



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105

November 20, 2001

Richard Mach, Jr., P.E.  
BRAC Environmental Coordinator  
for Hunters Point Shipyard  
Southwest Division, Naval Facilities Engineering Command  
1220 Pacific Coast Highway  
San Diego, CA 92132-5190

**RE: Hunters Point Shipyard Parcel F Winter 2001 Sediment Dynamics Study Technical Memorandum, dated July 12, 2001**

Dear Rich,

Please find enclosed EPA's review of the Hunters Point Shipyard Parcel F Winter 2001 Sediment Dynamics Study Technical Memorandum, dated July 12, 2001. This document is an interim deliverable; the forthcoming Validation Study should incorporate the complete results of the Parcel F Study.

Based on the field data collected and the problems encountered collecting this data, the model results are weak and it cannot be concluded definitively that sediment transport is not occurring. There are a number of limitations related to the data collected during this study. For example, the model works for sandy to silty noncohesive beds, but the sediment near Hunters Point falls in the silt-clay range. Modeling of cohesive sediment transport is not well understood, but cohesive sediments dominate the sediment environment at the South Stations. Direct measurements of the cohesive and physical properties of the sediment were not made. No quantitative suspended sediment data was collected, which adds additional uncertainty to the model. Further, this version of the model discounts benthic biological activity, storm events and wave current resuspension of suspended sediment.

Please feel free to contact me at 415-744-2392 if you have any questions or comments.

Sincerely,

A handwritten signature in cursive script that reads "Michael Work".

Michael Work  
Remedial Project Manager  
Superfund Division (SFD-8-3)

Attachment

cc: (see Distribution List)

**Distribution List HPS**

David Demars  
Lead RPM (Hunters Point Shipyard)  
US Navy, Naval Facilities Engineering Command  
SW Division  
1230 Columbia Street, Suite 1100  
San Diego, CA 92101-8571

Chein Ping Kao, P.E.  
Office of Military Facilities  
Department of Toxics Substances Control  
700 Heinz Avenue, Suite 200  
Berkeley, CA 94710-2721

Michael Rochette  
California Regional Water Quality Control Board  
SF Bay Region  
1515 Clay Street, Suite 1400  
Oakland, CA 94612

Amy Brownell  
City and County of San Francisco  
Department of Public Health  
1390 Market Street, Suite 210  
San Francisco, Ca 94102

Karla Brasaemle  
TechLaw  
530 Howard Street, Suite 400  
San Francisco, CA 94105

**EPA's Review of the  
Hunters Point Shipyard Parcel F Winter 2001  
Sediment Dynamics Study Technical Memorandum**

**GENERAL COMMENTS**

1. Throughout the report, several generalized, qualitative statements were provided regarding data interpretation and significance, with no citations or other (more quantitative) validation. While it is recognized that the document is intended to present interim results, a greater effort to elucidate data and model limitations and uncertainties should have been included in the discussion. Please provide citations and more quantitative validation in future documents, and in this document if it is revised.
2. In several areas throughout the report, various uncertainties were mentioned, but were not listed in the conclusions as data limitations. Although the level of uncertainty associated with a data set is not clearly quantified, it should be listed as a potential limitation to the application of the data. Please include a bulleted list of limitations in the Validation Study Report and in this document if it is revised.
3. In Appendix F-1, Page F-1, Paragraph 5, the text states "model performs well for sandy to silty noncohesive beds." The Hunters Point (S1, S2) sediment environment falls within a much more narrow grain size (silt-clay) range. This particular variable might impact the precision of the model. Please clearly describe this limitation and the associated uncertainty in model precision in future documents.
4. In Appendix F.2.2; Page F-5, Paragraph 1, the text states "Unfortunately, modeling of cohesive sediment transport is not well understood and developed as for non-cohesive sediment environments. Determination of appropriate input parameters such as  $T_c$  and other model factors for cohesive beds is still problematic and under general study." This point is highly significant, as it speaks directly to the "limited" utility of the study results and 1D model, since cohesive sediments predominate at the South Stations. This significant uncertainty should be clearly evaluated in the presentation of the results of this effort as well as carefully considered during remedial decision making. Please discuss this uncertainty in future documents.

**SPECIFIC COMMENTS**

2. **Section 1.0, Introduction, Page 1, Paragraph 2:** The text states "Processes that may affect the mobilization and transport of sediments at HPS include tides, wind, waves, bottom currents, surface water runoff, and benthic biological activity." The scope of this report attempts to quantify each of these processes, with the exception of biological activity. In order to best represent all possible contributions to sediment mobilization in the area, the biotic component (sediment dwelling detritus and filter-feeding marine invertebrates) should be quantified rather than discounted with qualitative opinion. Please discuss the contribution of biota to sediment mobilization in future documents.
3. **Section 2.1, Sediment Transport Measurement System, Page 3, lines 5 and 6:** It is stated

"Each system was designed to collect time-series measurements of all parameters in an area of unobstructed flow near the seafloor for a one-month period." Please provide specific information regarding system quality assurance and/or validation protocols.

4. **Section 2.1.2, Suspended Sediment Measurements, Page 3, Paragraph 2:** It is indicated that "these types of effects have been discussed in previous studies, and add an undetermined uncertainty to the quantitative estimates of suspended sediment concentrations." Because the level of uncertainty is "undetermined," it seems highly inappropriate to use data that have no 'boundary of limitation.' Please provide some measure or estimate from recognized experts or the peer-reviewed literature of the degree of advection from upstream sources.
5. **Section 2.2, Field Operations Program, Page 4, Paragraph 3:** The text states that "data appeared acceptable." Please present the information supporting this conclusion. Also, please present quality control and quality assurance measures used to evaluate the data.
6. **Section 4.1.2, Stations South 1 and South 2, Page 9, Paragraph 1:** It is stated "Because the current velocities were generally low at the South Basin stations and the data were only collected over a relatively short time period (i.e., about one month), the estimates of flux have a lower degree of statistical confidence than the flux estimates calculated for North 1 and therefore must be regarded with a moderate degree of uncertainty." Please reiterate the lower degree of statistical confidence and other uncertainties associated with the South Basin stations as a study limitation in the report conclusions. This verbiage is subjective without quantitative information. Please make a greater effort to provide quantitative information regarding the degree of uncertainty (i.e., order of magnitude, etc) and statistical confidence in the data and model.
7. **Section 4.2, One-Dimensional Sediment Resuspension Modeling, Page 10, Paragraph 3:** It is stated "Because direct information about the cohesive and physical properties of the bottom sediment was not available (e.g., yield strength, bulk density, etc.), critical stress estimates were used to represent the initial mobilization criteria." Cohesive and physical properties of site sediments can be derived employing relatively rudimentary testing methods (e.g., yield strength using a ploughmeter, bulk density using gamma ray attenuation). This information would have been useful in order to validate the 1D model. Further, this would have reduced uncertainty to some extent, with little additional effort. Because this part of the 1D model was not based on site-specific sediment properties, please state this limitation in the report conclusions.
8. **Section 4.2, One-Dimensional Sediment Resuspension Modeling, Page 11, Paragraph 2, last line:** It is indicated that based on the model employed, "little transport of the resuspended materials occurred at Stations South 1 and 2." It should be noted however that there are other variables, not considered by the model, that contribute to the constant flux within the sediment milieu, particularly with sediments containing high proportions of silt, clay, and organic matter. Even in a standard hydrometer test, where the sediment/water column remains static after mixing, most of the silt and clay can remain suspended in the water column at the conclusion of the test for several hours. One would assume then that even intermittent or minor physical influences in the South 1 and 2 locales would keep the silt and clay in the (fluid) water column, making these fine sediments amenable to the constant fluid mechanics flux of the water itself. Hence, to state that sediment disturbance sometimes occurs via tidal, current, or wave influences, but that transport of these disturbed sediments is not occurring, seems contradictory. Please state

why sediment biota were not considered in this study, and cite the data that provides technical support for the conclusion that (intermittently) suspended sediments would not be transported by physical forces of the overlying water.

8. **Section 5.2, Two-Dimensional Regional Sediment Transport Modeling, Page 13, Paragraph 2:** It is stated, "the currents are dominated by tidal forcing. Therefore, for the winter simulations, wave-induced currents were not included in the regional sediment transport modeling. During storm/extreme conditions, the wave-induced currents will comprise a more significant portion of the total bottom boundary current, and will play a larger role in initiating sediment movement. In future simulations for storm/extreme cases, wave-induced currents will be included in the sediment transport modeling." This passage identifies other potentially significant limitations to this study. Please include these limitations in a list of data-related limitations. It would be useful to include the site-specific data employed to support the decision to use tidal forcing while omitting any contribution from currents. Lastly, the fact that storm events were not considered in this study is another source of uncertainty. Assuming the South sites are true depositional areas, such events, given higher sediment disturbance potential from wave-induced currents, seem potentially significant with respect to sediment transport issues. Please discuss the limitations that result when storm events are not considered in the study.
9. **Section 5.2, Two-Dimensional Regional Sediment Transport Modeling, Page 15, last two sentences:** The document states "It is likely that a majority of the sediment movement within these basins occurs during storm events. Future simulations will include the impact of storms on the region and present an overall picture of sediment movement, erosion, and deposition at HPS." Please specify the document where these simulations will be presented.
10. **Section 6.1, Summary, Page 16, Paragraph 6:** It is stated "cumulative flux over the deployment period was minor and insignificant." The use of the term "insignificant" is not clear. Please clarify whether the significance was demonstrated statistically and the type of treatments that were used for this demonstration. In addition, please provide references to support this conclusion.
11. **Section 6.2, Conclusions, Page 17, Paragraph 2:** The document states that "Bottom stresses estimated from the 1D model were generally weak, although increased wave currents associated with infrequent and moderate winter storms combined with periods of spring tidal flow indicated that resuspension of the bottom sediment and local transport would occur at both sites... These results suggest that although bottom sediment was infrequently mobilized by increased wave and current stresses, the sediment was not transported out of the South Basin during the period of study." Earlier in the report, the contribution of wave currents were discounted in the model, though in this passage it is stated that "*increased wave currents. . . (contribute to) resuspension of the bottom sediment.* Though the data does show that sediments were not transported out (via erosion) of the South Basin, the study should also qualify the data limitations (i.e., the study took place over a 1 month period, a "snapshot" within only 1 of 4 seasons during approximately 30 of 365 possible monitoring days). The utility or application of this study should be identified as being limited. Sediment transport depends on a number of abiotic and biotic variables. No biotic contribution were considered. In order to accurately characterize site-specific sediment transport mechanics, each of these variables must be quantified through a more inclusive "longitudinal" approach to data collection. Lastly, several study limitations were identified in

the report, though no discussion pertaining to how these uncertainties should restrict the application of the report conclusions, were provided. Much of the data herein is useful, however, please clearly state that this study only considers a partial and in some cases entirely qualitative picture based entirely on physical/mechanical influences within the broader field of sediment transport and fate.

12. **Table F-2:** The "excess bed shear stress" ( $T_b$ ) variable is missing from the table. Please include the missing variable in the next iteration of the report.
13. **Table G-1, Page G-6:** Citation(s) should be provided to support all variables (i.e., velocity, density, critical bed stress). If these estimates are only "best professional judgment," then please state this in Appendix G as a limitation.