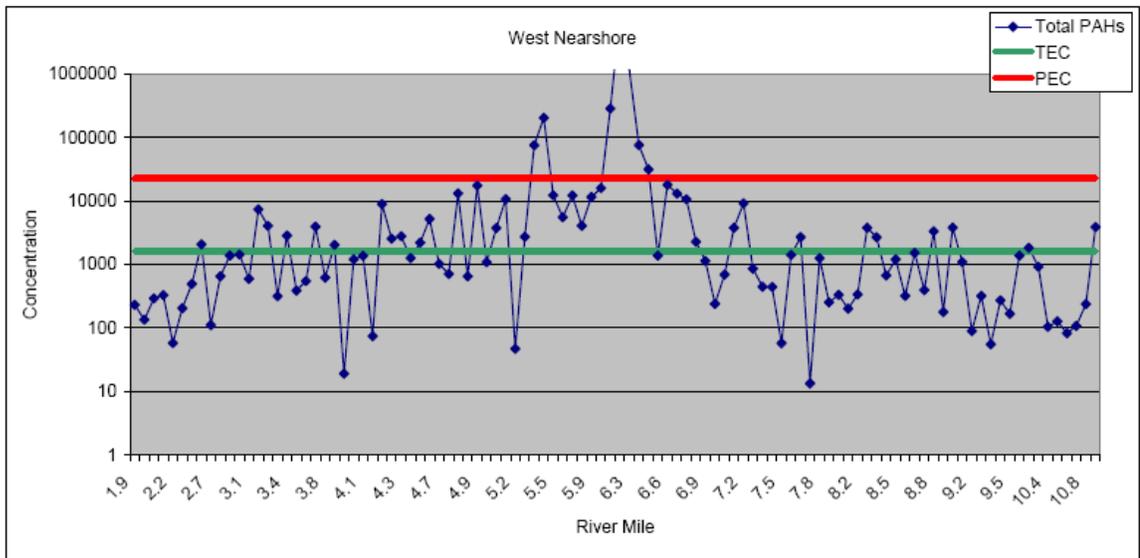
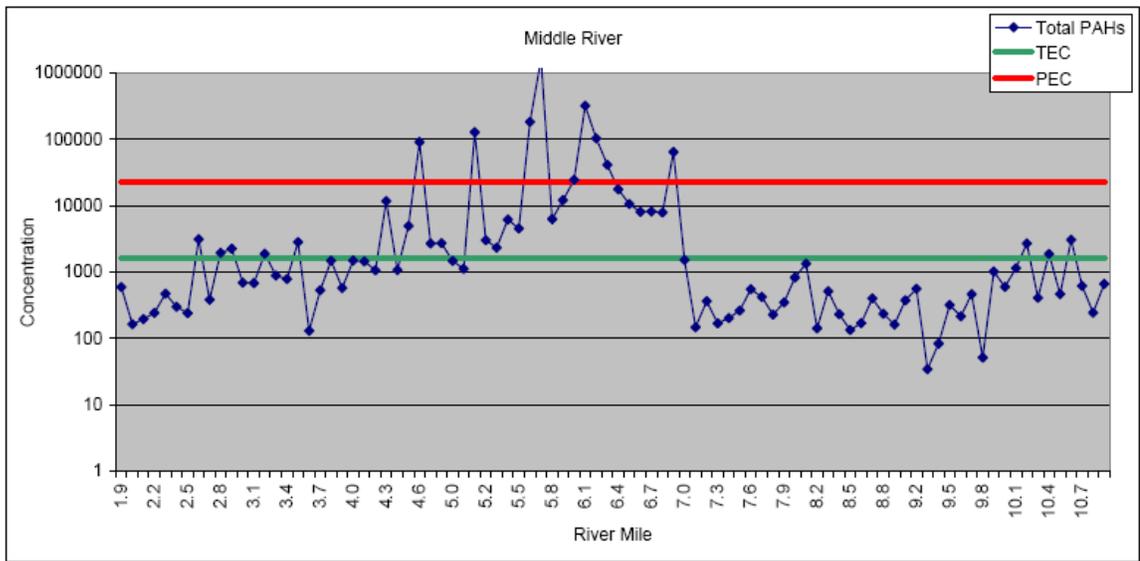


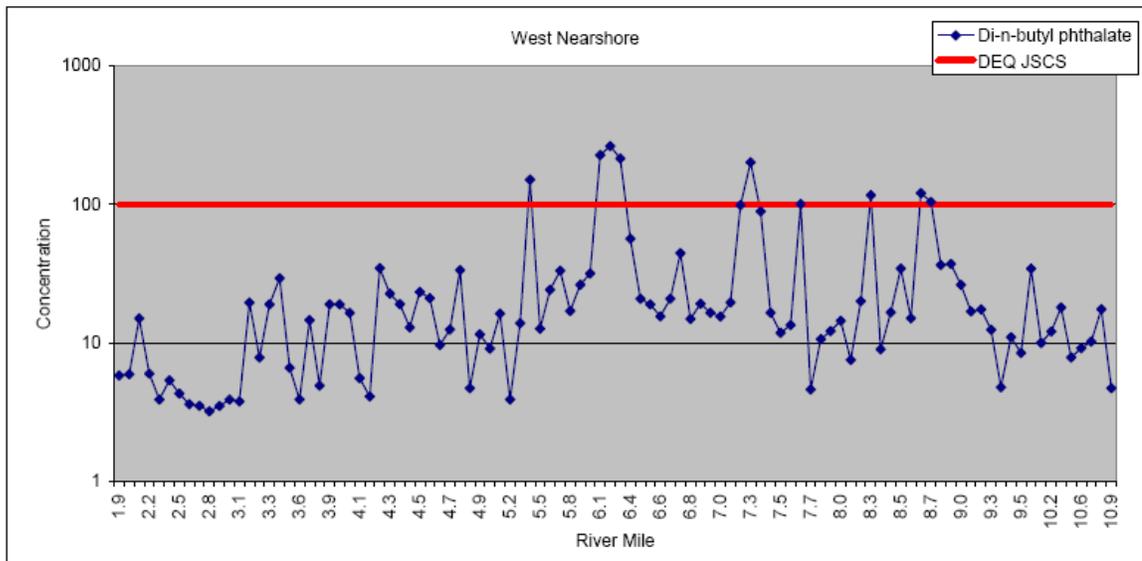
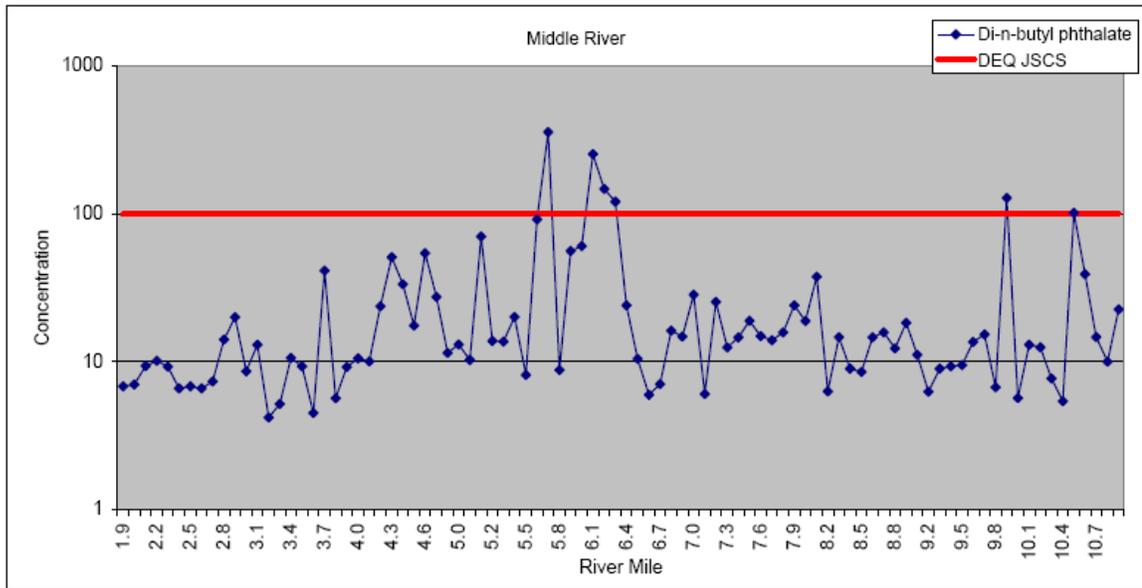
**Portland Harbor Round 2 Data Review:  
 Surface Sediment  
 Total PAH (PPB)**



River Miles 8.2 - 11  
**DRAFT**







# Transition Zone Water Benthic Toxicity, Round 2 Data Summary

