



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
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HUNTERS POINT
SSIC NO. 5090.3.A

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August 14, 1996

Richard Powell
Mail Code 09ER1
Engineering Field Activities West
900 Commodore Drive, Building B102
San Bruno, CA 94066-2402

RE: Parcel D Remedial Investigation Draft Report, Hunters Point Shipyard, San Francisco, California

Dear Mr. Powell:

EPA has reviewed the above referenced report, prepared by PRC Environmental Management, Inc., submitted on June 28, 1996 and received by our agency on July 1, 1996. We would like to commend the Navy and the document writers on a report that is greatly improved over the Parcel B draft report. The Parcel D report presents an enormous quantity of information in a readable, well written format and addresses almost all concerns that arose over the Draft Parcel B report.

The enclosed comments can be divided into two categories. The first comments are general, recurring concerns that became apparent in reading through the document. There are only a few of these types of comments and EPA is confident that they can be dealt with effectively in the draft final report. The remainder of the comments, broken out by sections of the report, point to either specific instances where the general concerns apply or deal with quality assurance issues. Although the comments are numerous, they don't, for the most part, require extensive rework of the draft document and incorporation of the requested revisions will result in a very thorough and complete draft final Parcel D report.

If you have any questions regarding the comments, please call me at (415) 744-2367.

Sincerely,

Anna-Marie Cook
Remedial Project Manager

cc: next page

cc: Cyrus Shabahari, DTSC
Richard Hiett, RWQCB
William Radzevich, EFAWEST
Mike McClelland, EFAWEST
Jim Sickles, PRC

**EPA COMMENTS ON THE PARCEL D
REMEDIAL INVESTIGATION DRAFT REPORT
HUNTERS POINT SHIPYARD**

GENERAL COMMENTS

1. The 90 to 180 degree swing in groundwater flow directions described for many sites requires justification. This swing is more likely the result of tidal influence than an actual change in groundwater flow direction, particularly if measurements were not taken at the same tidal stage each season. Apparent changes in direction would also result if it took more than a couple of hours to collect groundwater elevation measurements.
2. Although HGALs for ambient background groundwater concentrations for inorganics are still in the process of being finalized, it would be helpful to reference this process in the draft document and describe how the finalization of these levels will affect the draft final version of the RI and the draft FS.
3. The belief that contaminants in soil should remain sorbed and not migrate into the groundwater is unsubstantiated and probably incorrect. This claim and any recommendations or conclusions based on this assumption should be removed from the document. Numerous site evaluations have shown that many VOCs, metals and TPHs desorb through percolating from precipitation events and/or rising groundwater and migrate from the soil into the groundwater.
4. Very little attempt has been made to relate sediment contamination, soil contamination and groundwater contamination to each other. Often a pathway from a potential source area appears to track to subsequent soil and sometimes groundwater contamination, but this connection is very seldom explored in the text of the document and no conclusions are drawn from the possible connection.
5. Often the statement is made that metals concentrations, although sometimes significantly above established HPAL values, are not indicative of a release. HPALs were established to determine concentrations of metals that could reasonably be expected to be due to ambient conditions. Any concentration significantly above these levels is then assumed to be due to some source. Claiming that statistical patterns do not show a release obviates the use and intent of the HPALs, which were also based on a statistical approach. Please see the specific comments where this concern is directly applicable.
6. Risk to aquatic receptors from Parcel D groundwater is not covered in this report and is not covered in the Phase 1B ERA. This data gap needs to be addressed in the draft final RI report and in the draft FS.
7. As presented in previous discussions and memos associated with FOSLs and EBS reports, permissible exposure levels (PELs) are not appropriate criteria for screening and should be removed and replaced with health-based values of the ambient air PRGs.

8. The description for the use and calculation of the surrogate value for Chromium VI is confusing and should be clarified. The application of a statistical outlier test on the Cr data is based on questionable assumptions (i.e. that all samples are from the same sample population) and should be deleted. The test is not consistent with a determination of a surrogate for Parcel B and does not take into account the spatial and operational histories of the grid areas. This problem could be easily resolved by using the highest ratio of Cr VI/Cr total of 3.3% as a surrogate or doing a review of the spatial correlation with the operational histories of the detected Cr VI levels. The former would be rapid and health protective and would define a Cr VI PRG 2-3 times higher than in the default PRG table.
9. The discussion of potential soil contaminant migration across parcel boundaries is perplexing. What distances and depths are being discussed? Contaminant migration in soil is fairly limited, usually being confined to a small amount of lateral migration in a spill situation, or due to contaminated infiltration from runoff due to precipitation events. Contamination across parcel boundaries is far more likely to occur by means of groundwater migration.

SPECIFIC COMMENTS

EXECUTIVE SUMMARY

1. **Figure ES-1.** Add a note to the figure defining the acronyms ELCRS and HIS. Define the ELCR. i.e. is it based on exposure scenario, average to RME, or values of the grids within the IR area? Change the symbol explanation from "Parcel B boundary" to "Parcel D boundary".
2. **Page ES-2, 1st paragraph.** Please state where risks presented to aquatic receptors from groundwater will be considered.
3. **Page ES-2, 4th paragraph.** Change "Parcel C to the southeast" to "Parcel C to the northeast".
4. **Page ES-3, 2nd paragraph.** The term geology is incorrectly used in the first sentence. "Overburden" is a more accurate term. Expand the discussion of Undifferentiated Sedimentary Deposits.
5. **Page ES-5, 2nd paragraph.** It is stated that a basewide evaluation for the potential for groundwater contaminant transport to the bay is currently being conducted. Which document is being generated to report this evaluation, what is the schedule for this document and how will the results be incorporated into any remedial action taken at each parcel?
6. **Page ES-5, 4th paragraph.** Briefly describe the significance of the exploratory excavations.

7. **Page ES-7, 4th paragraph.** Suggest briefly describing the process of establishing HGALs and how these levels will be used to screen inorganics in groundwater.
8. **Page ES-8, 2nd paragraph.** Please rename the "non-HHRA" screening criteria because the PRGs are primarily health-based and this fact needs to be accentuated.
9. **ES-10, 1st paragraph.** PELs are not appropriate for baseline risk evaluations. Please remove.
10. **ES-11, last paragraph.** COPCs in the text and Appendix N were defined as all chemicals detected less essential nutrients and metals below the HPALs.
11. **ES-20, 3rd paragraph.** The lack of monitoring wells in Parcel C to confirm or refute suspected migration of lead in groundwater across the Parcel C and D boundary should be identified as a data gap.
12. **ES-21, 2nd paragraph.** Please clarify the third sentence of this paragraph.
13. **ES-22, 1st paragraph.** Please state whether there is a lack of data or a lack of detected contamination that constitutes "no evidence".

SECTION 1

1. **Figure 1.3-2.** Clarify the boundaries between each of the Parcels (A-E) on this figure.
2. **Figure 1.3-3.** Exposure areas are not indicated on this figure as implied by the title. Please resolve this discrepancy.
3. **Figure 1.3-4.** The significance of bolded numbers on this figure is not clear. The figure should have a note or a legend that explains the meaning of bolded sites, asterisks, and dashed lines.
4. **Table 1.3-1.** IR-33 is not broken into two sites (IR-33N and IR-33S) as shown on Figure 1.3-3 and evaluated in Section 4. IR-36 is also not broken into sites as described on Figure 1.3-3 (IR-36S, IR-36W, and IR-36N). Please clarify which buildings are included in each of the respective sites.
5. **Section 1.3.3, page 1-14, 3rd paragraph.** Clarify that Figure 1.3-3 does not show sites IR-45, IR-48, IR-50, and IR-51, (utilities and former transformer sites). Reference the figure(s) in the RI report which indicate the locations of these sites.

SECTION 2

1. **Section 2.2.3, page 2-9, 1st paragraph.** Discussion should be limited to activities which took place in Parcel D and it is not necessary to mention quarterly monitoring which occurred in Parcel B.
2. **Section 2.3, page 2-13, 2nd paragraph.** The scope of the groundwater removal action has been limited to IR 1/21. Please correct the text.
3. **Section 2.3.4, page 2-17, 2nd paragraph, last sentence.** Aroclor 1254 is a carcinogen. This sentence includes this congener as a noncarcinogenic hazard, which is incorrect.
4. **Section 2.4.2, page 2-18, 2nd paragraph.** A figure should be included which indicates the location of the former and existing transformers at Parcel D. This is an important step in evaluating the potential sources of PCBs detected in soil.
5. **Table 2.3-1.** Is there a reason why no USTs or ASTs are listed for the Navy Exchange Gas Station (IR-36, Bldg 709).

SECTION 3

1. The location of HPS should be indicated on all regional geologic maps to aid the non-technical reader.
2. Please correct the usage of "feet msl" throughout this section. Indicate whether the elevation is above or below mean sea level. An example of this is in section 3.7.3, page 3-14, 3rd paragraph, the third and fourth sentences.
3. All boring logs, including those for the DMB borings, should be included in the appendices.
4. The groundwater elevation maps should only present mean water levels in areas of significant tidal influence. Mean water level elevations can be calculated using such methods as Serfes (1991). Contour maps of individual point water level measurements collected over a multi-hour time period from wells located in tidally influenced areas are misleading and do not represent actual water level conditions at any point in time. Groundwater elevation contour maps prepared using point water level measurements from tidally influenced wells can not be used to accurately determine groundwater flow directions or groundwater flow rates.
5. **Figure 3.1-1.** The Parcel D boundary is not indicated on the figure making it difficult to transfer utility line locations to other maps. Please add the parcel boundary.
6. **Section 3.1.1, page 3-1, 3rd paragraph.** Please clarify current and former land use in the discussion of the three functional areas at Parcel D. It is unclear from this discussion whether the descriptions of the three functional refer to current or former use.
7. **Figure 3.4-1.** Define the symbol Qsr.

8. **Figure 3.4-1.** Please label more of the two foot contour intervals to enhance the presentation of topographic data.

The line weights for the "previous dock location" and the "parcel boundary" should be accurately represented in the explanation. The "previous dock location" symbol (in the explanation) is not what is represented on the figure, and what is represented in the explanation as the "previous dock location" appears to be a parcel boundary on the actual figure.

Clarify the definition of an "area of seepage" (e.g. describe whether an area in which seeps are naturally occurring at the ground surface).

Since Parcels A, B, D, and E are indicated on this figure, also label Parcel C.

9. **Section 3.7.1.** Please include a discussion of how the geology influences extent of contamination and contribution to background metals. Include a discussion of present and former mineral deposits in the San Francisco or the Hunters Point area. The discussion of geology does not support the inference that elevated metals concentrations of chromium, manganese, and nickel are attributable to the occurrence of serpentinite-derived fill material in section 4 (e.g., page 4-12, 1st paragraph).
10. **Section 3.7.3, page 3-14, 3rd paragraph.** The sentence "bedrock is not exposed on Parcel D" contradicts Figure 3.4-1. which indicates that the northernmost portion of Parcel D does contain bedrock. Also, the text on page 3-11 suggests bedrock is exposed in Parcel D.
11. **Figure 3.7-4.** Please label the general direction of this schematic cross-sectional view, and cite it in the text.

This figure indicates a post-Quas trough scoured to bedrock, which appears to be a paleostratigraphic feature. If this is interpreted as pre-fill dredge please discuss the justification for this interpretation in the text. Please provide and define geologic units/symbols on the figure. Kjf is not depicted on Figure 3.7-2.

12. **Section 3.7.3, page 3-15, 1st paragraph.** It is confusing to state "slopes of up to 30°, over a height of 100 feet" because slopes are normally referenced to distance.

Please explain the significance of a "south east-draining gully in the bedrock surface", since it is unclear if this sentence was intended to suggest that the bedrock surface controls groundwater flow by channeling groundwater flow in a southeasterly direction or if it was intended to describe trends in the bedrock surface. In similar fashion, explain "west-southwest-draining expression or swale". If the intent was to indicate that these features sloped downward in the indicated direction, please use a word like "sloping" or "declining" rather than "draining". The work "draining" is appropriate for describing surface runoff, but is not appropriate for describing subsurface bedrock topography.

13. **Figure 3.7-5.** The text (page 3-15) implies that the bedrock elevation in the vicinity of Shag Rock should higher than sea level and the contours should be modified to reflect this.
14. **Figure 3.7-6.** Figure 3.7-6, which shows the occurrence of the Bay Mud unit in feet below sea level, does not appear to correlate with the boring logs. An example of this is boring log IR16BO13, at IR-16.
15. **Figure 3.7-7.** Bay Mud is shown as absent at IR09B022. However, Figure 3.7-6 and the boring log show it as present. Please correct Figure 3.7-7.
16. **Figure 3.7-9.** This figure should be consistent with Figures 3.7-1 through 3.7-4 in use of standardized lithologic symbols.
17. **Figure 3.7.10 through Figure 3.7-15.** Log symbols are not consistent with Figure 3.7.9. Please revise Figure 3.7-9. The legends on these cross-sections do not contain symbols for the sp unit portrayed on the figures. Please include this information in the legends. If the boring symbols are different than the bedrock symbols, please reference the boring logs accordingly in the figure legend. Ensure that all of the symbols used on the figures are represented on either the figure itself, or referenced to the boring log symbols.
18. **Figure 3.7-11.** The bedrock elevation shown on the cross-section should match the bedrock contour map (Figure 3.7-5).
19. **Figure 3.7-15.** Please query the dashed contact of the undifferentiated sand deposits at the south end of the cross-section. The subsurface interpretation is not provided at the southern end of the cross-section. When data is available, an interpretation should be made. If no geologic interpretation is reasonable, please discuss this in the text.
20. **Section 3.8.1, page 3-17, 1st paragraph.** From Figure 3.8-1 it is not clear that the Islais Valley Groundwater Basin is located northeast of the HPS. The South Basin appears to be located west-southwest of the HPS. Please clarify these locations. Relabel the Islais Valley Basin on Figure 3.8-1 for clarity.
21. **Table 3.8-1.** When presenting Geologic ages, it is misleading to represent both an epoch (Holocene and Pleistocene), and a period (Jurassic and Cretaceous) in the same column without explanation. Please revise this table to separate Geologic periods and epochs. The footnote does not help the reader understand the table.
22. **Section 3.8.2.1, page 3-21, 2nd paragraph.** From figure 3.8-2, groundwater flow direction of the A-aquifer is influenced by the sewer systems at Parcel D, and is redirected from its general flow direction toward the bay. Please amend this discussion to include a discussion of the influence of the sewer system.
23. **Figure 3.8-2.** Please enhance the presentation of the zone of tidal influence on this figure. This may be done by adding shading or a different color line to the affected area, and/or arrows depicting the width of the affected area.

24. **Section 3.8.2.2, page 3-22, 1st paragraph.** Enhance the description of the B-aquifer at Parcel D. Since the presence of Bay Mud is extensive at Parcel D, discuss whether the B-aquifer is assumed to be confined across the site. There are two areas in Parcel D where the Bay Mud is missing according to figure 3.7-6; the northernmost strip across the site, and an isolated area in the southern portion of the site. If there is figure showing the extent of the B-aquifer at Parcel D, reference it in this discussion.

The legends contain references which are not accurate (under "notes"). An example of this is the reference of the location of the cross-sections on figure 3.7-4, and the reference of the lithologic symbols on figure 3.7-5. Please reference the appropriate figures.

25. **Table 3.8-1.** Table 3.8-1 is identified in the Table of Contents as "summary of monitoring wells and Piezometers at Parcel D" but is not included in the report and should be included in the draft final report.
26. **Tables 3.8-2 through 3.8-7.** These tables are mislabeled in the Table of Contents as Tables 3.8-1 through 3.8-6.
27. **Table 3.8.6.** In many cases, the discrepancy between Cooper-Jacob and B&R results can be explained because computer curve matching selected early-time data which gives hydraulic conductivity values for the gravel or sand pack instead of the aquifer. Please see comments on Appendix C.

SECTION 4

Overall Comments for this Section:

1. This report does a good job of concisely describing an enormous amount of analytical data. However, it appears that little analysis of the distribution of contaminants was done. For instance, the distribution of metals in soil is almost always described as sporadic, but the "Nature and Extent of Contaminants in Soil" sections describe the metals data using ranges and maximum concentrations instead of describing the spatial distribution of metals. The validity of the "sporadic" description is questionable. Spatial patterns in metals data were apparent at many sites that were checked for this review. Describe the distribution of metals and organic analytes in the "Nature and Extent of Contaminants" in spatial terms.

Spatial analysis of the analytical data was difficult because important features or potential contaminant sources such as underground storage tanks, sumps, wash racks, dip tanks, transformers, and utility lines are not shown on site figures. Without this information, association of samples with potential source areas is difficult for both the authors and the reader. These critical features must be shown on site figures.

2. There are several locations in the report where table and figure citations are incorrect (e.g., incorrect figure numbers for the bedrock surface map and two Bay Mud figures are made in every discussion of geology). Additionally, several cited tables were not found in the report (e.g., a table summarizing migration routes is referenced in the first paragraph of every potential migration route discussion but none of these tables were included in the tables volumes). Examples of incorrect citations and known table and figure omissions are noted in the specific comments, however, all table and figure citations should be rechecked and corrected if necessary.

It would be helpful to cite only the applicable cross-section(s) for each site rather than generically cite all of them.

3. The 90 to 180 degree swing in groundwater flow directions described for many sites requires justification. See general comments.
4. The site geology descriptions seem to be only based on the parcel wide geology discussion and figures in Section 3. Site specific information should be integrated into each site geology description. For instance, in many sections artificial fill is described in the same way ("consists predominantly of sandy clay with gravel and sand") and information from site logs is not discussed. The serpentinite bedrock descriptions also appear to be based entirely on the parcel wide discussion. Several sections attribute the bedrock information to site drilling activities, even though site borings did not encounter bedrock. Please use site specific boring logs to correct the geology descriptions for each site.
5. A number of problems were found in the slug test analyses (see comments on Appendix C) so the hydraulic conductivities listed in the text are incorrect and should be corrected.
6. The report should contain lists of all of the screening levels used in evaluating the analytical results for all media including the PRGs, HPALs, NAWQC, and MCLs. The lists should also indicate the reference source for each individual screening value. These were probably included on Table 4.0-1, which is missing from the document.
7. It can not be determined from the report if the metals results reported for groundwater are from filtered (dissolved) or unfiltered (total) samples. Appendixes I and K present methods for collecting both filtered and unfiltered groundwater samples. The draft-final HPA Facility Groundwater Monitoring Plan (HLA, 1992) lists analyses for "dissolved metals" only. The use of filtered versus unfiltered sample results in data evaluation is a critical issue that should be clearly documented and the rationale for selecting a particular sampling methodology fully explained.
8. Tables of analytical results for Hydropunch samples should include the depth interval for each sample result.
9. The geochemical conditions of the vadose zone, A-Aquifer, B-Aquifer, and bedrock water-bearing zone have not been adequately characterized to support the conclusions made regarding contaminant migration, fate and transport. Many of the migration

evaluation subsections state that environmental conditions at the site result in "very limited" migration of soil and groundwater contaminants, particularly metals. These conclusions must be based on site-specific geochemical data and not just on general geochemical principles and assumptions of site geochemistry. The report contains no specific discussion of the geochemical environment in the Facility and Parcel D Characteristics section (Section 3) or in the Contaminant Fate and Transport appendix (Appendix O). Site-specific data on groundwater pH, oxidation-reduction potential (redox or Eh), temperature, dissolved oxygen content (DO), chemical oxygen demand (COD), anion and cation concentrations, and contaminant concentrations are all useful in developing a reasonably accurate model of a site's geochemical environment. In this report, only data on pH, anion, cation and contaminant concentrations are presented, but these parameters are not discussed in terms relative to geochemical controls on contaminant migration. Redox, DO, and COD data should be collected during future rounds of groundwater sampling and the data should be evaluated and discussed in future documents along with other available geochemical data in terms relative to contaminant migration.

10. Only individual PCB Aroclors are compared to screening criteria in the statistical summary and analytical results tables, and in the analytical results and nature and extent text sections. Total PCBs should be summed from detected individual Aroclors and also compared to screening criteria in all applicable text, tables, and figures. Review of Appendix M indicates that, in several samples, total PCB concentrations exceed the PCB screening criteria while concentrations of the individual Aroclors do not. The existing screening approach used in the report results in some samples that actually fail the PCB screening criteria not being identified.
11. Areas of pavement and bare soil should be identified on the sample location maps for each site. Estimates of paved area are already present at various places in the text suggesting that this information is available.
12. The report suggests that many organic contaminants detected in groundwater are not indicative of releases to groundwater because they occur in isolated samples. Isolated occurrences can be due to small isolated releases. If the contaminants are not due to a release evaluate whether they could be due to laboratory or field contamination. State in the conclusion sections if the contaminants are likely lab/field contaminants or are due to isolated releases.
13. There are numerous inconsistencies between the text and tables and between the nature and extent discussions and Fate and Transport sections. Please correct and revise text and/or tables as necessary.

SECTION 4.0

1. **Section 4.0, page 4-4, Table 4.0-1.** Table 4.0-1 was not found in the report. It is critical that this table be included and checked against screening criteria sources.

2. Figure 4.0-2. The HPAL for thallium is missing and should be provided in the figure.

SECTION 4.2

1. **Section 4.2, page 4-23, 4th paragraph.** Please indicate the location of the steam line which was used to transport waste oil with PCBs by Triple A. Discuss whether it was located partially or wholly within IR-08 site boundaries.
2. **Section 4.2.5-1, page 4-48, 5th paragraph.** Figure 4.2.5-1 is a schematic cross-section for migration of contaminants at IR-08, not IR-17.

Also, table 4.2-10 does not appear to be included in the Tables (Vol.3) with the set of tables for IR-08. The text discusses a summary table of migration routes, Table 4.2-10. If this table is not located in the tables section, please refer the reader to its location.

3. **Section 4.2.5.1, page 4-49, last paragraph.** The explanation for the vertical transport of PCBs is unlikely since PCBs are relatively insoluble. PCBs are normally transported vertically only when petroleum products or solvents are present to act as the "carrier". An alternative explanation is that PCBs could be transported sorbed to sediment which migrates through coarse gravel pack (if the gravel pack does not act to filter out fine particulates). Vertical migration of PCBs in PCB contaminated oil has also been shown to occur when the release was continuous over a long period of time. The most likely explanation may be that PCB containing oils were transported through the storm drain system into the dry well during one or more releases.
4. **Section 4.2.5-1, page 4-50, 2nd paragraph.** This paragraph does not mesh with the previous discussion of aroclor-1260 migration through the SDCB. Explain whether the overland flow migration route is strictly dependent on topography or whether the SDCB is a secondary pathway for migration.
5. **Section 4.2.7.1, p.4-61.** Include a description of potential sources for all contaminants at the site. It is not clear from the text why only sources of PCBs are discussed in this summary section. Potential sources should include upgradient and/or off-site sources as appropriate. Include a discussion of the source for the DDD and DDE.
6. **Figure 4.2.5-1.** This schematic should include the topographical low as discussed in 4.2.5.1, Potential Migration Routes. It would also be helpful to provide a scale to show the approximate depth of the water table, and to show the depth of the Aroclor-1260 contamination, as discussed in the text.
7. **Section 4.2.5.3, page 4-53, 3rd paragraph.** The discussion of migration of PCBs in groundwater is the same as the discussion for PCBs in soil. This section should discuss the fate and transport of PCBs that are already in groundwater. It is important that media-specific migration evaluations and discussions be included in the report.

8. **Figure 4.2-1 through 4.2-5.** These figures should indicate the area of soil removed during the 1988 interim remedial action and the locations of the storm drains mentioned in the text on page 4-23.

SECTION 4.3

1. **Section 4.3, page 4-67, 2nd paragraph.** A clear understanding of the site, including the locations of features mentioned in the text, is needed to evaluate the data. It would be helpful to show the location of the pickling tanks and containment vault, drying racks, and storage racks on a figure.
2. **Section 4.3.1, page 4-69.** Please include statistical summaries of the following samples: pickling tank liquid, pickling tank sludge, and paint residue. These results are important because a removal action was based on them and because they are source characterization samples.
3. **Section 4.3.2, page 4-75, 2nd paragraph.** Describe the geology of the site in more detail, especially the extent of geologic units, so that contaminant migration can be more easily evaluated. A clear presentation of the geology of the site will also allow a more thorough evaluation of well placement. A fence diagram or several cross sections constructed specifically for this site would help greatly in understanding the geology of the site, and may facilitate interpretation of the source of TCE.

Reference Figure 3.7-5 instead of Figure 3.7-1.

4. **Section 4.3.3.3, page 4-85, 5th paragraph.** Trichloroethene is incorrectly listed as trichloroethane.
5. **Section 4.3.4.1, page 4-92.** The sixth paragraph is misleading. There are discernable patterns for arsenic, beryllium, chromium, lead, nickel and manganese, which are consistent with a release (see section 4.1 figures). Of these, chromium is particularly important because it has been detected in every soil sample and is a known site contaminant. Figures 4.1-15 through 4.1-18 show that there are definite chromium hot spots superimposed on a more diffuse release.
6. **Section 4.3.4.1, page 4-93, 2nd paragraph.** Soil contamination is attributed to a drain line and so the drain line should be shown on a figure to verify this conclusion.
7. **Section 4.3.4.2, page 4-97, 5th paragraph.** Another groundwater contaminant which appears attributable to a release at the site is nickel. Nickel was detected in IR09MW35A at a concentration significantly greater than detections from samples collected from other wells at Parcel D (see Figure 4.1-78). Include a discussion of nickel in the Summary of Groundwater Chemistry.
8. **Section 4.3.4.2, page 4-97, last paragraph and page 4-98, 1st paragraph.** The paragraph implies that the eastern extent of the northern hexavalent groundwater plume

(Figure 4.3-4) is based on Hydropunch data. However, this data is not posted on Figure 4.3-4. Add hydropunch data to the figure so that the validity of the concentration contours can be determined.

9. **Section 4.3.7.2, page 4-116.** Since groundwater samples have not been collected from the B-zone in the southwestern corner of IR-09 the vertical extent of hexavalent chromium has not been determined in this area. Additional groundwater sampling in the B-zone should be a recommendation.

Additional investigation of the extent of TCE contamination should also be recommended. TCE was commonly used as a degreaser before metal plating was conducted, so it is not surprising that it was detected at IR-09. TCE was detected in groundwater samples collected from a bedrock well, yet there are no other bedrock or shallow wells in the vicinity of this well to evaluate the vertical and horizontal extent of TCE contamination in each aquifer.

SECTION 4.4

1. It is unclear from the text whether the PCB contamination was the result of leakage from a drum of waste oil, or some other release. Please clarify likely point source of the PCB contamination, the location in relation to the site and other detected contaminants. The location of the contamination in relation to the site should be described for each contaminant. The location of each contaminant must then be interpreted in relation to its suspected source, e.g., an on site release, an upgradient release, etc. Although figures are provided which "post" the analytical results, this information needs to be interpreted in the text.
2. **Section 4.4, page 4-117, 2nd paragraph.** State which one-third of the site was used for the storage of the drums which contained oily rags, and PCB's (e.g. the northern portion).
3. **Section 4.4.1, page 4-120, 3rd paragraph.** Please include a description of how and why monitoring wells PA16MW16A through PA16MW18A were redeveloped. This information could be included in an appendix.
4. **Section 4.4.2, page 4-122, 4th paragraph.** It appears from cross-section 3.7-15 that no borings actually extended into the undifferentiated sedimentary deposits or the bedrock units. Please revise the text discussions of depths and lateral extent of such units to include such descriptors as "estimated".

According to Figure 3.7.9, and the explanation of soil and rock classification and numbering system, at boring IR16B012 there is no sand between 10 and 20 feet. Please explain.

5. **Section 4.4.3.1, page 4-125, 1st paragraph.** If Tables 4.4-1, 4.4.4, and 4.4.7 are summaries of requested analyses, the titles should be revised accordingly. From the text discussion it seems that some analyses were only requested, and not performed
6. **Section 4.4.4.1.** Include a brief description of the location of each contaminant. An example would be "in the north-eastern portion of the site." This is particularly important for Aroclor-1260 and for all of the metals.

When a maximum concentration value is being discussed, even if there is only one sample exceeding the screening criteria, be sure to include a word like "maximum" or "this maximum value." An example of this is found in the metals section, on p.4-133, para.5, for molybdenum. The second sentence describes the maximum concentration of molybdenum detected. Although it is clear that the discussion focuses on a particular sample, using the words "the maximum" (or similar wording) would add clarity to the discussion.

7. **Section 4.4.1, page 4-133, 6th paragraph.** Based on figures 4.1-15 through 4.1-18, chromium concentrations can be contoured; these figures indicate both the lateral and vertical extent of chromium. Therefore, it seems that there are discernable patterns.
8. **Section 4.4.7.1, page 4-150, 5th paragraph.** Please explain why the Navy believes arsenic, beryllium and manganese are naturally occurring when these metals were detected above both the HPAL and PRG. By "definition" these exceedences indicate a release.
9. **Section 4.4.7.1, page 4-151, 4th paragraph.** According to the text, the PCB detection was "assumed to be an isolated occurrence". This appears to be true, but note that the presence of PCBs indicates a release. Since transformers, drums labeled "oil with PCBs" and oily rags were stored at this site, there is a potential source for this release. This should be discussed in the text.

SECTION 4.5

1. **Section 4.5.3.2, page 4-166, 1st paragraph.** PCBs were not detected, however the detection limit for PCBs (159 to 200 µg/kg) significantly exceeded the PRG. PCBs may actually be present at concentrations that exceed PRGs. Because the site was used for storage of PCB oils this should be noted as a data gap. Since PCBs were found in storm drain sediments above the PRG is likely that there is PCB contamination of surface soils.

SECTION 4.6

1. **Section 4.6, page 4-185.** Please discuss the activities in Building 308 and Tank HPA-308 which is located immediately southeast of Building 308 as shown on Figure 4.6-1. Information regarding these site features should be added to this section. The discussion in Paragraph 1 on Page 4-190 indicates that HPS-308 is an abandoned UST. The type of material stored in this UST may explain the distribution of contaminants such as TPH at this site.

2. **Section 4.6.1, page 4-187, 3rd paragraph and Table 4.6-1.** The storm drain sediment samples should have also been analyzed for organotins to assess potential sources of sediment contamination in the south slip and San Francisco Bay. Organotins should be analyzed in all storm drain sediment samples located within drainage areas suspected of containing sandblast abrasive materials. This is important because antifouling additives used before the organotins were detected in sediments and abrasive samples, and organotins are extremely toxic to marine life.
3. **Section 4.6.1, page 4-188, 2nd paragraph and Table 4.6-4.** The suspected sandblast abrasive samples should have also been analyzed for organotins.
4. **Section 4.6.1, page 4-188 and 4-189, Soil Characterization and Groundwater Characterization.** Please explain why soil samples collected in the vicinity of Tank HPA-308 are not included on figures and in summary tables.
5. **Section 4.6.2, page 4-192, 2nd paragraph.** It is likely given the close proximity of IR-22 to the south slip and San Francisco Bay that groundwater is tidally influenced at this site. The influence of the bay is supported by the high TDS (29,000 mg/L) reported for groundwater at the site. Tidal influence on groundwater at this site should be re-evaluated.
6. **Section 4.6.4.2, page 4-214, 4th paragraph.** The statements that concentrations of metals in groundwater are similar to their parcel-wide distributions and (except for lead) do not indicate a release are incorrect and are not supported by the data. Chromium, copper, and nickel are elevated in the vicinity of Building 368 in the same area where hexavalent chromium is detected in soil. This section should be revised in light of the site data.
7. **Section 4.6.6.1, page 220.** The discussion of the HHRA is missing.
8. **Section 4.6.7.1, page 4-221, 6th paragraph.** The "underground utility corridors serving Buildings 274, 368, and 369" should be depicted on the site figures and in the Section 4.6 background discussion.
9. **Section 4.6.7.1, page 4-222, 2nd and 4th paragraph.** The conclusions regarding TPH in soil and TOG in groundwater should be re-evaluated in light of abandoned UST Tank HPA-308.

SECTION 4.7

1. The information used to characterize this site appears to be limited when compared with the number of exploratory borings, the test pit, and sampling conducted within the IR-32 site boundary. The subsurface data (logs) used to characterize the site are limited to the following 5 borings: PA32B001, PA32B002, PA32B003, PA32B005, and PA32MW04A. Considering its size, and the number of other borings within the IR-32 boundary, it is not clear why other data was not incorporated into the characterization of the contamination

and the subsurface conditions at this site. Please explain the rationale for using limited data at this IR site.

2. **Section 4.7.2, page 4-232.** It seems likely given the close proximity of IR-32 to San Francisco Bay that groundwater is tidally influenced at this site. Tidal influence on groundwater at this site should be reevaluated.
3. **Section 4.7.3.1, page 4-235, 1st paragraph.** This paragraph states that PCBs were not detected in the one sediment sample from the site; however, Figure 4.1-52, Aroclor 1260 in soil (0-2' bgs) shows a concentration of Aroclor 1260 in sample PA51SS19.

SECTION 4.8

1. **Section 4.8.7.1, page 4-314, 1st paragraph.** No evidence is presented to justify the conclusion that the metals detected at concentrations exceeding screening criteria do not indicate a release at IR-33 North. The co-occurrence of the metals with organic contaminants, particularly TPH, suggests that a release of metals has occurred. Given the relatively low mobility of metals in soil and groundwater and the finite number of samples collected, localized occurrences of metals relative to organics such as TPH should be anticipated. The conclusions regarding releases and the nature and extent of metals should be re-evaluated.
2. **Section 4.8.7.1, page 4-314, last bullet.** PCE was detected in sediment and soil samples collected from two areas, southeast of building 302A and southwest of building 302, and was also detected in groundwater grab samples, yet there is no discussion of the implications of the soil and sediment detections and their relationship to potential groundwater contamination, since VOCs are not often detected in soil. Also discuss whether grab groundwater samples were collected at depths and locations suitable to evaluate the potential presence of PCE in groundwater. Discuss why monitor wells were not installed in these areas as this appears to be a data gap.

SECTION 4.9

1. **Section 4.9.** Please label the features (i.e., sumps and vaults) buildings at IR-33 south on figure 4.9-1.
2. **Section 4.9.2, page 4-325, 5th paragraph.** Boring logs for IR-33 South do not indicate that fill materials consist mainly of clayey gravel, but that the fill materials are highly varied throughout the site. Please reword this description to better describe the range of materials encountered in the fill materials.
3. **Section 4.9.5.1, page 4-348, 1st paragraph and Section 4.9.5.2, page 4-349, VOCs.** According to the tables and text (p.4-345) only chloroform was detected in groundwater yet the discussion in these sections focuses on TCE, 1, 1-DCE and Benzene.

4. **Section 4.9.7.1, page 4-357, 4th paragraph.** This section is inadequate. Additional information regarding the location of the contamination and the relationship to potential sources is needed. An example of this would be the reference to the contamination "associated with the storage at these compounds." It is unclear which contamination is located at which building. If every contaminant is associated with storage at every building, this information must be clearly presented. Please clarify and enhance this section.

SECTION 4.10

1. **Section 4.10.3, page 4-374, 1st paragraph.** The presence of pentachlorophenol in storm drain sediments indicates that dioxin may be presents as dioxin contamination occurs during the manufacture of PCP. Sediments should be analyzed for dioxins.
2. **Section 4.10.3.1, page 4-374, 2nd paragraph.** The PRG referenced for Aroclor-1254 should be corrected.
3. **Section 4.10.5.** TCE and TCA were used in building 366 and were detected in soil or storm drain sediment north, east and southeast of building 366 and in groundwater north of building 366. Since VOCs are not often detected in soil samples, this strongly suggests that TCE and TCA may be present at higher levels in groundwater. Hydropunch samples are frequently collected at the top of the water table, but concentrations of TCE and TCA frequently are higher at the bottom of an aquifer. Evaluate whether the hydropunch samples were collected at depths appropriate to detect the maximum levels of these compounds. Evaluate whether monitor wells are located correctly to have detected maximum concentrations of these compounds. The extent of TCE and TCA in groundwater appears to be a data gap.
4. **Table 4.10-10.** pH should have been measured and reported for all groundwater samples including Hydropunch samples. Measurement of pH in groundwater is especially important at IR-34 because batteries were stored on the site and low pH can be an indication of battery acid releases.

SECTION 4.11

1. The subsurface data presented in Appendix J is insufficient for the geologic interpretation at this site. The site consists of 3.4 acres. There is not enough subsurface data presented in appendix J to support the geologic interpretation of this site. Also, the data which supports the existence of a pinnacle-like high which is a dominant subsurface feature should be supported by data. Please reference the field data which supports the geologic interpretations throughout this section.
2. **Section 4.11.1, page 4-408, 1st paragraph.** Appendix J does not contain all of the boring logs for the borings/wells constructed at this site. Please include all of the raw data used for preparation of this report, or reference previously published sources.

3. **Section 4.11.1, page 4-409, 5th paragraph.** The four floor drains represent a potential pathway for contaminant migration which has not been considered in subsequent sections.
4. **Section 4.11.2, page 4-412, 4th paragraph.** The data that support the statement that the thickness of artificial fill ranging from 25 to 35 feet are not included in Appendix J. Please provide boring logs which indicate the presence of artificial fill to a thickness of 35 feet. The data supporting the thickness of the Undifferentiated sedimentary deposits is also not included in the Appendix J boring logs, nor is there data to support the depth to bedrock. If there is supporting data, please reference it or include it in Appendix J.
5. **Section 4.11.2, page 4-413, 2nd paragraph and 3rd paragraph.** These paragraphs provide the same information, and require editing. Please edit this information, and reference the geologic data supporting this discussion.
6. **Section 4.11.3.1.** High levels of antifouling agents used prior to organotins were detected in sand blast abrasive samples, so it is likely that organotins were also present. Identify the lack of analyses for organotins as a data gap.

SECTION 4.12

1. **Section 4.12.2, page 4-455, 1st paragraph.** The report states that the reason for the steep hydraulic gradient in the northwest portion of the site is unknown. Based on other information provided elsewhere in the report it appears that the steep gradient may be a response to groundwater flow to the sanitary sewer line and Pump Station A.
2. **Section 4.12.3.2, page 4-460, 4th paragraph.** The text incorrectly compares benzo(a)pyrene in soil to an MCL.
3. **Section 4.12.3.2, page 4-463.** Table 4.12-9 does not include any samples with a detected concentration of TCE of 2 µg/L, yet the text and summary table 4.12-8A state that the maximum for TCE was 2 µg/L. Please explain and correct as necessary.
4. **Section 4.12.4.2, page 4-473, 6th paragraph.** According to Table 4.12-15, the maximum detected concentration of TCE was 4 µg/L, not 2 µg/L as stated in the text. Please correct.
5. **Section 4.12.5.1, page 4-476, 1st paragraph.** The report states that the source of TCE and vinyl chloride in groundwater southwest of Building 405 is unknown. Based on other information provided elsewhere in the report (including Section 4.12.7.1, page 4-490, 5th paragraph) it appears that the source is most likely related to the solvent release at Building 406 at the adjacent site, IR-36 South.
6. **Section 4.12.5.1, page 4-476, 2nd paragraph.** The statement that contaminants in soil should remain sorbed and not migrate is unsubstantiated and should be removed. Theoretical sorption kinetics aside, actual site evaluations at hundreds of sites clearly

indicate that many VOCs, TPH and some metals desorb into percolating precipitation or rising groundwater and migrate from soil to groundwater.

7. **Section 4.12.5.2, page 4-476, 4th paragraph.** The list of organic contaminants in soil at IR-36 South is incomplete. Explain why only some of the organic contaminants are carried through the migration evaluation discussion in the following section. For example, TCE and 1,2 DCE were detected in soil and TCE, 1,2 DCE, and vinyl chloride were detected in groundwater. This is a likely relationship between contaminants detected in soil and those detected in groundwater.
8. **Section 4.12.5.3, page 4-477, 2nd paragraph.** The statement that migration of several metals is "very limited" under the environmental conditions at IR-36 South is not substantiated by the information in Table O-4, and no other discussion of the geochemical conditions at this site is present in the report.
9. **Figure 4.12-2.** The soil data for IR05MW85A should also be posted on one of the three sheets comprising this figure.

SECTION 4.13

1. **Section 4.13.1 through 4.13.4.** Many of the table citations are incorrect and should be revised. For example, Table 4.13-7 is cited as listing the chemical constituents analyzed in soil boring samples; this information is actually presented in Table 4.13-4.
2. **Section 4.13.4.1, page 4-523, 4th paragraph.** Evidence is not presented to justify why the metals detected at concentrations exceeding HPALs do not indicate a release at IR-36 (except for mercury). Some metals exceeded their HPALs by orders of magnitude strongly suggesting that they are not occurring at "natural background" concentrations and more likely represent a release. The co-occurrence of the metals with organic contaminants further suggests that a release may have occurred. An approach similar to the rationale that is provided in the following paragraph for mercury contamination should also be used for the other metals.

Boring IR363B062 mentioned in the text is depicted as IR36MW128A on the site figures and tables, and is referenced as IR36MW128A at other places in the text of Section 4.13. All site discussions should use consistent sample station identifiers to minimize confusion. Additionally, a table containing cross-referenced monitoring well and soil boring identifiers should be included in the report.

3. **Section 4.13.4.1, page 4-524 and Figures 4.13-1 through 4.13-7.** The sanitary sewer and storm drain lines beneath "I" Street should be shown on all of the site figures so that the relationship of soil and groundwater contamination to the utility lines can be evaluated.
4. **Table 4.13-12.** The hydropunch sample depth interval should be presented for each result.

5. **Section 4.13.4.1, page 4-527, 4th paragraph.** Change "trichloroethane" to "trichloroethene" in the first sentence. All TCE results, including Hydropunch and grab sample results, should be posted and contoured in Figure 4.13-6. The detection of 1,2-DCE should also be discussed because this compound is a daughter product of TCE and the parent compound of vinyl chloride. 1,2-DCE is a link which is necessary for the fate and transport discussion.
6. **Section 4.13.5.1, page 4-531, 3rd paragraph.** The conclusions regarding contaminant migration in groundwater and soil are unsubstantiated and are contradicted by the site data presented in Section 4.13. The concentrations of TCE found in soil and groundwater suggest that TCE DNAPL is present in the subsurface as either a residual or mobile phase and may have migrated vertically downward below the A-Aquifer. Vertical migration of DNAPL at this site has not been adequately assessed in this RI; the existing B-Aquifer wells at IR-36 are located upgradient of the likely release area and are too distant to adequately assess potential impacts to deeper groundwater zones.

The statement that contaminants in soil should remain sorbed and not migrate is contradicted by the discussion in Section 4.13.5.3 and should be removed. Many VOCs, TPH and some metals can desorb into percolating precipitation or rising groundwater and migrate from soil to groundwater.

7. **Section 4.13.5.3, page 4-532, 3rd paragraph.** The statement that migration of several metals is "very limited" under the environmental conditions at IR-36 North is not substantiated by the information in Table O-4, and no other discussion of the geochemical conditions at this site is present in the report.
8. **Section 4.13.5.3, page 4-534, 2nd paragraph.** No discussion of DNAPL is made in this section on contaminant migration evaluation. This should be thoroughly evaluated in this section.
9. **Section 4.13.5.3, page 4-534, 3rd paragraph.** The statements made in this section regarding pesticides remaining strongly sorbed to soil and not migrating to groundwater are not supported by the groundwater data at this site: pesticides were detected in site groundwater samples. The discussion and conclusions should be revised in light of these facts.
10. **Section 4.13.7.1, page 4-546, 1st paragraph.** The presence of VOCs does not influence groundwater gradient. This sentence must be revised or removed.

SECTION 4.14 IR-36 West

1. **Section 4.14, page 4-555, 3rd paragraph.** Figure 4.14.8 which is referenced in this section could not be found in the report volumes and is not listed in the Table of Contents.

2. **Section 4.14 and Figure 4.14-1.** The figure does not identify the site features described in the text, and the its scale does not allow for the review of the placement of samples relative to the features (i.e., dispenser pump islands, underground product lines). An enlarged inset of the Building 709 area identifying the site features should be added to this figure.
3. **Section 4.14, page 4-556, 2nd paragraph.** Please reword the sentence "Groundwater was encountered in the UST S-715 excavation; therefore, no groundwater samples were collected."
4. **Section 4.14.2, page 4-562, 5th paragraph.** The range of thicknesses for the Artificial Fill and Bay Mud Deposits don't add up to the given range of depth to bedrock. Please explain or correct the unit thicknesses and depth to bedrock.
5. **Section 4.14.4.1, page 4-585, 7th paragraph.** The extent of PCBs in soil around IR36B138 has not been adequately defined and should be identified as a data gap.
6. **Section 4.14.4.1, page 4-586, 3rd paragraph.** The boring log in Appendix J for IR36B108 indicates that a sand layer at 46-49 feet bgs is "product saturated." This fact is not mentioned at any point in the text. The occurrence of any product, in any sample, identified during field investigations should always be discussed in the nature and extent of contaminants section of the report.

The presence of product at this depth suggests that NAPLs may be present at this site. The horizontal and vertical extent of the product has not been adequately determined and should be identified as a data gap.

7. **Section 4.14.4.1, page 4-587, 2nd paragraph.** The statement that, with the exception of lead, metals in soil do not have discernable patterns and that the soil data do not support a release of metals at IR-36 West, is unsubstantiated. The parcel-wide maps for soil and groundwater contaminants clearly show that several organic contaminants (i.e., VOCs, SVOCs, PCBs, TPH) and metals co-occur at elevated concentrations within the various subareas of IR-36 West.
8. **Section 4.14.4.1, page 4-587, 4th paragraph.** The assumption that the PAHs originated from historical placement of contaminated fill is highly speculative considering that relatively large areas of the site have not been sampled and small source areas at the surface could have easily been missed. The 5,000 µg/kg of benzo(a)pyrene at 46.25 feet bgs in Boring IR36B108 is clearly related to the observed "product" and TPH-d also detected in the sample.
9. **Section 4.14.4.2, page 4-590, 5th paragraph.** The extent of benzene in groundwater south and west of IR39MW21A is poorly characterized and should be identified as a data gap.
10. **Section 4.14.4.2, page 4-594, 2nd paragraph. and Section 4.14.7.1, page 4-613, 1st paragraph.** The statements regarding the metals in groundwater at IR-36 West being

similar to their parcel-wide distribution and not being indicative of a release at IR-36 West are unsubstantiated. The parcel-wide maps for soil and groundwater contaminants clearly show that several organic contaminants (i.e., VOCs, SVOCs, PCBs, TPH) and metals co-occur at elevated concentrations within the various subareas of IR-36 West.

11. **Section 4.14.5.3, page 4-601.** The assumption that PCBs will remain in place may not be valid for site IR-36W. PCBs have migrated to a depth of at least 11.25 feet, since PCBs are mobilized by petroleum products and may be transported by water or wind (as sediment or dust, respectively), mobilization of PCBs could occur.
12. **Section 4.14.7.1.** No attempt was made to relate potential soil contamination and groundwater contamination. For example, the discussion should include an evaluation of whether PCBs (or PAHs, or metals) were detected in both soil and groundwater in the same vicinity. When correlations are found, potential source areas should also be evaluated and discussed.

SECTION 4.15

1. **Section 4.15.1, page 4-623, 2nd paragraph and Figure 4.15-1.** The locations of sanitary sewer water samples PA37SN01 and PA37SN02 should be included on Figure 4-15.1.
2. **Section 4.15.1, page 4-424, and Section 4.15.3.1, page 4-629.** Very high concentrations of VOCs, SVOCs, pesticides, PCBs, metals, and TPH were detected in the storm drain sediment sample (PA50CB405) collected from the catch basin located in the northeast corner of the site. No soil or groundwater samples are located in IR-37 in the entire northern half of the site. Please explain the absence of soil samples in the vicinity of the catch basin, or elaborate on other investigations that were conducted to assess potential sources of the storm drain sediment contamination. This is a data gap and must be identified as such.
3. **Section 4.15.4.2 and Section 4.15.5.3.** Based on groundwater flow directions given in the text, the only monitor well at IR-37 is not located downgradient. Further, the single Hydropunch sample was only analyzed for chromium VI. The results therefore are irrelevant to a discussion of the nature and extent of contamination at IR-37. The lack of suitably located monitor wells must be identified as a data gap, particularly since the storm drain sediment has high levels of contamination. There is insufficient data to support an FS at this site.
4. **Tables 4.15-5 and 4.15-6.** Salinity appears to be reported with incorrect units ($\mu\text{g/L}$) and should be reported as parts per thousand (ppt) based on comparison with the TDS results.

SECTION 4.16

1. The geologic discussion is not supported by raw data (boring logs) in Appendix J. Please provide the subsurface data which supports the text discussion. Appendix J contains only subsurface data for two monitoring wells, borings IR38MW02A, and IR38MW03A. Subsurface data for IR38MW01A is not included in Appendix J. Of the two borings included in Appendix J, boring IR38MW02A does not appear to be posted on the figures for this section.
2. The discussion of potential contaminant sources is presented exactly the same (word for word) in the conclusions as in the opening discussion. The conclusions should contain an interpretation based on the analytical data discussed throughout the section.
3. The text states that groundwater flows to the southwest, yet the only monitor well installed at this site is on the northern boundary. The hydropunch samples were collected from the northeastern portion of the site at very shallow depth. The analytical results of groundwater sampling do not adequately represent this site. This should be identified as a data gap.

SECTION 4.17

1. Please identify the location of former building 519 on the figure 4.17-1.

SECTION 4.18

1. **Section 4.18.2.** The boring logs included in Appendix J do not indicate that the thickness of the fill materials was 25 feet. Please explain this discrepancy.

The boring logs provided in Appendix J do not indicate that the Undifferentiated Sedimentary Deposits are "at least 40 feet beneath the site" as stated in the text. From the logs provided, the deepest boring at IR-44 was boring IR44B006, reaching a depth of approximately 41.5 feet. This boring is comprised of Bay Mud from a depth of approximately 24 feet to its termination. There is no data to support the geologic interpretations made throughout this section. Another unsupported example is the statement that the thickness of the Bay Mud ranges from 25 to 45 feet.

2. **Section 4.18.3.1, page 4-744 and 4-748.** The sand blast abrasive samples should have been analyzed for organotins. Elevated concentrations of the two additives used immediately prior to organotin were detected in these samples. This should be identified as a data gap.
3. PCB contamination in the storm drain sediment (above criteria) was omitted in any further discussions (nature and extent in soil), and from in the soil chemistry discussion. This discussion should include the fact that PCBs were detected in groundwater sample from a nearby boring. Discuss potential sources of PCBs and their relationship to detected contamination.

SECTION 4.19

1. **Section 4.19, page 4-776 and Figure 4.19-1.** The steam line system is not shown on Figure 4.19-1. The steam line break near Buildings 503 and 504 is also not shown. As stated in previous comments, all relevant site features discussed in the text need to be shown on a figure in order to help the reader gain a full understanding of a site.

The text also states that the steam lines are a concern due their potential use for transporting waste oil from Berth 29 in Parcel D to an above ground storage tank. If possible, indicate the sections of steam lines that would have been used for transporting waste oil if it had been used for this purpose. This information would facilitate agency and public understanding of the significance of analytical results.

2. **Section 4.19.1, page 4-777.** Show the location of the 1987 sample on Figure 4.19-1. Also, show the locations of the utilidor visual inspections and sampling conducted in 1993.
3. **Section 4.19.1, page 4-778.** Please explain how water samples would indicate whether PCBs were transported in the steam lines, if the only known break in the steam lines was near buildings 503 and 504 at IR-08. Explain the supposition that the lines from which these samples were collected were used to transport PCB oils.
4. **Section 4.19.1.** Explain why the investigation focused on the vicinity of Manseau and Cochrane and along Manseau Street.
5. **Section 4.19.1, page 4-780, 4th paragraph.** Only 7 of 20 test pits are shown on Figure 4.19-1. Show the locations of test pits PA45TA14 through PA45TA17 and the other missing test pits on the figure.
6. **Section 4.19.4.1, page 4-790, 6th paragraph.** The summary implies that the steam lines may be a source of lead in soil. Please explain why this conclusion was made and discuss other potential sources of lead. It does not seem likely that lead was present in steam line fluid given that it was not detected in the source water samples.

The last sentence associates lead with PCBs and SVOCs at a particular location. To which location does the text refer? Since lead, PCBs and SVOCs were not detected in source water samples there association with the steam lines is not obvious. Explain whether there is another potential source for these analytes in the vicinity.

7. **Section 4.19.4.2, page 4-791.** Include an evaluation of whether PCBs detected in soil are related to the steam lines.
8. **Section 4.19.5.3, page 4-794, 5th paragraph.** The text incorrectly states that petroleum hydrocarbons are nearly insoluble in water. Many petroleum hydrocarbons (i.e. toluene and benzene) are soluble. Please specify which petroleum hydrocarbon fractions have a low solubility.

9. **Section 4.19.7.2, page 4-797.** This text appears to belong in Section 4.19.7.1, Human Health Risk Assessment (immediately above Section 4.19.7.2). Please provide recommendations.

SECTION 4.2.1

1. **Section 4.21, page 4-821 through 4-823.** Drainage areas and storm drains within Parcel D are discussed. However, a figure showing the locations of the drainage areas and storm drains is not referenced. Show these features, along with sampling locations, on Figure 4.21-1 so that the discussion in the text can be followed by readers. Also indicate the locations of the broken pipes and plug identified in the bulleted items on p. 4-825. Show the storm drain lines on all posting maps associated with this subsection.

The Storm Drain Removal Action should also be outlined in this section.

2. **Section 4.21.1, page 4-824, 1st paragraph.** Provide a summary of the storm water analytical data collected in 1988 by the Navy.
3. **Section 4.21.4.1, page 4-837, 1st paragraph.** Provide a figure that shows the sediment analytical results and provide the figure number in the text. This figure must include all results which exceed criteria including those which are presented in other sections. This is important to understand the extent of storm drain sediment contamination.
4. **Section 4.21.4.1, page 4-837, 2nd paragraph and page 4-840, 8th paragraph.** Provide the missing section reference.
5. **Section 4.21.7.1.** The summary statistics given in this section are useful.

SECTION 4.22

1. **Section 4.22.** Figure 4.22-1, which presents sample locations, is incomplete. This figure must also show the sanitary sewer system. Label the reaches and indicate flow directions. This will help the reader follow the discussion. Include the boundary information identified in paragraph 1 of page 4-854.
2. **Section 4.22.1, page 855, 3rd paragraph.** The results of the sanitary sewer vault inspections are not discussed or integrated into the section. Provide a summary of the results of this investigation. This information should also be compared to groundwater contour maps and flow directions near the sanitary sewer.
3. **Section 4.22.4.2, page 4-867, last paragraph.** According to tables and figure 4.22-3, the maximum concentration of chromium VI not chromium was 30 µg/L. Also correct the references to chromium VI in the first paragraph on page 4-870.

4. **Section 4.22.4.2, page 4-868, 2nd paragraph.** The minimum and maximum lead concentrations in groundwater at PA50MW05A cited in the text do not match the postings on Figure 4.22-3 or Tables 4.22-8 and 4.22-9. Furthermore, the maximum concentration of lead posted at this location on Figure 4.1-75 does not match Table 4.22-9. Review the text, figures and tables for consistency.
5. **Section 4.22.7.1.** This paragraph does not include recommendations, but instead contains material which should be included in the previous section. Provide recommendations.

SECTION 4.23

1. **Section 4.23, page 4-878, 3rd paragraph and Figure 4.23-1.** Figure 4.23-1 is referenced for the location of 12 removed transformers. However, only eight transformer locations were found on the figure. Add the missing transformer locations to Figure 4.23-1.
2. **Section 4.23.1, page 4-878 and 4-879.** All features discussed in the text should be labeled on a figure. Indicate the location of the 1987 HLA study, the Building 524 yard, and the 18 locations inspected by HLA in March 1993 on Figure 4.23-1.
3. **Section 4.23.7.2, page 4-894.** This text belongs in the previous section. Provide recommendations.

SECTION 4.24

1. **Section 4.24, page 4-895.** Figure 4.24-1 shows two IR sites within the boundary of IR-53. Explain the relationship between these two sites and IR-53. Explain why IR-16 and IR-69 are separate sites.
2. **Section 4.24.2, page 4-900, 1st paragraph.** The text states that Buildings 525 and 530 are the only structures at IR-53. Structures at IR-16 and IR-69 should be mentioned since they are in close proximity to IR-53.
3. **Figure 4.24-2.** Placing this figure on four different sheets greatly reduces its usefulness. Consider using a larger scale for the base map, smaller location labels, and smaller posting boxes so that only one or two sheets are needed.
4. **Section 4.24.3.1, page 4-905 and Section 4.24.4.1, page 4-915, 2nd paragraph.** According to table 4.24-2, Aroclor 1248 was also detected. This detection should be discussed. The lack of screening criteria is not a sufficient reason to dismiss the presence of this PCB congener.
5. **Section 4.24.4.1, page 4-916, 4th paragraph.** This section claims that, with the exception of lead, there were no discernable patterns in the detection of metals. However, copper was detected at concentrations exceeding the HPAL primarily around Building 523

and northwest of Building 525. Other metals may also show "discernable patterns." Describe the areas where individual metals were detected above screening criteria.

6. **Section 4.24.7.1, page 4-931, Site Characteristics and Potential Sources.** This section should include a discussion of the relationship between sources and observed contaminants. For example, discuss whether PCBs were associated with transformer storage areas, oil stained areas, oil leaking from winches, etc. Discuss whether metals detected at elevated concentrations are used as pigment in paint and if these metals are related to potential sources.
7. **Section 4.24.7.1, page 4-932, 4th paragraph.** Given the low mobility of SVOCs and PCBs, the most logical source of these contaminants in groundwater is onsite soil. Furthermore, the lack of well defined groundwater plumes does not mean that contaminants in groundwater are not related to each other. Groundwater contaminants could be related to each other in the sense that they could be the results of multiple small spills over time that were not large enough to coalesce into one large, well defined plume.

SECTION 4.25

1. **Section 4.25, page 4-936, 1st paragraph.** Please confirm the second sentence which states that "the site was designated as IR-38".
2. **Section 4.25.4.1, page 4-948 through 4-952.** The ranges and maximum concentrations of analytes are given. However, the extent of elevated concentrations is not described. Describe the spatial distribution of analytes.
3. **Section 4.25.4.1, page 4-951, 5th paragraph.** Metals detected at site IR-44 are discussed. Discuss site IR-55.
4. **Section 4.25.7.1, page 4-966, Potential Sources.** The geophysical surveys, test pits, and soil borings did not confirm the existence of buried hazardous materials. If complete coverage of the site was obtained in the geophysical surveys, the existence of paved over utility vaults containing hazardous waste seems doubtful. Discuss the results and indicate the likelihood of the existence of additional buried hazardous waste.

SECTION 4.26

1. **Section 4.26, page 4-971, 2nd paragraph.** The description of the location of the concrete vault is confusing and the reason given for the lack of information on the condition of the concrete vault does not make sense. Please elaborate, and also indicate the vault on Figure 4.26-1.
2. **Section 4.26.4.1, page 4-983, 3rd paragraph.** Two samples had a concentration of PCBs exceeding the PRG but only one sample is mentioned. Discuss both samples.

3. **Section 4.26.7.1, page 4-992, 6th paragraph.** Text in the nature and extent section indicated that the PCBs were not likely from a leak in the transformer (page 4-984). Please make the conclusion and nature and extent sections consistent.

SECTION 4.28

1. **Section 4.28, page 4-1021.** Provide a figure that shows the locations of the concrete vault, dip tanks, and flash tank. Explain the basis for the observation that the "dip tanks....appeared to have never been used".
2. **Section 4.28.3, page 4-1030, 1st paragraph.** The detection of pentachlorophenol (PCP) in the waste tank liquid suggests that the dip tanks may have been used for wood treatment. Dioxins are contaminants of PCP. Sludge samples should be collected from these tanks and for analysis of PCP and dioxins. If sludge is not available, then a liquid sample should be analyzed for dioxins. The lack of analyses for dioxins and the lack of sludge/sediment analyses should be identified as a data gap.
3. **Section 4.28.4.1, Nature and Extent of Contaminants in Soil.** Samples were collected adjacent to possible sources (waste USTs, concrete vault, and flash tank). Describe the spatial distribution of analytes in relation to these structures.
4. **Section 4.28.7, page 4-1048, Site Characteristics and Potential Sources.** The results of the waste tank liquid analyses should be summarized in this subsection.
5. **Section 4.28.7.1, page 4-1049, 3rd paragraph.** Since hexachloroethane is not a naturally occurring compound it was either "released" to groundwater or was the result of cross contamination. See general comments.
6. **Section 4.28.7.2.** Additional sampling and analyses of waste tank sludge for SVOCs and dioxins (at a minimum) should be recommended.

SECTION 4.29

1. **Figure 4.29-1.** Show the locations of the above ground fuel tank and the generator shed.
2. **Section 4.29.2, page 4-1057, 1st paragraph.** Bedrock encountered during drilling at the site is described. However, this description seems to be based on data collected from other sites since borings were not drilled at IR-68 to the depth of bedrock (205 ft). Please explain and revise as necessary.
3. **Section 4.29.4.1, page 4-1067, 3rd paragraph.** Samples with metals concentrations exceeding screening criteria are clustered in an area northeast of Building 378. Discuss this "discernable pattern."

4. **Section 4.29.4.1, page 4-1067, 5th paragraph.** Aroclor-1260 seems to have been detected over a larger area than described. However, this is difficult to evaluate since the former location of the generator shed is not shown on the figure. Show the former location of the shed on Figure 4.29-2 and correct the text if necessary. Also discuss the detection of PCBs in the sediment samples.
5. **Section 4.29.7.1, page 4-1074, 4th paragraph.** The data appears to indicate that the transformer is the likely source of PCB contamination. This is difficult to evaluate without the transformer location marked on the figure.

The extent of PCB contamination towards the south has not been determined. Identify this as a data gap.

SECTION 4.30

1. **Section 4.30, page 4-1078, 4th paragraph.** List leakage of unknown materials stored in the shed as another potential contaminant source.
2. **Section 4.30.2, page 4-1081, 3rd paragraph.** Artificial Fill at this site is primarily gravel, not clay. None of the site borings encountered bedrock or Undifferentiated Sedimentary Deposits. Specify where information on these two units was obtained (i.e., information based on the parcel wide geology or nearby borings). Update the discussion to include geologic information obtained from borings located in IR-69 and nearby sites.
3. **Section 4.30.4.1, page 4-1089, last paragraph.** It is necessary to consider data collected at sites IR-53 and IR-16 to evaluate discernable trends. Based on Section 4.1 figures, there are discernable patterns for antimony, arsenic, chromium, copper, lead, nickel, thallium, and zinc.

SECTION 4.31

1. **Section 4.31.2, page 4-1108, 2nd paragraph.** The boring logs in Appendix J are not complete for this site. Include all of the boring logs for this site or reference the appendix section where they can be found.
2. **Section 4.31.3.1, page 4-1111.** Soil samples from areas with sand blast abrasive should have been analyzed for organotins. Elevated levels of earlier antifouling (metal) additives were detected in soil samples. The lack of organotin analyses must be identified as a data gap.
3. **Section 4.31.3.1, page 4-1113.** Aroclor 1254 was also detected and should be mentioned, even though there are no specific screening criteria for this congener.
4. **Section 4.31.4.2, page 4-1121, 3rd paragraph.** The last sentence is incorrect. Section 4.1 figures show that there is a discernable lateral (and for some metals vertical) pattern for arsenic, chromium, copper, lead, thallium and zinc.

SECTION 4.32

1. **Figure 4.32-1.** The figure indicates that three of the structures contained sandblast debris. Page 4-1143, paragraph 3 states that sandblast debris is present "in a large shed." Please clarify. Indicate Areas I and II on the figure and define the fuel tank and storage area more clearly.
2. **Section 4.32.2, page 4-1149, 3rd paragraph.** Remove the redline and reference the appropriate section.
3. **Section 4.32.3.1, page 4-1150.** The sand blast abrasive should also have been analyzed for organotins. Elevated concentrations of earlier antifouling additives were detected in this sample. The lack of analysis for organotins must be identified as a data gap.
4. **Section 4.32.4.2, page 4-1163, 6th paragraph.** The statement that VOCs migrated into IR-71 from off-site should be substantiated by a discussion of sources for these VOCs at nearby sites.
5. **Section 4.32.7.1, page 4-1175, 6th paragraph.** Recharge from a sanitary sewer near Building 365 is identified as a possible source of VOCs in groundwater. Building 365 and the sanitary sewer are not shown on Figures 4.32-1 or 4.32-4. Add these features to the figures. The statement can not be made as a conclusion unless evidence for the conclusion is presented in earlier section (for examples in section 4.32.4.2).
6. **Figure 4.32-4.** The groundwater direction shown on the figure does not match the groundwater flow directions described in Section 4.32.2. Correct the figure or text.

SECTION 5

1. There is a summary of known or suspected source areas for each site. Reference Section 4 figures that show these source areas. Reference other figures where they would enhance or complement the text. For instance, reference Figure 4.1.15 through 4.1.18 when discussing chromium contamination at IR-09.
2. **Section 5.0, page 5-1, 2nd paragraph.** In the brief description of the Parcel D setting in the second sentence Bay Mud is not mentioned. Include Bay Mud in the description because of its large significance to the site hydrogeology.
3. **Section 5.1.2, page 5-5, last paragraph.** The confirmed presence of TCE in bedrock groundwater should be discussed.
4. **Section 5.1.7, page 5-12, 3rd paragraph.** The statement that "no metals had distributions indicative of a release from IR-33N" is not supported by the Section 4.1 figures. Metals also co-occur with organic contaminants. Reevaluate this conclusion.

5. **Section 5.1.12.** Discuss the potential for DNAPL at this site.
6. **Section 5.1.15, page 5-27, last paragraph.** Based on Section 4.1 figures, chromium, copper, lead, mercury, and zinc were detected in patterns which may indicate a release.
7. **Section 5.1.29, page 5-48.** The distribution of arsenic, chromium, copper, thallium and zinc also appears to indicate the release of metals to the environment.
8. **Tables 5.2-1 and 5.2-2:** These tables appear to be incorrectly included in this report. However, similar tables containing evaluations of data from Parcel D sites should be included in the report.
9. **Section 5.4.2.** The lack of analyses for organotins in areas where sand blast abrasive was known or suspected to have been used, stored, or disposed should be included as a data gap.

Other data gaps were identified in Section 4 site specific comments. These data gaps should be included on pages 5-72 through 5-76.

Appendix C

General Comments

The field methodologies for both the slug tests and the constant rate pumping tests appear to have been correct; well-established and time-tested data collection methods were used. However, a review of the data analysis portion revealed three general errors in the methodologies used to evaluate the slug test data.

1. In some cases (IR17MW12A and PA36MW02A), there were simply too few data points to accurately perform curve-matching using either the Cooper-Jacob method or the Bouwer-Rice method. Results from these tests should not be used.
2. In some cases, a curve match was not possible using the Cooper-Jacob Method. This may be due to potential vertical flow, which is not accounted for in the Cooper-Jacob Method (the well must be fully-penetrating). If the Bouwer-Rice Method results in a good straight-line match, the results of that method should be used. In many cases, however, the curve match only reflects the early-time data, which gives hydraulic conductivity values for the gravel or sand pack instead of the aquifer being tested. For these cases, the raw data should be used to rerun AQTESOLV. (Good Bouwer-Rice match possible but exiting data plot must be redone to get more reliable results: IR09MW45F, IR36MW127A, IR36MW128B, and IR38MW03A. Bouwer-Rice match not possible IR36MW126A)
3. In many cases, the computer-calculated curve match accurately matches the data for the Cooper-Jacob Method. The Bouwer-Rice version of the data, however, results in a very different hydraulic conductivity value. This is usually due to the computer range selection on the Bouwer-Rice Method, which matches the early-time data instead of the later-time

data (see table for list of wells to which this comment applies). The data should be used to rerun AQTESOLV, this time performing the Bouwer-Rice curve matching manually. A more timely and cost-effective method would be to simply use the hydraulic conductivity values estimated by the Cooper-Jacob Method. Once the erroneous data from the Bouwer-Rice Method has been eliminated from the data set, no glaring discrepancies should be noted between the two methods for a given test.

IR09MW51F	IR09MW52A	PA16MW16A	PA16MW17A
PA16MW18A	IR22MW07A	IR22MW16A	IR22MW20A
PA33MW36A	IR34MW01A	IR34MW35A	IR22MW08A
IR36MW120B	IR36MW129B	PA36MW08A	IR36MW11A
IR36MW13A	IR36MW14A	IR36MW135A	IR36MW139A
IR39MW23A	IR39MW36A	IR37MW01A	IR38MW01A
IR39MW33A	IR44MW08A	IR50MW14A	PA16MW16A
PA16MW17A	PA16MW18A	IR50MW14A	IR55MW04A
IR34MW02A	IR67WM04A	IR36MW16A	IR70MW07A
IR71MW03A			

4. Many of the title pages within Appendix C did not have slug test information from the corresponding wells. For example, a page was titled, "SLUG TEST FIGURES IR-35", but well IR22MW08A was the only slug test presented. Many of the wells listed in Table 3.8-6 are not represented by data plots in Appendix C.
5. The average linear velocity calculations were done correctly if the goal was to perform contaminant transport estimates or particle tracking. If bulk groundwater velocity is desired, the Darcy velocity should be used (i.e., don't divide by effective porosity).

Appendix L

General Comments

1. Appendix L provides a general summary of data validation, but provides no details regarding QC criteria which are exceeded. It is impossible to review whether data were qualified appropriately because no detailed information is provided to the reviewer, except for the number of qualifiers assigned for each category. This appendix needs to be rewritten in greater detail with the following types of information for all QC parameters as listed in the EPA functional guidelines for data evaluation.

Holding Times

Date of Collection
Extraction Date
Analysis Date
Number of Days Exceeding the QC Criteria

MS/MSD

Sample Concentration
Concentration of Spike Added
Concentration of Analyte Found
Percent Recovery
Percent Difference
QC Criteria

Method Blanks

Analyte Present
Concentration
Affected Sample Concentration

etc.

In addition, copies of detailed, independent (from the laboratory) data validation reports should be included. This would provide the reviewer with enough detail to be able to determine whether the validation was conducted correctly and that the appropriate qualifiers were assigned to the data.

2. While details were not presented, there appeared to be extensive metals contamination (antimony, arsenic, beryllium, mercury, and molybdenum) in laboratory method blanks, resulting in a large number of analytical results being qualified as "undetected". The source of contamination should have been determined by the laboratory and all affected samples should have been reextracted and reanalyzed.

Appendix O

General Comments

1. The discussion of fate and transport in Appendix O is an excellent overview of factors affecting chemicals of concern at Hunters Point. The section is thorough, well written, and very readable.
2. Appendix O could be more focused toward actual site conditions if sufficient site specific data are available to support the evaluation. Several suggestions include:

The most likely dissolved metal species present in groundwater could be discussed if representative, site-specific values are available for pH, redox potential, and common anions are available.

Estimated site-specific partition coefficients could be obtained for organics if representative, site-specific values for soil total organic carbon (TOC) are available.