N60028_000894
TREASURE ISLAND
SSIC NO. 5090.3.A

Department of Toxic Substances Control

Jesse R. Huff, Director
700 Heinz Avenue, Bldg. F, Suite 200
Berkeley, California 94710-2721

Pete Wilson
Governor

Peter M. Rooney
Secretary for
Environmental
Protection

August 5, 1998

Commanding Officer
Engineering Field Activity, West
Naval Facilities Engineering Command
Attn: Mr. Ernesto Galang
900 Commodore Drive
San Bruno, California 94066-2402

DRAFT REMEDIAL INVESTIGATION OFFSHORE SEDIMENTS OPERABLE UNIT, NAVAL STATION TREASURE ISLAND (JUNE, 1998)

Dear Mr. Galang:

The Department of Toxic Substance Control has reviewed the Draft Remedial Investigation Offshore Sediments Operable Unit (RIOSOU) Report for Naval Station Treasure Island, dated June 1, 1998. Enclosed with this letter please find comments from Mr. James M. Polisini, Ph.D., Staff Toxicologist of the Human and Ecological Risk Division of the Department of Toxic Substance Control.

RIOSOU Specific Comments

1. Page ES-2, Executive Summary, Results

   Please briefly discuss how boundaries for each of the offshore areas were determined and include a reference to a figure for each of the areas.

2. Page ES-3, Executive Summary, Risk to Benthic Receptors

   The entire first paragraph of this section beginning with "Several lines of evidence..." is somewhat ambiguous and needs clarification.

3. Page ES-6, Executive Summary

   Please add a section that discusses the overall conclusions of the report.

894

4. Section 1, Figures

Please include a figure that shows all of the offshore areas included in this report.

If you should have any questions regarding this letter, please contact me at (510) 540-3763.

Sincerely,

David Rist

David Rist
Hazardous Substances Scientist
Office of Military Facilities

Enclosure

cc: See next page.

cc: Mr. James Ricks Jr. (SFD-8-2)
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105

Mr. David Leland
California Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, California 94612

Mr. James B. Sullivan
Caretaker Site Office
Treasure Island
410 Palm Ave., Room 161
San Francisco, California 94130-0410

Ms. Martha Walters
Mayor's Office at Treasure Island
770 Golden Gate Avenue
San Francisco, California 94102

Mr. James M. Polisini, Ph.D.
Staff Toxicologist
Human and Ecological Risk Division
1011 N. Grandview Avenue
Glendale, California 91201

Richard Hansen
Paul Hehn
Pat Nelson
Dale Smith
John Allman
Nathan Brennan
Harlan Van Wye
ARC Ecology
} Community RAB

Richard Knapp (Tetra Tech EMI)
Admin Record (3 copies)

CalEPA

Department of
Toxic Substances
Control

400 P Street,
4th Floor
P.O. Box 806
Sacramento, CA
95812-0806

Pete Wilson
Governor

James M. Strock
Secretary for
Environmental
Protection

MEMORANDUM

TO: David Rist, Project Manager
Office of Military Facilities - Berkeley
700 Heinz, Building F, Second Floor
Berkeley, CA 94704

FROM: James M. Polisini, Ph.D.
Staff Toxicologist
Human and Ecological Risk Division (HERD)

DATE: July 31, 1998

SUBJECT: DRAFT REMEDIAL INVESTIGATION REPORT FOR OFFSHORE SEDIMENTS AT TREASURE ISLAND
[PCA 14740, SITE 200135-47 H:81]

Background

We have reviewed the document titled Draft Remedial Investigation Offshore Sediments Operable Unit, Naval Station Treasure Island, San Francisco, California, dated June 1, 1998. This draft Remedial Investigation (RI) Report was prepared by Tetra Tech EM, Inc. of San Francisco, California. This review is in response to your written work request.

General Comments

Contaminants of potential ecological concern (COPECs), which were detected at elevated sediment concentrations in the Phase I investigation, are not carried forward as contaminants of ecological concern (COECs) if not detected at elevated concentrations in the Phase II sediment samples. Some reasonable rationale must be provided for excluding COPECs, such as 4,4'-DDD (Section 10.2, page 10-9), which are persistent and bioaccumulative. In other words, where did the 4,4'-DDD, 4,4'-DDE and 4,4'-DDT go as it was not detected in the Phase II sampling?

Printed on Recycled Paper

Specific Comments

1. DDT was detected in pore water above the Ambient Water Quality Criteria (AWQC) at locations A6, A8 and A10 (Page ES-4). The Executive Summary states that benthic receptors are at negligible risk because DDT was not detected in sediment at these locations and DDT is measured in sediment around the bay in regional monitoring programs. DDT in pore water above AWQC presents a risk to aquatic receptors. If the contention is that the DDT detected in pore water at these locations is not due to Navy activities at Treasure Island please state this position clearly.

2. Exposure pathways for human receptors are reported as incomplete (Section 1.1, page 1-1). This is true only if activities such as fishing or collection of shellfish do not occur. If the contention is that direct exposure pathways for subtidal sediments are not complete, please state that conclusion clearly.

3. Fish and invertebrate tissues have yet to be collected and analyzed for the assessment of contaminant transfer to vertebrate predators through the food web (Section 4.6, page 4-22). The bioaccumulation assessment will reportedly be completed and reported in the final RI Report. The food web analysis should be furnished informally for review prior to submittal of the final RI Report.

4. Please clearly explain why three chemical classes (PAHs, pesticides/PCBs and metals) will be assessed for invertebrate tissues while five chemical classes (trace metals, PAHs, pesticides/PCBs, organotins and TPH) will be assessed for fish tissues (Section 4.6.3, page 4-23).

5. The sediment concentrations used as representative of inorganic 'ambient' sediment concentrations were taken from the San Francisco Regional Water Quality Control Board (SFRWQCB) order for the Shearwater site (Section 5.0, page 5-1; Section 5.1, page 5-2 and Table 5-1). The SFRWQCB has released the final inorganic 'ambient' sediment concentration report (SFRWQCB, May, 1998). Some of the sediment values in the final report differ significantly from those contained in the Shearwater order:

Element (mg/kg)	Shearwater Value (mg/kg)	Final 100 % Fines 'Ambient' (mg/kg)
Arsenic	16.1	15.3
Chromium	212	112
Selenium	1	0.64

Total PAHs	5.13	3.39

The final sediment inorganic 'ambient' concentrations should be used rather than those presented in the Shearwater order.

6. An sediment screening value of 25.1 µg/kg tributyl tin (TBT) attributed to the EPA is used in the assessment of TBT sediment concentrations (Section 5.0, page 5-2). The approach used in the report cited (EPA, 1996) was equilibrium partitioning (EqP) theory normalized to organic carbon in sediments. The TBT sediment effect concentration would then vary between each sampling site based on the organic carbon content. The summary of the Region X report contained in the EPA Contaminated Sediments News number 18 states: "Results of Region 10's study suggest that bulk sediment, and organic carbon-normalized sediment TBT concentrations may be poor predictors of the bioavailable fraction of TBT. Thus, Region 10 strongly recommends that sediment cleanup decisions at Superfund sites in Puget Sound be based on TBT concentrations in interstitial water, and on any associated biological effects testing." We contacted Karen Keeley, the EPA Region X contact for the TBT report, and were told that the Region X TBT report contained no screening value for TBT in bulk sediment and that EPA Region X screens sediment TBT based on a pore water concentration of 0.05 µg/l to 0.15 µg/l as TBT ion. Assuming a 2 percent total organic carbon (TOC) to develop the single sediment value of 25.1 µg/kg (Section 5.4, page 5-4) seems an unnecessary simplification. If a sediment screening criterion is required, despite the findings of the Region X TBT investigation, the TOC for each location should be applied to develop a location-by-location criterion.

7. A log octanol-water partition factor (log K_{ow}) of 3.5 is proposed as a screening criterion to identify chemicals which could pose a threat via bioaccumulation (Section 5.0, page 5-2). The recently-released draft RI Report for offshore sediments at Mare Island Naval Shipyard used a log K_{ow} of 2.5 to identify chemicals which could pose a threat via bioaccumulation. While the difference is unlikely to cause a significant difference, please explain the characteristics of Treasure Island sediments which would justify a different log K_{ow} value.

8. Detection limits for storm water samples were above the AWQC for chromium, copper, lead, mercury, nickel, silver and zinc (Section 6.3, page 6-43). This data gap should be considered when evaluating the conclusions regarding storm water discharges from Treasure Island.

9. The SFRWQCB 'ambient' value for polycyclic aromatic hydrocarbons (PAHs) is lower than the PAH value contained in the order for the Shearwater site. The PAH sediment concentrations (Section 7.1.1, page 7-3) should be assessed with the final PAH sediment value.

10. The alkylated tin compounds, in addition to tributyltin, usually detected in sediment as a result of degradation of tributyltin, applied as an antifouling agent, are dibutlytin and monobutyltin. This report refers to dibutlytin, tributyltin and tetrabutyltin (Page ES-3; Section 7.1.3, page 7-13; Section 7.1.4, page 7-13; Section 10.2, page 10-15; Section 13.0,, page 13-8). Although the sediment data tables (Volume 2) list detects for tetrabutyltin, we are not familiar with this compound. The toxicity section (Volume 2) does not discuss the toxicity of butylated tin compounds. Please include some discussion on the toxicity of tetrabutyltin relative to the other butylated tin compounds.

11. There appears to have been a problem with the amphipod bioassays for the Paradise Cove reference site (Section 8.2.1, page 8-3). HERD would not consider an amphipod survival rate of 45 percent as appropriate for use as an unimpacted reference site survival rate. Nor would we consider the 54 percent amphipod survival cited for the dry season Regional Monitoring Program Yerba Buena Island (YBI) station (Section 8.2.1, page 8-3) as indicative of no adverse effect. These criteria for toxicity certainly identify those areas that present the greatest hazard as measured by the bioassay results. A working standard for amphipod survival that has been used at other sites is that survival rates of less than 76 percent are considered significant. HERD's interpretation of the DeWitt, et al., 1988 publication is that *Eohaustorius estuarius* in 100 percent fine sediment <u>may</u> exhibit a 10 percent decrease in survival not related to chemical stressors. Applying this 10 percent decrease in survival due to fines to the 76 percent survival working standard yields a survival criterion of 66 percent. This survival rate is very similar to the 68 percent survival rate cited for the SFRWQCB reference envelope approach. An amphipod survival criterion of 66 percent or 68 percent in 100 percent fines would significantly alter the offshore areas considered potentially toxic as compared to the minimum Paradise Cove or YBI dry season survival rates of 45 percent and 54 percent. These are the sampling locations HERD considers to pose some toxic effect on amphipods, and therefore require additional evaluation, separate from the locations identified as toxic for amphipods based on the Paradise Cove or YBI dry season survival rate.

12. Please provide some basis for the 15 percent exceedance criterion applied to surface sediment samples (Section 10.0, page 10-1). This application of this criterion is such that 15 percent of the samples in an area must exceed screening

criteria and the criteria must be exceeded by 15 percent in any one sample. We are not aware of this criterion beING used in any pervious sediment RI.

13. Please provide some basis for the criterion that potential contaminants, with the exception of nickel, must contribute a Hazard Quotient (HQ) of more than 0.5 to the Hazard Index (HI) to be retained as contaminants of ecological concern (COECs) (Section 10.0, page 10-1). We do not recommend removing COECs from the analysis. The significant contributors to the HI will be obvious from their individual HQs.

14. The probability of an adverse effect should be discussed for those sampling locations with sediment chemical concentrations between the National Oceanic and Atmospheric Administration (NOAA) Effects Range-Low (ER-L) value and the Effects Range-Median value. The probability of adverse effects for many contaminants investigated in this RI Report are available in the scientific literature (Long, et al., 1995).

15. Please provide a rational explanation for the apparent 'disappearance' of persistent, toxic and bioaccumulative sediment COPECs such as 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, α-BHC, β-BHC, δ-BHC, heptachlor, and methoxychlor (Section 10.2, pages 10-9 through 10-14) in the time period between the Phase I and Phase II sampling events. If an acceptable rationale cannot be developed these sediment COPECs should be carried forward as COECs.

16. Please describe, in more detail, the method by which the ratio of simultaneously extracted metals to acid volatile sulfide (SEM/AVS) will be used to assess the potential impact of Treasure Island sediment contaminants on piscivorous and carnivorous birds (Table 11-1, page 11-31).

17. We disagree with portions of the methodology described to assess the food web impacts on vertebrate predators (Section 12.2, pages 12-4 through 12-9). It is biologically impossible for an active vertebrate predator to support the maximum body weight known for the species by foraging at the lowest reported feeding rate. Ingestion rates for food, soil and water should be paired metabolically to the chosen body weight. Please amend the proposed methodology.

18. It is not necessarily true that the numerically low Toxicity Reference Value (TRV) represents the '...lowest concentration at which no adverse effects were observed in laboratory animals.' (Section 12.2.2.2, page 12-8). The numerically low TRV is most often the highest concentration at which no adverse effects were observed. The

numerically low TRV reflects a dose chosen to represent a No Observable Adverse Effect Level (NOAEL). Please amend this description of the numerically low TRV.

19. Please provide the rationale for differing correlation criteria for inorganic chemicals versus organic chemicals in evaluating sediment and pore water concentrations of COECs (Section 12.5.1, page 12-18 and 12-19). Inorganic COECs are considered correlated if the probability of the null hypothesis occurring by chance is less than 0.05 ($p<0.05$) regardless of the magnitude of the Spearman's rank correlation coefficient of determination (r^2_s). Organic COECs are considered correlated if the r^2_s exceeds 0.50 ($r^2_s>0.50$). The generally accepted criteria for considering variables correlated is that the probability of the null hypothesis occurring by chance is less than 0.05 and the coefficient of determination is above a set value, such as 0.50. These criteria should be used for both inorganic and organic contaminants.

20. There appears to be a typographic error on many of the correlation plots of pore water versus sediment concentration. The label on the abscissa indicates the values are the log(Bulk Chemistry) in mg/kg. The highest sediment arsenic concentration (Figure 12-6) would then have a log value above 10. Arsenic concentrations of $1x10^{10}$ mg/kg are impossible. The same typographic error occurs for many inorganic elements and organic compounds. Please correct the labeling.

21. There appears to be a distinct rise in barium pore water concentration above a log barium sediment concentration of approximately 70 (Figure 12-7). Does Treasure Island site history indicate any discharge of barium or barium compounds?

22. The correlation of pore water copper and sediment copper concentration is distorted by the single sample with log pore water copper concentration of 10 µg/l coupled with a log sediment copper concentration of 10 mg/kg (Figure 12-9). We suggest this sample be removed and the relationship retested.

23. The ordinate of the mercury correlation is mislabeled with two zeros (Figure 12-11). Please correct the figure.

24. The correlation plots for many organic COECs contain many values with identical pore water concentrations (Figures 12-16, 12-17, 12-18, 12-23 and 12-28). These correlations appear to be artifacts of multiple detection limits. Please clearly explain whether samples which were non-detect or detects at the detection limit were used in calculating the correlation between pore water concentration and sediment concentration. Do not use the results of analyses which are non-detect to construct the correlations.

25. Spearman's rank correlations which account for 10.1 percent (sediment total ammonia) to 15 percent (pH) of the total variance in amphipod survival rates are not 'strongly correlated' (Section 13.2.1, page 13-10). Please amend the sentence to indicate that these correlations are statistically significant rather than strongly correlated.

26. Amphipod survival rates are described as 'strongly correlated' with inorganic HIs in sediment and pore water (Section 13.2.1, page 13-10). We would agree that amphipod survival rates are statistically significant with p=0.01 for sediment and p=0.05 for pore water. We do not agree that Spearman's rank correlation coefficients of determination (r^2_s) of 0.167 for sediment and 0.102 for pore water demonstrate 'strong' correlation. Please amend the sentence to indicate that the correlation of amphipod survival and inorganic HIs is statistically significant.

27. The figure presenting the correlation of sediment inorganic HIs to amphipod survival (Figure 13-11) presents approximately 15 samples with inorganic HIs of 0.0. This is simply an artifact of screening COPECs based on NOAA ER-L values and then calculating the HI based on comparison to NOAA ER-M values. A correlation of inorganic HIs with amphipod survival rates should be calculated using the NOAA ER-L values as the basis for the inorganic HIs.

28. While it is possible to calculate a correlation among any set of variables we see no utility in presenting a Spearman's rank correlation (r^2_s=0.102, p=0.05) between pore water inorganic HIs and amphipod survival which is driven solely by the results of three amphipod bioassays (Figure 13-14). The same three amphipod bioassays appear to drive the Spearman's rank correlation (r^2_s=0.0.16) between pore water organic HIs and amphipod survival rates (Figure 13-15).

29. The discussion of amphipod survival rates in the different Treasure Island investigation areas (Section 13.2.1, page 13-10 and 13-11) makes a distinction between samples with amphipod survival rates greater than 60 percent in addition to amphipod survival rates greater than the SFRWQCB reference envelope survival rate of 68 percent. This 60 percent survival rate is not supported in the RI Report and should be removed. Evaluation of amphipod survival rates should be to the SFRWQCB reference envelope value of 68 percent or the HERD proposal of 66 percent survival in sediment with 100 percent fines.

30. It is no wonder that polychaete growth rates are not correlated with inorganic HIs or organic HIs in pore water (Section 13.2.1, page 13-13). The COEC selection process removed nearly all the COPECs resulting in inorganic HIs (Figure 13-30)

and organic HIs (Figure 13-31) of zero in 5 of 6 polychaete growth rates. Please indicate this limitation in the text.

31. There is extensive discussion of sampling locations with significant amphipod toxicity where no COECs were identified in sediment or pore water (Section 14.2). For example, amphipod survival was less than 68 percent at locations C3, C6, C7, C8, C11 and C13 (Section 14.2.3, page 14-7), but no COECs were identified except selenium at location C3. This discrepancy between bioassay results and chemical concentrations may indicate the COEC selection process does not identify the appropriate COECs. A discriminant analysis should be performed in an attempt to identify those chemical or physical measurements which differentiate the sampling locations with amphipod survival less than 68 percent from those sampling locations with amphipod survival greater than 68 percent. A similar discriminant analysis should be performed on the echinoderm pore water bioassay results. Grouping these analyses by sediment grain size may also prove useful.

32. We do not accept the conclusion that amphipod survival rates of 39 percent to 63 percent in Area D can be attributed sediment grain size (Section 14.2.4, page 14-9). This RI Report states that *Eohaustorius estuarius* '...tolerates a full range of sediment grain size' (Section 4.4.2.1, page 4-17). The generally accepted explanation of sediment contaminant distribution is that elevated organic carbon and finer grain size are representative of sediments which will contain elevated levels of contaminants. Increased fines, elevated total organic carbon and elevated contaminant concentrations will all covary if this association is true. We propose some additional analyses in the preceding comment.

33. DDT in pore water above the AWQC is a potential ecological hazard regardless of whether DDT is detected in sediment at Area A (Section 14.4, page 14-18) or in sediment at Area G (Section 14.4, page 14-20). Similarly, mercury in pore water above the AWQC is a potential ecological hazard regardless of whether mercury is detected in sediment in Area B (Section 14.4, page 14-18).

Conclusion

This draft Remedial Investigation Report appears to have identified most of the areas of Treasure Island sediments which pose the greatest potential ecological threat. While we do not agree with all of the methodology, we agree that Area C, Area D and Area E appear to pose the greatest threat to benthic receptors. Area A and Area B appear to pose a somewhat lesser potential ecological threat to benthic receptors. Area G appears to pose the least potential ecological threat to benthic receptors. Because of the focused nature of the sampling the Skeet Range poses an unknown potential

ecological threat to benthic receptors. It seems unlikely that sediment contaminant concentrations other than lead and PAHs would be significantly different in the Skeet Range than those occurring in the adjacent Area C and Area D. The Skeet Range can therefore be combined with the further analysis of Area C and Area D.

We recommend a discriminant analysis be performed as outlined in Specific Comment number 30 in an attempt to identify the chemical and/or physical measurements which differentiate samples demonstrating amphipod and echinoderm toxicity from those which do not demonstrate significant toxicity.

We look forward to receipt of the vertebrate food web analysis. This analysis should be furnished informally for review prior to inclusion in the final Remedial Investigation Report.

References

EPA. 1996. Recommendations for Screening Values for Tributyltin in Sediments at Superfund Sites in Puget Sound, Washington. Prepared by Roy F. Weston, Inc. For EPA Region 10. EPA 910-R-96-014. October 1996.

Gandesbery, Tom and Fred Hetzel. 1998. Ambient Concentrations of Toxic Chemicals in Sediment. Staff Report. Regional Water Quality Control Board San Francisco Region. May, 1998.

Long, Edward R., Donald D. MacDonald, Sherri L. Smith and Fred D. Calder. 1995. Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments. Environ. Management 19(1):81-97.

Reviewed by: Brian K. Davis, Ph.D.
Staff Toxicologist, HERD

cc: Michael J. Wade, Ph.D., DABT
Senior Toxicologist, HERD

Clarence Callahan, Ph.D., BTAG Member
U.S. EPA Region IX
Superfund Technical Assistance
75 Hawthorne (SFD-8-B)
San Francisco, CA 94105

Susan Ellis, BTAG Member
California Department of Fish and Game
Oil Spill Prevention and Response (OSPR)
P.O. Box 944209
Sacramento, CA 94244-2090

Laurie Sullivan, BTAG Member
Coastal Resources Coordinator (H-1-2)
c/o U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105

James Haas, BTAG Member
U.S. Fish and Wildlife
Environmental Contaminants Section
3310 El Camino Avenue, Suite 130
Sacramento, CA 95821

(818) 551-2853 Voice
(818) 551-2841 Facsimile
c:\jimp\risk\ti\OFFSHORE.doc\h:81