General Responses to EPA's Non-Directive Comment Key Issues on the Draft Remedial Investigation Report
November 18, 2010

Key Issues	EPA Comment No. G = General Comment S = Specific Comment	LWG General Response	Resolution
Issues Discussed with EPA between October 15th and November 5th, 2010			
RI Document Outline/Section-by-Section Objectives	G5, G21 S81, S107, S234-238, S245	Per the RI report outline fully vetted with EPA in 2008/2009, cross-media data discussions are presented in Section 10 (CSM) of the RI report. The agreed-upon RI outline was designed to build from physical setting and source discussions (Sections 3 and 4), to media-by-media data presentations (Section 5), through empirical loading and background analyses (Sections 6 and 7), to a presentation of the resulting conceptual understanding of the study area (Section 10). As a result, the RI report seems to contain the elements requested in EPA's comments. Revising each section of the report to contain the information requested in these comments would result in redundancy and a major reorganization/rewrite of the report. However, we do note the comments and will take the requested analyses into consideration when revising RI Section 10, and we agree with the changes suggested for Section 11.	EPA agrees with the response. RI section-by-section information presentations will remain as in the Draft RI. EPA comments will be addressed as warranted in the relevant report sections (i.e., not necessarily in the sections commented upon). Section 11 will be reduced to two subsections.
Linking Sources to In-water Contamination/ Property Names on Maps	G8 S33, S222, S235, S306, S313, S314, S326, S327, S352	The information requested is presented elsewhere in the RI. Section 3 includes detailed maps with ESCI and TSCA properties identified for general reference, and the Section 10 panels include ECSI site labels on displays, which include the physical, chemical, and biological data. In addition, in some cases, it would be mechanically difficult to include property names on Section 5 maps (e.g., surface dot maps), due to their scale and the amount of information already displayed. Finally, as noted in the previous general response, discussions of the relationship between potential sources and in-water contamination are not presented in Section 5, but are reserved for Section 10. Consequently, we do not feel the requested map revisions would add significant technical value to the RI. Regarding the request for more detailed discussion of potential sources in Section 10, a primary objective of the Section 10 panels is to illustrate those potential relationships between sources and in-water contamination graphically. Section 10 also provides succinct summaries of reliable information available to the LWG regarding current and historical sources. As noted previously, there are significant differences in the level of information available among upland sites along the Site. The source tables provide more details on specific	EPA agrees with the response. EPA agrees that property names need not be added to additional maps. EPA provided a specific outline for the reorganization to Section 10.2 in an email from E. Blischke to G. Revelas on 11/4. The LWG feels that that additional effort only adds marginal value to the RI and it will add 4-6 weeks to the RI revision schedule; we therefore do not intend to incorporate this request.

Do Not Quote or Cite: This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

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		knowledge of sources at individual sites.	
Identification of Sources/Presentation of Source Information	G6, G7, G16, G19 S81, S82, S89, S90, S96, S105, S107, S109, S115, S116, S118-S138, S151, S152, S153, S154, S157, S161 S165, S166, S169, S171, S172, S176, S179, S181, S183, S184, S185,S186, S188, S189, S191, S195, S196, S198, S200, S202, S203, S205, S209, S213, S290	**Site Summaries.** Updating the site summaries would require extensive effort to compile and present, and it is unclear what value it would add to the RI beyond the work the LWG is currently doing with DEQ to update pathway information for upland sites in the FS. As documented in the LWG December 17, 2008, letter to EPA summarizing meetings in the spring of 2008 with EPA, the general approach for updating upland site information for the Draft RI was agreed upon. The main components of that approach were that the LWG would not update site summaries and would use the most recent version of the Milestone Report and meetings with EPA/DEQ on the table entries as the means for updating the table (R2 report Table 5.1-2, currently RI Table 4.2-2). This is the process that was followed for the RI, and a similar process based on the most current Milestone Report and updates from DEQ and members is being undertaken for the FS, which recognizes that it is EPA and DEQ that are collecting additional information and are thus able to make judgments on such matters as the completeness or reliability of such additional information, including site data from non-LWG participants. [S82, S154] **GNL Sites.** The addition of the GNL sites is a new EPA request. The GNL list will be reviewed and sites not already included in the RI will be identified. These sites will be discussed in Section 4 with a statement on the status of publicly available information per the ECSI web pages. It is anticipated that there will be little available information for sites that are not in the ECSI system and/or not tracked in the Milestone Report of the Joint Source Control Program. Information obtained for these sites will include review of DEQ ECSI files system and summaries of and information provided by EPA and/or DEQ by a target date to be determined. If information is obtained for these sites, revisions will be made to RI Sections 3 and 10, as needed. [S109, S115] **Screening.** Screening has been requested in several comments. Screening upland media would require an extensive effort to assemble and evaluate a database, to agree on screening criteria, and to develop a methodology that could	**Site Summaries** 1) EPA does not require Updated Site Summaries. 2) DEQ process for FS source control inventory update will be adopted in RI as an update on current sources. 3) On 10/21, EPA provided the LWG with an example of the type of historical source information requested in RI Section 4. On 11/1, the LWG provided EPA with a table that compared EPA's example with existing Draft RI Section 10 text that provided the same kind of information. On 11/9, EPA acknowledged that that presentation was adequate, but requested that the information be moved to Section 4 and can then referred to and/or summarized in Section 10, as needed, to support the Section 10 CSM narrative. The LWG agrees to this revised organization and also agrees to add maps of historical industry locations to the RI to support the historical source discussions. **GNL Sites** EPA agrees with the response and acknowledges the potential limitations of the information to be added to the RI regarding GNL sites. **Screening** The LWG agrees to add comparisons of surface water and

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		be applied equitably to a large number of sites with a large range in data type and quality. According to a March 9, 2009 email from Eric Blischke to the LWG, EPA agreed that a screening of upland data would not be required for the RI. PRGs have not been yet finalized for the FS. Finally, regarding risk from stormwater, the objectives of the RI/FS stormwater program as discussed by the Stormwater Technical Team and accepted by EPA are 1) to understand the stormwater contribution to in-river fish tissue chemical burdens, and 2) to determine the potential for recontamination of sediment (after cleanup) from stormwater inputs. [G6, G7, G19, S186, S188, S191] **Modifying Table 4.2-2.** Comments on Table 4.2-2 include changes in the format of the table and changes in the information presented. Comments also request information on the status of source control measures. The LWG and DEQ are currently in the process of revising and updating pathway information (including source control measures) for sites in the Portland Harbor JSCS program to support the FS. We propose that major changes to Section 4 be limited to reconciliation of the existing presentation with the information generated through the ongoing LWG/DEQ process scheduled for completion in the fall of 2010,and that Table 4.2-2 not be reformatted or changed in any other way. [S116, S118, S120–S133, S152,S195, S154, S203] **Other Section 4 Comments.** Requests for specific revisions to the Section 4 source information (text, tables, maps) will be reviewed by the LWG. Changes supported by documentation will be incorporated into the revised RI. [G16, S81, S89, S90, S96, S105, S115, S119, S134-S138, S151, S153, S157, S161,S165, S166, S169, S171, S172, S176, S179, S181, S183, S184, S185, S189, S196, S198, S200, S202, S205, S209, S213, S290]	TZW data to established criteria in appendices to Section 5. **Modifying Table 4.2-2** (for Current Source Information Updates): Historical source information will be added/updated per the process outlined above under **Site Summaries**. **Other Section 4 Comments** Specific source information revisions will be made per the processes noted in the LWG General Response.
Groundwater/TZW Characterization and Analysis	G12, G13, G14, G15, G17, G18, S53, S187, S190, S264, S276, S328	The LWG believes that many of EPA's general and specific comments on the groundwater pathway assessment and TZW sampling program do not reflect or acknowledge EPA's agreed-upon approach to groundwater/TZW characterization	The LWG agrees to make the following changes to the TZW discussion in the RI: 1) Clearly acknowledge limitations and strengths of the TZW evaluation approach

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		and analysis in the RI. The LWG believes the RI provides a clear, complete, and objective evaluation of this pathway and potential exposures of human and ecological receptors to groundwater- and TZW-related COIs within the in-water portion of the site, entirely consistent with those prior agreements. The LWG asks EPA to review the prior agreements and then clarify these comments. For example: - The general comments state that the RI did not compile or obtain sufficient groundwater and TZW data for the Study Area. This is counter to prior agreement from EPA, specifically that the LWG's Round 2 and Round 3 groundwater pathway assessment work, in combination with work done by certain upland parties (e.g., Siltronic, GASCO, Rhone Poulenc, and Arkema) addressed all groundwater/TZW data needs for the RI/FS[1]. EPA also agreed that any data needs identified in the future related to upland groundwater plumes migrating toward the river would be addressed separately from the RI/FS (i.e., through DEQ's source control program or under separate EPA authority). - The general comments suggest that the RI does not adequately address "the potential for groundwater discharges to the Portland Harbor site for the 113 sites identified as potentially having groundwater contamination." These comments fail to acknowledge the process that the LWG, in direct and intensive consultation with EPA and DEQ upland site managers, followed to select the 9 TZW study sites for the Round 2 groundwater pathway assessment and to identify and address data gaps during Round 3. Sites included in the Round 2 groundwater pathway assessment were selected through a process that involved multiple meetings, deliverables, and related correspondence that occurred over the period of January through July 2005.	2) Obtain GW updates from DEQ on post-RI work for specific sites and revise RI discussions as warranted 3) Add more information on upland groundwater site status and GWPA approach/study objectives from Appendix C2 into the RI Section 4 TZW subsection. EPA acknowledges that the "tone" of some of the TZW/GW comments was inappropriate and that the TZW study conducted by the LWG was adequate in terms of overall scope for the RI, and that no additional site-specific TZW data or data evaluation is needed.

[1] TZW data gaps for the RI were initially identified by EPA in a June 8, 2007, e-mail on Round 3B data gaps from Eric Blischke of EPA to Jim McKenna, Bob Wyatt, and Rick Applegate of the LWG. TZW data gaps were further refined in a series of meetings held in June 2007 with representatives of EPA, DEQ, and the LWG. This process resulted in the identification of possible additional TZW data needs, contingent on additional data review, offshore of the PEO, Rhone Poulenc, and Gunderson sites, as documented in a June 29, 2007, e-mail from Eric Blischke to the LWG. DEQ and SLLI performed the data reviews for PEO and Rhone Poulenc, respectively; these evaluations did not identify additional TZW data needs offshore of these sites for purposes of the RI. The LWG performed the data review for the Gunderson facility and, based on this review, completed a supplemental stratigraphic investigation offshore of the Gunderson site in the fall of 2007. Results were documented in the Round 3 Groundwater Pathway Assessment Field Sampling Report for Stratigraphic Coring — Gunderson, submitted to EPA by the LWG on December 20, 2007.

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		Final concurrence on site selection is documented in a July 25, 2005 "Summary of Agreements on the Round 2 Groundwater Pathway Assessment" letter from the LWG to EPA. Round 3 data gaps were identified and addressed as described in the preceding paragraph. The site-selection process and the EPA- and DEQ-endorsed basis for inclusion/exclusion of upland sites in the GWPA are also documented in Appendix C2 of the RI report. - The general comments state that the "RI Report tends to discount groundwater sources at the site." The LWG believes this is incorrect. Groundwater sources are extensively and objectively evaluated throughout the RI Report, including Section 4.3.3, Section 4.4.3, Section 6.1.5, Section 10.1.2, and Appendix C2. - The general comments state that the RI may have missed "many plumes" that have been better characterized since the upland site summaries were prepared and because we did not account for contaminated groundwater infiltration into stormwater lines. However, the RI relied on the most recent available data (as of the RI data lockdown date), including any evidence of preferential pathways for the specific sites EPA names in its comments as examples of those with additional characterization and/or groundwater infiltration into stormwater lines. - EPA's comments characterize the discussion of ICs in TZW and groundwater seeps as "inaccurate and misleading" because the ICs don't include all chemicals associated with upland plumes migrating to the river. This is inconsistent with prior direction from EPA. Specifically, EPA had previously agreed, in a July 21, 2008 email from Eric Blischke to the LWG, to the indicator chemical approach for the RI, including for groundwater/TZW. - EPA's comments state that the TZW evaluation at the nine selected study sites was for "preliminary work." This is a mischaracterization of the GWPA conducted for the RI and is inconsistent with prior EPA agreements as explained above.	

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Groundwater Site Selection and Pathway Determinations	S187, S188, S190, S191	As noted in Section 4.4.3, a detailed discussion of the TZW site selection process is presented in Appendix C2 of the RI. This discussion defines four criteria that were used to categorize the upland sites and provides site-specific information describing the basis for inclusion or exclusion of Category A sites in the TZW sampling program conducted for the RI. A summary of the four site selection criteria, along with additional cross references to Appendix C2 and a brief summary of the site evaluation and selection process will be added to the text of Section 4.4.3. However, the detailed contents of Appendix C2, Section C2.0 will not be repeated in Section 4.4.3. This would be redundant and would unbalance the groundwater discussion in Section 4. It is inappropriate for EPA to suggest in these comments that screening of upland groundwater data against MCLs, AWQC, or any other screening-level value or ARAR be performed in the RI Report. According to a March 9, 2009 email from Eric Blischke to the LWG, EPA agreed that a screening of upland data would not be required for the RI.	See previous comment.
Deletion of Appendix A5	S333	Appendix A5 is not meant to be the administrative record itself, but rather information that EPA may consider when it designates the administrative record. In the revision, the LWG will change the title page of this appendix to EPA-LWG Communications. The LWG believes this information is useful to understanding the approach of the RI. The LWG recommends inclusion of this in the Administrative Record because it documents EPA LWG Communications leading up to the RI but we recognize this is ultimately EPA's decision.	Appendix A5 will remain in the RI and be renamed: *EPA-LWG Key Communications.*
Data Lockdown Date	S23, S218	On November 1, 2010, the LWG proposed the following as a response to these comments: 1. LWG and EPA agree that the data set to be used for the RI and risk assessments is to be unchanged (i.e., data lock-down of June 2008);	On 11/4, EPA responded to the LWG's 11/1 proposal in an email from C. Humphrey to J. McKenna requesting significant additional work, including an update of the project database through July 17, 2010, and nature and extent maps of all sediment ICs for the downtown reach, an area upstream of the Study Area. On 11/8, C. Humphrey, E. Blischke, J. McKenna, and G. Revelas discussed and clarified the

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		2. LWG will update the project data base with the finite list of recent studies of bedded sediment that EPA cited in their comments to the draft RI (i.e., the downtown reach sampling conducted by the City, ARCO-BP post-source control in-water data; and new data from RM 11 east) as well as some others identified by the RI/FS team (e.g., the Post Office Bar and U.S. Mooring data sets); 3. LWG will not conduct a "survey" to determine the full universe of any and all new data sets; 4. The updated electronic project data base will be provided to EPA as soon as practicable, enabling the Agency to conduct their own queries and searches; 5. A bibliography of these new data sets will be provided in an appendix of the revised RI, along with hard copies of reports generated by the party(s) who conducted the studies (including their tables of the data and related maps); 6. Text will be added to the appropriate paragraphs of Sections 5 and 10 of the revised RI that states new data at RM 11 east provides a more accurate depiction of the nature and extent of contamination (namely, PCBs), including the vertical extent; 7. Text will be added to the appropriate paragraphs of Section 5 (e.g., Section 5.6.2.1) that refers to post-data lockdown data from the downtown reach that was collected by the City. 8. Tables 5.6-3 through 5.6-6 and Table 5.6-13 will remain the same because they reflect the agreed-upon data lockdown data set (i.e., June 2008). 9. New text will be added to Section 10, CSM, that refers to the post-data lockdown data discussed in Section 5.6 (i.e., downtown sediment data collected by the City). The new text in Section 10 will note that the additional upstream data provides support for the currently established upstream study boundary of RM 11.8.	specifics of EPA's data update request (e.g., the new data products could be presented in an RI Addendum rather than in main body of the RI). The LWG estimates this additional work, as defined during the discussion on 11/8, would add 6-8 weeks to the RI revision schedule and is not needed to complete the RI. Therefore the LWG does not intend to accommodate this request.
Clarification Needed	S57, S263, S343	This set of comments only requires minor clarification from EPA.	S57: EPA clarified their comment and the revision requested will be made in the revised RI.

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			S263: EPA accepts the LWG's response to S263 and no change to the Draft RI is needed S363: EPA has indicated that the following revision to the text in Section C3.3.5 is acceptable: *Lead was detected in filtered TZW samples from the two groundwater discharge zones, but was not detected in the single filtered TZW sample from the low-to-no groundwater discharge zone; in unfiltered TZW samples, lead was detected in all three zones and at higher concentrations than in the filtered samples, indicating the influence of the particulate fraction on unfiltered (total) lead concentrations. As with arsenic and zinc, detected concentrations of lead in TZW were generally consistent with the range of concentrations in upland groundwater. Overall, the TZW data set, while limited, suggests that BTEX and metals in upland groundwater at the ExxonMobil site may have been transported to the TZW via groundwater flow prior to the implementation of upland groundwater source control measures. It is also plausible that the chemicals detected in TZW samples collected during the RI at the ExxonMobil site reflect chemical partitioning from sediment to pore water rather than transport from upland groundwater.*
Subsurface Core Maps Subsurface sediment core maps should include contaminant concentrations and depth intervals, as was done in the Round 2 Report.	G4, S230	The requested displays were included in the Round 2 report at the iAOPC-specific level. That detail level is not appropriate to the harbor-wide RI as the number of maps needed would be unwieldy. The core plot maps in the current document illustrate the broad trends, which is the purpose of this section.	The LWG agrees to provide, in an RI Appendix, subsurface sediment data maps at the detail provided in the Round 2 Report iAOPC maps for the following five chemicals: • Total PCBs • Total DDx • TCDD TEQ • Total PAHs • Carcinogenic PAHs
Congener Ratios Plot the ratios of specific congeners from each homolog group that were frequently detected to illustrate the difference in PCB characteristics. The congener ratios are	S232	The ratios of specific congeners will presumably vary in a similar pattern to that of the homolog groups. The relative differences in PCB homolog and Aroclors are shown graphically in Section 5.1. For example, in a sample where hexaPCBs are present at 50% of tetraPCBs, one would expect	EPA does not agree with presumption in the LWG response but is fine with not generating the requested plots as that detail level is not needed for the RI.

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important for a number of reasons, including source identification. In many areas, the homolog ratios in samples from fairly close stations appear to vary depending on the total concentration. It is difficult to tell from the presentation how much the percentages may vary because of detection-limit issues, i.e., at lower total concentrations, fewer congeners can be detected. Using the ratios of specific, detected, congeners reduces error of this sort.		a similar ratio to be observed in the frequently detected hexaPCB and tetraPCBs. For this reason, calculating and plotting the ratios of frequently detected congeners will provide no additional information.	
Surface Water Results Maps Although a sample location map is presented in Section 2 (Map 2.2-4), the RI Report should include the information presented in Tables 5.3-1 and 5.3-8 on a map(s) of surface water station locations.	S243	The surface water data were collected in multiple rounds of investigation. The information in Tables 5.3-1 – 5.3-8 is summarized in the Section 5.3 figures (e.g., Figure 5.3-15). In the Draft RI report, the surface water data are sorted by event type (high-flow, low-flow, stormwater influenced), sample type (transect, single-point), component (dissolved and particulate), river mile, and analyte in the Section 5.3 figures (e.g., Figure 5.3-15) to allow the reader to easily compare results by sample event, sample type, and component across all sampling stations by comparing within and across the bar charts. Creating maps of the information presented in the figures confounds the ability to compare across stations and river miles because the reviewer is not able to scan across all the results in a single display, but instead has to manually compare station to station or event type to event type. Creating maps separately for each event type or sample type would create a large number of new maps with little value to overall interpretation of the results. The Section 10 plates include spatial displays of surface water data.	LWG will add a map to Section 5.3 that summarizes the stations and station type (peristaltic, XAD, transect, near-bottom, near-surface), with an inset table that lists which stations were sampled for each of the seven sampling events. A second set of histograms sorted by stations on the east-side, west-side, and transects will be generated to include in the revised RI report.
TZW Maps The RI Report states that the TZW evaluation cannot be addressed by bounding chemicals. As a result, all ICs are discussed. However, maps are not presented for all chemicals. This should be corrected by including groundwater/TZW	S257	The approach to presentation of maps and tables for a subset of ICs was vetted with EPA in the process of review of the RI outline sections. (IC Technical Memorandum and table provided by LWG to EPA on June 26, 2008, as modified by e-mail communication from Erik Blischke on July 21, 2008; streamlining verbal agreement on March 19, 2008, as documented in RI/FS summary table submitted to EPA on February 6, 2009.) One goal of this outline development was	No new TZW IC maps will be developed, but an alternative approach to this comment was agreed to. The LWG will present the TZW plume maps currently presented in Appendix C2 in Section 4 (Sources), and, combined with the TZW comparison to be included in Section 5 (as noted above under **Screening**), will provide a summary of this information in Section 10.1.4 (CSM sources summary).

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maps for all ICs.		to streamline presentation of results in response to EPA comments on the Round 2 report. Creation of maps for all ICs would require a large effort, and the value of this effort to the RI is unclear. Table 5.4-1 summarizes the maps and figures in Section 5 that present the nature and extent of ICs in TZW. Please note that the majority of ICs are mapped.	
Screening TZW to RBSLs	S347	The context of the text cited in this comment is that of summarizing key findings from a separate investigation performed by Siltronic. The sole focus of Appendix C2 is evaluation of the groundwater pathway and its potential role in transporting upland groundwater COIs to the in-water portion of the Portland Harbor Site. Additional comparisons of TZW sampling results with risk-based screening levels will not be provided in Appendix C2, as these comparisons are irrelevant to this central focus of the document. Note that the TZW sampling results are evaluated in the BHHRA and BERA irrespective of the findings of the Groundwater Pathway Analysis regarding the potential sources of these chemicals. Figures C3.5-4a–f are reproductions of figures originally presented in a Siltronic site investigation report. Similar information comparing chemical concentrations in nearshore upland groundwater and TZW is provided on other cross-sectional figures presented in Appendix C2 (generically, Figures C3.X-3a-xx). The LWG does not propose any additional cross-sectional depictions in response to this comment.	See **Screening** and previous comment.
Revised RI Document Format/Updated Data Presentations	S23, S214, S218, S220, S221, S255	The LWG proposes to reorganize Section 5 by grouping separate volumes into subsections containing text, tables, and figures as follows: Sec. 5.1, 5.2, 5.3 (text, tables, figures) in 1 volume Sec. 5.4, 5.5, 5.6 (text, tables, figures) in 1 volume Appendix D (text, tables, figures) in 1 volume 3 folios for maps Although the number of volumes is not reduced, the information is packaged in a way that should allow for easier access to related information for each subsection.	EPA agrees with the response.

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Inclusion of HST and F&T Modeling in Final RI	G20, S66, S307, S310, S311	The LWG agrees to update the physical sediment transport discussion presented in Section 3 of the RI with the revised FS model HST output. This revised information will be also incorporated into subsections of Section 6 and in the CSM discussions in Section 10, as warranted. However, we do not plan to include the FS F&T modeling outputs in the revised RI. As noted in the Draft RI and as agreed during LWG-EPA modeling subgroup meetings (see EPA December 12, 2009 e-mail detailing the FS evaluation process), the F&T modeling is being conducted in the FS to address specific FS objectives. The loading estimates presented in RI Sections 6 and 10 are based solely on empirical or semi-empirical data and calculations. This empirical data evaluation was intended to inform the FS; however, the F&T modeling effort, including calculation of internal F&T processes such as sediment resuspension, was deferred to the FS. Any revision to the site conceptual model that emerges from a comparison of the modeling results presented in the FS with the empirical lines of evidence presented in the RI will be addressed in the FS.	EPA agrees with the response.
Background Statistical Outliers The RI Report should clearly present EPA's determination regarding statistical outliers. Statistical outliers that are geographically clustered should be eliminated because they represent a potential source. Statistical outliers that are distributed throughout the upriver reference area may be retained in the background data set. Note that the ProUCL 4.0 guidance states that statistical outliers should be used with caution. We believe that this approach is consistent with the guidance.	S279	The importance of spatial clustering as a line of evidence for identifying primary outliers is discussed in the fourth bullet on p. 7-14 of the Draft RI, and the LWG's understanding of EPA's specific position regarding certain specific cases for total PCB Aroclors and total DDx is discussed in the last paragraph on p. 7-15 of the Draft RI. We believe these discussions adequately capture EPA's position. As discussed on p. 7-15 of the Draft RI, EPA agreed (October 2008 verbal communication between R. Wyatt of the LWG and E. Blischke of EPA), in addition to presenting background statistics with these potential outliers removed from the data set, that the LWG could also present background statistics with these values retained in the data set. Both sets of statistics are presented in Section 7 of the Draft RI.	EPA agrees with the response.
Stormwater N&E The stormwater discussion in the RI Report should focus on the nature and extent of contamination. It should purely discuss	S334	This comment is directed at Appendix C1 which is comprised solely of two tables which present summary statistics for LWG-generated and non LWG-generated stormwater data from Portland Harbor. The LWG will add a table presenting stormwater statistics for the Study Area as a whole, i.e., not	The LWG will add the table indicated to the RI.

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what has been sampled out of the stormwater universe in Portland Harbor, where are there sources of contaminants posing risk, what are the ranges of concentrations observed. Stormwater data should not necessarily be grouped together because stormwater is a function of land use.		parsed by land use categories. However, the scope of the Portland Harbor stormwater pathway assessment is described in RI Section 4.4.1. The objectives of the RI/FS stormwater program discussed by the Stormwater Technical Team and accepted by EPA are noted above under the **Identification of Sources** Key Issue. The grouping of stormwater data by land use was necessary to support the loading assessment. The LWG and EPA agreed on the approach to performing stormwater loading calculations in November 2008 (EPA approval letter November 3, 2008, followed by LWG clarification letter November 19, 2008). Finally, it is not within the scope of the RI to address risks posed by contaminants in stormwater.	
Piper Diagrams In its 2006 comments on the groundwater pathway evaluation, EPA requested the major ions presented in Piper Diagram plots summarize large data sets of those analyses. The 2006 EPA comments were only partly responded to, and the 2008 LWG Round 2 Report and the draft RI continue to use basically the same figures from the 2006 TZW report, with some different colors. The main objective of the EPA comments, to make all that water quality data into a coherent and understandable package has still not been accomplished. The primary purpose of the Piper Diagram figures is to show how the different sites have significantly different ion proportions, both in relative type and in total concentrations. That concept is not used in the report, nor discussed in any detail in the main text of the draft RI. Furthermore, since the 2006 comments were not followed, there is no way for a reader to either find those plots easily in the draft RI, or if the reader finds them, to understand what they	S335, S336	A brief, qualitative discussion of variability in the major ion geochemistry will be added to Appendix C2 and the main text of the RI in response to this comment. However, the LWG disagrees that it did not fully respond to EPA's 2006 comments on the Piper Diagrams. It further disagrees with EPA's apparent larger concern that the presentation of major ion data in Appendix C2 is neither coherent nor understandable. EPA's 2006 comments made the following requests regarding the presentation and evaluation of major ions data: (1) that charge balances for each sample be calculated to identify potential imbalances that should be considered in data interpretation; (2) that Stiff Diagrams *could* be presented in addition to the Piper Diagrams, to aid in interpretation; and (3) that Piper diagrams should be plotted separately at sites with multiple plumes with highly distinct ionic signatures (e.g., Arkema). All of these recommendations were implemented in Appendix C2, except that Stiff Diagrams were not provided because it was the LWG's technical judgment that they would not shed additional light on the interpretation of this data set. There is no mention whatsoever in EPA's September 26, 2006 comments of any need or desire to combine data for all the sites into a single Piper Diagram. Further, as noted by the commenter, concentrations of major ions range widely (several orders of magnitude) among the TZW study sites. For this reason it would be neither practical nor informative to use a	The LWG and EPA have discussed these comments further and the LWG agrees to make the following requested changes to this information in the revised RI report: 1) The LWG will provide a thorough written description of the methods used in the construction of the Piper Diagrams, along with an expanded discussion of the underlying data sets (general discussion to be provided in Section C3.0.4; site-specific discussion to be provided in Sections 3.n.4.1 (n=1–9) for each TZW study site). 2) The LWG will show/differentiate 4 types of water in the Piper Diagrams: a) upland unimpacted groundwater, b) upland impacted groundwater (preferably along a flow path to an in-water groundwater discharge zone), c) TZW, and d) river water. Upland wells and TZW stations will be clearly labeled on the Piper Diagrams, and cross references to a location map will be provided for each site. 3) The LWG will verify that all of the symbol sizes in the diamond-shaped area of the plots are appropriately sized proportionally to TDS. 4) The LWG will use a common, linear TDS scale (0–

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mean. The massive volume of plots and figures in the many files of Appendix C2, and its multiple sub files, further hides and confuses the presentation and decreases the overall transparency of the data obtained and any attempt at coherent interpretation. Note that the Piper Plots have not been combined into a single plot, or the scales changed to a common scale, which would at least allow for comparability between the water quality of all the major groundwater sites selected for the TZW in the 2006 report. In addition, the plots are not discussed in any coherent manner to explain to the reader what they represent. For example, the plots presented show ranges in concentration for the upland sites from about 500 mg/L for the bulk fuel facilities, to 1000 mg/L for GASCO, and Siltronic, to 2200 mg/L for Gunderson, to 25,000 mg/L for Rhone Poulenc, to 150,000 mg/L for Arkema.		common scale for all of the Piper Plots. The reviewer states that the "primary purpose of the Piper Diagram figures is to show how the different sites have significantly different ion proportions, both in relative type and in total concentrations." We disagree. While differences in the ionic composition of groundwater among the different TZW study sites may be of academic interest, it was not the purpose for which they were developed. The LWG's purpose in presenting the Piper plots was, as described in the text of C2, to explore whether the TZW composition at each given site more closely resembles that of upland groundwater, surface water, or neither. This purpose is far more directly relevant to the central question of the Groundwater Pathway Assessment, which, as stated in the introduction to C2, is to assess whether a complete transport pathway exists for COIs in upland groundwater plumes to reach the groundwater/surface water transition zone in Study Area sediments.	2,200 mg/L) for all of the site-specific Piper Diagrams except for Rhone Poulenc and Arkema, for which a logarithmic scale will be used due to the larger variability in TDS at those two sites. 5) The LWG will provide a sitewide Piper Diagram showing all of the groundwater and TZW data for the nine study sites (diamond area only). For the sake of readability, we will consider aggregating the surface water data (e.g., averaging) on this plot, rather than showing all of the individual data points. Symbol sizes will be proportional to log-TDS.
TZW Background Background and upland groundwater data appear in many of the graphs presented in the RI Report. However, due to the color scheme used (red and orange) it is hard to determine where there is actual upland data for comparison. As mentioned elsewhere in relation to Figure C4.1-3, that figure does not indicate there are data except in two sites out of the nine on the figure. It does not appear that the RI Report properly assesses background contributions of manganese. EPA expects that that manganese background data would be low if wells from selected upland were used to find	S337	It appears that the reviewer may have misconstrued the information depicted in Figure C4.1-3. To clarify, this figure compares the concentrations of manganese in three data sets: (1) groundwater samples from upland background sampling locations (far left column of the figure), (2) groundwater samples from monitoring conducted at individual upland sites (in the case of manganese, site-specific upland groundwater data were only available for the Siltronic and Arkema sites), and (3) TZW samples collected from offshore of the nine TZW study sites during the RI. Please note that the upland background groundwater data presented in the far left column of the figure were compiled and provided to the LWG by DEQ are also reported in Table C4.1-2. (This table is erroneously cited as Table C4.1-3 on p. C-32 and will be corrected.) Note also that the ranges shown for groundwater at the Siltronic and Arkema sites reflect available groundwater monitoring data from the entire site and are not to be construed as background	The EPA team and the LWG discussed the TZW data and its interpretation relative to background versus local upland source issues. The LWG agreed to closely consider the comments and revise the text to acknowledge uncertainty and the limitations of the data as warranted.

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uncontaminated areas. Available data for upland sites in the Portland Harbor Study Area which have groundwater data from uncontaminated or relatively uncontaminated areas should be used to develop background estimates for chemicals such as manganese. The data used for the graphs in Appendix C2 do not seem to be even close to what actual data from upland site wells have documented. There is a need either to explain this background issue carefully or to correct the report. Unless there is a clear explanation of those background values used in the figures which is acceptable to EPA, the plots using those values need to be reworked or removed from the draft RI.		data. The range of background manganese concentrations in the upland background groundwater data set (far left column of Figure C4.1-3) is substantially lower—by about two orders of magnitude—than the reported ranges in site-specific upland groundwater at the Siltronic and Arkema sites. It is also lower than the range of manganese concentrations measured in TZW offshore of the nine study sites. This does not appear to support the reviewer's suggestion that the reported manganese background concentrations are too high and counter to expectations. Similarly for arsenic (Figure C4.1-2) and barium (Figure C4.1-4), the concentration ranges in the background groundwater data set are at the low end of the reported ranges for groundwater at the individual upland sites. The reviewer also expressed concerns about the color scheme used in Figure C4.1-3. Please clarify this concern if it has not been addressed by our responses above.	
Cr and As in Groundwater to River Based on the data presented, the report should conclude that chromium and arsenic appear to be transported by groundwater to the Willamette River. This conclusion is based on the levels of chromium relative to nearby upland groundwater wells and the presence of arsenic at slightly elevated levels relative to background and in the areas of higher groundwater flow. However, it is acknowledged that the levels are low and, in the case of chromium, it is likely that some contribution from sediment is occurring.	S353	The LWG disagrees that the available data support a conclusion that "chromium and arsenic appear to be transported by groundwater to the Willamette River." While these metals were detected at low levels in TZW samples collected from groundwater discharge zones offshore of the Willbridge site, chromium and arsenic in sediments co-located with these TZW samples were not elevated in comparison to sediments collected from low- to no-groundwater discharge areas. No TZW samples are available from the low- to no-discharge areas for comparison with concentrations detected in the discharge zones. Therefore, the LWG proposes to revise Section C3.8.5 to summarize these facts and acknowledge that there is uncertainty regarding the source of arsenic and chromium detected in TZW samples offshore of the Willbridge site.	See previous comment.
Mn in TZW/Groundwater The evaluation of manganese in the draft RI misses the connection between the changes	S356	The LWG disagrees that the evaluation of arsenic, barium, and manganese presented in Section 4.0 of Appendix C2 does not adequately consider the influence that site-specific upland groundwater conditions may have on concentrations of these	See previous comment.

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in concentrations of manganese, due to geochemical conditions being impacted by a contaminant plume, or other local impacts that alter the local geochemistry (wetland discharges or other local changes in the sampled locations). EPA guidance states in part: "*Mobilization of arsenic and manganese species has been observed at some sites. Where such mobilization is possible, these species generally should be monitored as potential contaminants, and also for interpretation of their possible use as electron acceptors.*" As a result, the draft RI should focus on site-specific combinations of factors, such as upland contaminant plumes, and the upland concentrations of manganese, rather than a statistical evaluation of the data in a particular area of the site. The RI Report should present specific site correlations of manganese with high concentrations of manganese in the upland sites, whether from manganese sources, such as at Terminal 5 and Oregon Steel Mills. (Note that the source control decision for the Port of Portland Terminal 5 Site identified the "Blue Lagoon" as a potential source of manganese based on a groundwater plume with concentrations ranging between 2170 to 7190 µg/L.)		metals in TZW. In fact, the potential linkage between upland groundwater plumes at individual sites and concentrations of As, Ba, and Mn in TZW is a central question that the evaluation presented in Section C4.0 of Appendix C2 is intended to address. For example, the first paragraph of Section C4.0 states, "The ubiquity of these metals/metalloids in TZW raises questions regarding whether their occurrence is a function of natural conditions (i.e., background) or the direct or indirect result of chemical releases to upland groundwater. Chemical releases may be direct sources of these metals to upland groundwater (e.g., historical use of arsenical pesticides), or they may cause releases of these metals indirectly, by altering the subsurface geochemical conditions, resulting in metals releases by mineral dissolution or desorption reactions within the subsurface soil/aquifer matrix." The second paragraph reiterates this theme, stating, "The objective of this analysis is to identify the geochemical controls that may be affecting the origin, transport, and fate of the metals/metalloids in the subsurface environment and assess if the occurrence of these metals in TZW is controlled solely by the geochemistry of the associated sediment or is also influenced by upland groundwater plume transport to the groundwater-sediment transition zone." In Section C4.2, titled "Site-Specific Evaluation of Arsenic, Barium, and Manganese Concentrations in TZW and Upland Groundwater", concentrations of arsenic, barium, and manganese in upland groundwater plumes are compared, on a site-by-site basis, with conditions in offshore TZW (subject to the limits of available data). The LWG believes the statistical comparisons presented in this section directly address the reviewer's request in the second paragraph of this comment for the RI report to provide site-specific comparisons/correlations of upland groundwater and TZW. Although other approaches to evaluating site-specific relationships exist and could be considered, we believe that the information presented in Section C4.2 is adequate to address the scope and goals of the evaluation. Finally, the reviewer's suggestion that manganese	

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		at Oregon Steel Mills and the Port of Portland Terminal 5 be included is inappropriate. Neither Oregon Steel Mills nor Terminal 5 were included in the list of sites for the TZW sampling program conducted for the RI.	
Mn in TZW/Groundwater Agree that "modest concentrations of these minerals can readily provide sufficient metal/metalloid mass to the transition zone sediment to account for the concentrations of arsenic, barium and manganese observed in the Study Area." However, the question is whether the observation of these metals in TZW at concentrations higher than observed background levels is a result of the oxidation of naturally occurring labile organic matter or labile organic matter associated with the release of petroleum-related compounds in the Study Area.	S360	We believe both questions are relevant and that the analyses presented in Appendix C4 answers them as fully as reasonably possible subject to the constraints of the available data sets. Importantly, while concentrations of As, Ba, and Mn in Study Area TZW are generally higher than in background upland groundwater, it is not evident that they are higher than concentrations in background TZW. (As stated in the appendix, there are no data available on concentrations of As, Ba, and Mn in TZW from a designated background area for the Portland Harbor Site that would allow this comparison to be made directly.) Ultimately, our analysis concludes that the dominant control on As, Ba, and Mn concentrations in TZW are the local geochemical conditions of the shallow sediment environment from which the TZW samples were collected, irrespective of whether those conditions are the result of naturally occurring or introduced labile carbon. A corollary of this is that the observed concentrations of these metals are independent of influences from migration of upland groundwater plumes to the Study Area.	See previous comment.
DDX 2,4' Isomers Please reconsider the quality of the DDX data for many of these samples with high concentrations of the 2,4' isomer. Given the manufacturing process for DDT, is seems unlikely that the samples would be solely or dominated by the 2,4' isomers. This distribution also occurred predominantly in samples with very low overall concentrations, increasing the likelihood that the results represent an interference/artifact of the measurement. See comment at Section 5.3.7.4 re: quality of DDX data.	S256	The DDX signature discussed in the comment is more applicable to DDX products. The manufacturing waste products present in this system would not necessarily have the same fingerprint as the final product. At this point, there is no reason to suspect issues with the quality of these data.	EPA does not necessarily agree with the response but does not feel the need to discuss this issue any further.

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Default TOC Concentrations No justification is provided for the "default" TOC concentrations. Change the default justification to reflect the mean TOC of 1.67%. The use of higher-than-actual TOC concentrations may bias the data toward indicating lower bioavailability. In addition, when used, identify OC-normalized data based on the default concentrations.	S26	Procedures for developing "default" TOC concentrations are provided in the data treatment summary table transmitted to EPA on June 5, 2008, and subsequently approved by EPA (see Appendix A5, Attachment A6). Additional justification will be provided in the text, but the default TOC concentration will remain the same.	EPA agrees with the proposed revision.
Gasco Offshore Groundwater Detections The discussion of the offshore groundwater concentrations at the GASCO site should also discuss the near bottom surface water samples that were collected. The detection of benzene and naphthalene in surface water in areas of contaminated groundwater discharges should be used as evidence that groundwater is transporting contaminants to the Willamette River.	S344, S346, S348, S349	A discussion of the near-bottom surface water samples collected offshore of the GASCO site will be provided. However, while the detection of benzene and naphthalene in these samples can be considered a line of evidence for groundwater transport of these chemicals to the Willamette River, it does not rule out other possible mechanisms, such as direct desorption from sediments and diffusion into the water column.	The LWG agrees to include this discussion in Section 10.1.
Issues resolved without discussion with EPA			
Background 95UCL We do not see the value of the 95 UCL of the background mean, or how it will be used in evaluating site data. The example provided, comparing the 95 UCL of the site mean with the background 95 UCL, is not a standard statistical test. Consistent with the ProUCL guidance, distributions should be compared to distributions.	S280	The 95 UCL is a useful statistic for comparing background levels to exposure point concentrations (frequently also estimated using the 95 UCL) for individual areas of concern. This usage is explicitly recognized on p. v of the ProUCL4 Technical Guidance, which states, "A 95% upper confidence limit (UCL95) of the unknown population (e.g., an AOC) arithmetic mean (AM), µ1, can be used to…[e]stimate background level mean contaminant concentrations. The background mean contaminant concentration level may be used to compare the mean of an area of concern. It should be noted that it is not appropriate to compare individual point-by-point site observations with the background mean concentration level."	EPA has received the LWG's response and has not raised the issue for further discussion.

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Phytoplankton EPA requested an analysis of OC and TSS relative to phytoplankton in surface water.	S244, S65	Phytoplankton assessment was not part of the RI, and the relationship between TSS and plankton was not part of the scope of the surface water objectives. Because quantitative information on phytoplankton was not collected, the requested evaluation cannot be conducted in a quantitative manner. However, the comment is noted and we will add a qualitative discussion of this concept in the revised RI.	EPA has received the LWG's response and has not raised the issue for further discussion.
Particulate PCB Values Please plot and discuss the dry weight particulate PCB concentrations in these sections. The particulate PCB and TSS data are available to calculate the dry mass PCB concentrations associated with suspended particulate matter. Those concentrations are useful in estimating transport under a variety of flow conditions, exposure for biota, potential accumulation in sediments via deposition, and support of the fate and transport model by providing estimates of in situ partitioning. Please also (or instead) plot the dry weight DDX concentrations on the particulates in these plots and discuss the results.	S248, S252	The requested calculation and comparison cannot be conducted. In the XAD sampling, neither the initial or final mass of the filter was collected; only the volume of water pumped was collected. Therefore, the dry-weight particulate concentrations for PCBs and DDx cannot be calculated, as the mass of particulates is not known.	EPA has received the LWG's response and has not raised the issue for further discussion.
The remainder of EPA's RI comments fall into one of these six general categories.			
Comments the LWG Agrees to Address	General Comments: 1-3, 9, and 10 Specific Comments: 1-4, 10-15, 16-20, 22, 25, 27-29, 30-32, 34-52, 55, 56-61, 63, 64, 67-70, 72-75, 77-80, 85-88, 91-95, 97-103, 104, 106, 110-114, 117, 139, 141-143, 145, 146, 148-150, 155, 156, 158-160, 162-164, 167, 168, 170, 173, 174, 177, 178, 180, 182, 192-194, 197, 199, 204, 206-208, 210, 212, 215-217, 219-221, 223, 225, 226, 227-229, 231, 239-242, 247, 249, 250, 258, 259-	The RI will be revised in general accordance with comments listed to the left.	

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	262, 265-270, 272, 274, 275, 282-289, 291-294, 298-300, 303-305, 308, 309, 312, 315, 316, 318-321, 323-325, 329, 339-342, 350, 355, 357, 359, 362		
The LWG does not agree with all aspects of the comment, but the comment is noted and will be addressed in the Revised RI.	S6, S7, S8, S54, S62, S71, S140, S144, S147, S175, S211, S251, S281, S322		
The LWG will address the comment but wi11 modify the specific text insert requested by EPA.	S5, S21, S83, S84, S108		
Comments Addressed in the Risk Assessments	S9, S76, S295, S296, S297, S301, S302, S317, S330, S331, S332, S342	These comments pertain to the risk assessments, and the respective RI discussions will be consistent with changes made to those documents. Comment S76 also requests information on groundwater as a drinking water source. We disagree to provide information regarding the use of groundwater *along the LWR*, as it is not within the scope of the AOC and SOW for the in-water portion of the Site.	
Comment Noted. No Action Required	S224, S233, S246, S253, S254, S277, S278, S338, S345, S351, S354, S358, S361		
Other	S201, S247, S271, S273	This set of comments relates to data or information that do not exist to perform the requested change (for S247 – 5 of the 7 figures will be generated as requested; 2 of 7 figures cannot be generated).	