N60028_000378
TREASURE ISLAND
SSIC NO. 5090.3.A

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY
PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
REGION 2
700 HEINZ AVE., SUITE 200
BERKELEY, CA 94710-2737
(510) 540-3724

February 24, 1995

Commanding Officer
Western Division
Attn: Mr. Ernesto Galang, Code 1813
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, California 94066-0720

Dear Mr. Galang:

COMMENTS TO DRAFT PHASE II ECOLOGICAL RISK ASSESSMENT WORK PLAN, NAVAL STATION TREASURE ISLAND (DECEMBER 19, 1994)

The Department of Toxic Substances Control (Department) and San Francisco Bay Regional Water Quality Control Board (Regional Board) have reviewed the subject document. The Department and Regional Board have concerns about (1) how offshore sediment will be evaluated; (2) the use of sediment predictors of aquatic toxicity; (3) the rationale for proposed sediment sampling locations; and (4) the use of Hazard Indices for designing the sampling plan.

Specific comments are enclosed. If you have any questions regarding this letter, please contact me at (510) 540-3818.

Sincerely,

Mary Rose Cassa

Mary Rose Cassa, R.G.
Engineering Geologist
Office of Military Facilities

Enclosures

cc: Mr. Michael Bessette
California Regional Water
Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Ms. Rachel Simons [H-9-2]
U. S. EPA, Region IX
75 Hawthorne Street
San Francisco, California 94105-3901

Admin Record (3 copies)
Jim Sullivan

378

Printed on Recycled Paper

STATE OF CALIFORNIA—CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
400 P STREET, 4TH FLOOR
P.O. BOX 806
SACRAMENTO, CA 95812-0806
(916) 323-3734 Voice
(916) 327-2509 Fax

MEMORANDUM

TO: Mary Rose Cassa, Project Manager
Office of Military Facilities, Region 2
700 Heinz, Building F, Second Floor
Berkeley, CA 94704

FROM: James M. Polisini, Ph.D.
Office of Scientific Affairs
Human and Ecological Risk Section

DATE: February 8, 1995

SUBJECT: TREASURE ISLAND PHASE II ECOLOGICAL ASSESSMENT WORK PLAN
[PCA 14740 SITE 200231-45 OC 2:39]

Background

We have reviewed the document titled *Naval Station Treasure Island, San Francisco, California, Phase II Ecological Risk Assessment, Draft Work Plan*, dated December 19, 1994 and prepared by PRC Environmental, Inc. of San Francisco, California in response to your written request dated January 3, 1994.

Naval Station Treasure Island occupies both Treasure Island and Yerba Buena Island in San Francisco Bay midway between San Francisco and Oakland. Treasure Island (TI) is manmade and approximately 450 acres in size. Yerba Buena Island (YBI) is a natural island in San Francisco Bay approximately 130 acres in size. The U.S. Army first occupied YBI in 1866. The Navy began operations on YBI in 1896. TI was constructed in 1936 and 1937 as a site for the Golden Gate International Exposition in 1939. TI was leased to the Navy in 1941 for use as a training and personnel processing facility. Naval Station Treasure Island (NAVSTA TI) is used today for processing personnel and training, such as fire fighting. YBI is mainly a residential facility.

General Comments

The current work plan contains no mention of development of sediment predictors of aquatic toxicity. Previous discussions with the U.S. Navy and Navy contractors regarding TI and YBI have included discussion of an attempt to identify a sediment characteristic which is predictive of the results of aquatic toxicity testing. The proposal was then to sample off-shore sediments at approximately 54 locations, perform bulk chemical sediment analyses and physical sediment characterization at all locations and then perform an aquatic toxicity tests on sediment collected at approximately 10 randomly selected locations out of the 54 total samples. These results would be used to identify a sediment characteristic which would predict aquatic toxicity results with sufficient accuracy and precision to be acceptable to regulatory agencies in place of actual aquatic toxicity testing on all 54 samples. Aquatic toxicity testing of 10 samples was judged sufficient to attempt

Printed on Recycled Paper

to identify the sediment predictor, but may be insufficient to accurately characterize the threat to aquatic receptors. If the predictive phase has been abandoned the results of the Phase I sediment sampling will require further review by regulatory agencies to determine the appropriate number and location of sediment samples.

Changes to this work plan should be identified by using a ~~strikeout mode~~ for those portions being removed and underlining added text.

Specific Comments

The possibility that the peregrine falcon pair nesting on the Bay Bridge may utilize YBI as a foraging area has been discussed in scoping meetings for the ecological risk assessment. A statement is presented that none of the three threatened and endangered species listed, which include the peregrine falcon, breed or forage extensively on YBI or TI (Section 2.9, page 11). If this statement is based on information discovered after our meetings please provide the supporting information.

Is there any plan to investigate the storm water system for catchment basins or areas which may have accumulated contaminated material and serve as a secondary source for releases in storm water (Section 3.3, page 14)? This assessment should be performed for TI and YBI.

The site conceptual model (Figure 6) seems to concentrate on ingestion as the predominate exposure pathway. Organisms such as grainivorous and omnivorous birds which certainly have dermal contact with contaminated soils and ingest contaminated soils appear, in the figure, to be exposed only through ingestion of contaminated plants. If the transfer paths indicated in the figure are meant to be the major exposure pathway, the figure title should be amended.

We propose that the term 'semiquantitative' be removed from the description of the type of analysis to be performed for terrestrial receptors should the qualitative assessment indicate that receptors are potentially at risk (Section 7.1, page 17). Our discussions at meetings concerning the TI ecological risk assessment indicated that the second level of terrestrial assessment would involve estimation of dose and comparison with contaminant-specific dose information. This type of predictive analysis is quantitative not 'semiquantitative'.

Development of a list of chemicals of concern for terrestrial ecological receptors should be performed only after the selection criteria have been reviewed by the appropriate regulatory agencies. 'Ambient' concentrations are generally not an appropriate single criterion for selecting contaminants of concern (Section 7.1, page 18).

While we agree that the amphipod *Rhepoxinius abronius* is sensitive to the grain size of sediments, the information available, in a reference contained in this work plan, indicates that the maximum effect is an approximate difference of 10 percent mortality at 100 percent fines (DeWitt, et al., 1989). This evidence does not support the conclusion that *Rhepoxinius abronius* is 'very sensitive to grain size' (Section 7.3, page 21).

We propose that the toxic endpoints for the *Strongylocentrotus purpuratus* aquatic toxicity test be percent normal larval development and mortality rather than fertilization as listed (Section 7.3, page 22). The larval development endpoint appears to be both more sensitive and more precise than the percent fertilization endpoint. The San Francisco Regional Water Quality Control Board (SFRWQCB) is currently performing a series of these bioassays on sediment pore water in San Francisco Bay. Percent mortality and abnormal development are listed as endpoints for this

test later in the work plan (Section 13.71.1, page 47), but Section 7.3 lists fertilization as the endpoint.

We suggest that ammonia measurements be included with the suite of sediment measurements (Section 8.2, page 23). Ammonia concentrations are inexpensive and sometimes useful in data interpretation.

A more complete description of how grain size, TOC, SEM/AVS ratio and pH will be used to determine the 'bioavailable fraction' of contaminants should be included in the work plan (Section 8.2, page 23).

We agree that pore water bioassays are usually more accurate predictors of sediment toxicity than elutriate bioassays (Section 8.2, page 24).

The 'ambient' levels that are proposed as screening levels for Clipper Cove sediments should be presented in the work plan (Section 9.0, page 24).

A ten to fifteen percent range is used repeatedly in discussion of Clipper Cove sediments (Section 9.0, page 24):

1. Ten to fifteen percent of sediment samples will be analyzed for PAHs;
2. Ten to fifteen percent of cores will be analyzed to the 3-foot depth; and,
3. Water samples will be collected at ten to fifteen percent of locations if lead is released.

Please provide the basis for the use of the 10 to 15 percent partial sampling.

The assessment of ecological effects (Section 10.1.2, page 26) refers to 'toxicity confirmation analyses' as one of the laboratory and desktop techniques to be used in assessing effects. Are these confirmation analyses reference toxicity tests or some additional testing which will be performed on samples which appear toxic in the first round of testing?

We suggest that the terms applied to the different 'chains' of assessment (Figure 14) be amended in the bottom frame to 'Solid Phase Estimate of Risk' and 'Bioavailable Estimate of Risk' rather than the terms 'conservative' and 'realistic' which now appear.

What will be the course of action should the bulk sediment analysis and estimate of risk prove a more precise and accurate estimator of the threat as demonstrated by the aquatic toxicity tests than the 'bioavailable' predictors (Section 10.1.1.1, Step 4, page 28)? How will cleanup criteria be developed in this case?

Assessment endpoints are generally considered to be components or functions of the biological community which are judged important enough to warrant protection so that the functioning of the community is not negatively impacted. Assessment endpoints are, by their nature, difficult or technically impossible to measure directly. Measurement endpoints, which are more easily measured components or functions, are usually selected so that they are indicative of potential negative impacts on the assessment endpoints. The discussion of avian ecological assessment (Section 10.2, page 28) seems to ignore this distinction. Whenever direct measurement is being discussed the component or function being discussed is a measurement endpoint.

Full justification should be provided for excluding exposure routes from the quantitative predictive assessment (Section 10.2.1, page 28). For example, it may be appropriate to eliminate inhalation exposure for birds if all the contaminants are inorganic elements or organic compounds with low vapor pressures while it may not be appropriate to eliminate dermal exposure for

shorebirds which spend a significant fraction of their feeding period wading in contaminated sediments.

The importance of 'spatial and temporal distribution of both contaminants and receptors' (Section 10.2.1, page 28) to the assessment of risk to birds is difficult to evaluate. Spatial distribution of receptors is certainly important in evaluating potentially complete exposure pathways. Receptors which do not come in contact with contaminated media cannot be exposed and are therefore not at risk. For those receptors which utilize areas of contamination, temporal patterns of activity will affect only the length of exposure. If release of contaminants has ceased at the present time, there should be no spatial and temporal pattern of contaminants.

The dose equation (Section 10.2.1.1, page 29) should include components of water ingestion, dermal exposure and inhalation exposure if this is intended as a 'generic' equation. These components would drop out of the quantitative risk assessment based on incomplete exposure pathways or be treated qualitatively if there is a lack of pertinent toxicological data. Pathways which are treated qualitatively should be identified as data gaps.

It is possible to perform the Phase I Predictive Assessment at a 'screening' level by assuming exposure throughout the year and a site use factor (SUF) of 1, to minimize the research of receptor-specific exposure duration and the SUF. If the individual site being evaluated presents a hazard index (HI) less than one this presents evidence that the receptor being evaluated is not at risk due to contaminants associated with the site. If the individual site presents a HI in excess of one, the exposure calculation can be refined by inclusion of exposure duration and the SUF.

Inclusion of a SUF in the exposure equation (Section 10.2.1.1, page 29) for each site requires that some assessment of base-wide threat must be made which sums the exposure over multiple sites. A description of the proposed process for development of the base-wide threat should be included in the work plan.

We do not agree with the preference sequence proposed for dose levels when No Observable Adverse Effect Levels (NOAELs) or Lowest Observable Adverse Effect Levels (LOAELs) are unavailable (Section 10.2.2.1, page 33). We propose the preference sequence of no-effect level > chronic-nonlethal-adverse-effect level > lethal effect level (with adjustment).

The approach proposed for evaluation of exposure to multiple contaminants should be clearly presented (Section 10.2.3, page 35). This section cites one example where saturation of binding sites with zinc decreases cadmium toxicity in mussels. Individual hazard quotients for contaminants which might reasonably be expected to act additively should be summed to produce a HI for that class of contaminants.

The uncertainty section states that a 'weight-of-evidence' approach will be used to compare the results of several models (Section 10.2.4, page 36). The 'several models' or separate estimates of threat which will be evaluated in the 'weight-of-evidence' approach should be clearly stated in the work plan.

The current draft work plan states that 'Risk to assessment endpoints will be characterized by calculating a HQ....' (Section 10.2.5, page 37). As stated above, the predictive assessment addresses potential threats to measurement endpoints, which are extrapolated to the assessment endpoints.

One sampling station in each sampling section (Section A through F, Figure 12) will be selected at random for benthic community analysis (Section 13.1, page 38). Demonstration of a difference in benthic community structure is frequently dependent on a rather marked difference in

stressor level among the sampling stations. It is doubtful that six samples selected at random will encompass a range of stressor level sufficient to demonstrate an unambiguous pattern of benthic community parameters. We suggest that the samples for benthic community analysis be sieved and preserved for later processing should the chemical and toxicity testing demonstrate a sufficient range of stressors or biological response to warrant benthic community assessment.

The proposed three foot vertical core (Section 13.1, page 38) may be inadequate to portray historical accumulation in certain areas. Bathymetric changes during the period of 1955 through 1990 on the eastern side of TI and YBI (Section A through F, Figure 12) appear in excess of six feet for several sampling sections and between three and six feet for other sampling sections (U.S. Corps of Engineers, 1992). An alternate coring and analysis procedure should be presented in the work plan for those areas with more than three feet of sediment deposition.

Differing depth of penetration performance criteria are listed for chemical/toxicity analysis (Section 13.5.2, page 44) and benthic community analysis (Section 13.8.2, page 51). The former criterion is 'at least 12 cm' while the latter varies from 4 cm to 10 cm depending on substrate type. It seems reasonable that the work plan should specify similar depths of penetration for each with differing depths of penetration allowable only when deeper penetration is impossible.

The proposed holding time for sediment samples is 8 weeks based on an EPA citation for freshwater toxicity testing (Section 13.7.4, page 48). The holding time should be based on guidance for marine or estuarine sediment samples. The *Strongylocentrotus purpuratus* test protocol specifies a 14 day holding time (Appendix B, page 3). Four weeks has been used as the holding time for several studies of San Francisco Bay sediments.

The statement of data output from the *Strongylocentrotus purpuratus* toxicity test should be amended to state that the results will include survival and percent larval <u>abnormality in pore water</u> from reference sediments and samples from each sampling section (Section 13.7.4, page 49). The work plan currently indicates that the test will be run on sediments.

A more complete description, perhaps with an example, should be provided for aquatic toxicity tests which might fit the exclusion criterion stated as 'Statistically significant increases are considered unreasonable when they are greater than or equal to two times the level measured in samples from the reference area.' (Section 13.7.5, page 50). Does this refer to a combined statistical test and relative difference criterion for evaluating the results of the aquatic toxicity test?

The preferred method of assessing bioaccumulation is analysis of tissues from free-living organisms collected on site. Assessment of bioaccumulation based on the amphipods exposed for ten days in the aquatic toxicity test is unacceptable (Section 13.91.1, page 53). The exposure period of the proposed aquatic toxicity tests may be too short to reach steady-state tissue concentrations for some contaminants of concern. Benthic sampling should continue until sufficient biomass is collected to perform the chemical analysis for bioaccumulation assessment.

Conclusions

Previous discussions with the U.S. Navy and Navy contractors have focused on an attempt to identify a sediment predictor for aquatic toxicity results. If the predictive model has been abandoned for Treasure Island and Yerba Buena Island, a more thorough review of the results of the Phase I sediment sampling is required to determine the number and location of sediment samples to more fully characterize the threat to aquatic receptors. If the predictive model has been abandoned, aquatic toxicity testing on sediment samples from ten locations chosen at random is probably not sufficient to evaluate the potential threat to aquatic receptors from contaminants associated with Treasure Island or Yerba Buena Island.

The other components of the work plan when amended in response to the comments provided can provide the basis for evaluating the threat to aquatic and avian receptors should aquatic toxicity testing be performed on a larger number of sediment samples.

Reviewed by: Laura M. Valoppi, M.S. LMValoppi
Associate Toxicologist
Human and Ecological Risk Section

References

Corps of Engineers, San Francisco District. 1992. Sediment Budget Study for San Francisco Bay Final Report. Prepared by Ogden Beeman & Associates, Inc. Portland, Oregon. Contract DACW07-89-D-0029.

cc: Michael J. Wade, Ph.D., Senior Toxicologist, OMF Liaison, HERS
Stephen DiZio, Ph.D., Staff Toxicologist, Region 2 Liaison, HERS

Clarence Callahan, Ph.D.
U.S. EPA Region IX
Superfund Technical Support (H-8-4)
75 Hawthorne Street
San Francisco, CA 94105

c:\jimp\ecol\tieco4.doc\h39

Prepared by: Susan Gladstone sfg File No. 2169.6013(sfg)
Michael Bessette MMB

Date: February 15, 1995

Subject: DRAFT Workplan for Phase II Ecological Risk Assessment, Naval Station Treasure Island, dated December 19, 1994

General Comments:

In general, Regional Board staff concerns focus on the issues of how offshore sediment will be evaluated for this site. This workplan requires additional rationale for the proposed sediment sampling locations, taking areas of sediment erosion and accretion into account. The use of Hazard Indices for designing the sampling plan must be elaborated on.

For the team's information, the RWQCB has recently performed chemical analysis on sediment samples collected near YBI as part of another Regional Board program. These samples were obtained in the vicinity of NAVSTA TI sample station SS-08 and preliminary results indicated the presence of pesticide compounds. Regional Board staff will provide the Navy and the agencies any additional information on sample locations and results when they become available.

Specific Comments:

1. **pages 6 - 7, Section 2.7, Sedimentation in the Bay**: This section presents a general discussion of sedimentation in the Bay. The Navy should provide any specific information on sediment movement in the vicinity of NAVSTA TI to estimate trends in erosional and depositional areas. This information will be useful to characterize where contaminants may be deposited and to provide rationale for the lateral and vertical extent of sampling. To supplement Figure 5 'Water Depths at NAVSTA TI,' for example, the Navy should include historical information such as dates, depths, areas, quantities, and locations of any previous dredging events..

2. **pages 10 - 11, Section 2.9, Threatened or Endangered Species:** This section states that the California Least Tern and the California Brown Pelican can be considered to be infrequent visitors of NAVSTA TI based on lack of breeding or foraging habitat. This conclusion may be modified based on the T&E survey to be performed and supplemented with bird surveys from local conservation groups such as Golden Gate Audubon Society and Point Reyes Bird Observatory.

3. **page 13, Section 3.0, Identification and Prioritization of COPCs:** There is no mention of contaminants in groundwater, as it relates to flow or communication to the Bay and potential exposure to aquatic receptors. The Draft ERA dated November 15, 1993 indicated incorrectly that contaminants in groundwater would be diluted upon reaching the Bay. The groundwater as a potential exposure pathway must be considered in the ERA or the Navy must provide rationale as to why it is not being considered.

4. **page 13, Section 3.2, Identification of Offshore COPCs:** This section notes that the screening values used to develop sediment COPCs were apparent effects thresholds (AETs) for San Francisco Bay and the equilibrium partitioning (EqP) approach. However, section 8.1 - **Additional Offshore Sampling Locations** indicates that effects range - low (ER-Ls) as screening values were used to develop hazard indices (HIs) in order to identify areas for further sampling. The Navy has not explained the relevance of using these three different sediment screening values to determine potential effects to receptors. The ER-Ls were used to propose sampling locations, but have not been related to the use of the AETs and EqP for COPC screening. The Navy should clarify the differences between these screening values and how they propose to use them.

   Unfortunately, the RWQCB has little confidence in the existing AETs because they were derived with a minimal amount of data. Although for some constituents AETs vary little with other screening values for SF Bay, we caution the Navy as to their validity. In addition, we have minimal confidence in using the EqP approach in San Francisco Bay due to the Bay's extremely dynamic nature. The EqP approach assumes a steady-state condition between porewater and sediment organic matter. However, Regional Board's staff extensive work in SF Bay seem to indicate that a steady-state may rarely be achieved and that the system in the Bay is always in a state of flux due to currents and mixing.

   Currently, the RWQCB is in favor of using ER-Ls as a screening tool for SF Bay sediments. A brief review of the sediment chemistry data presented in the Phase I report indicates that metals, particularly chromium, copper, mercury, nickel, and in some cases zinc, fall above the ER-Ls at all sediment sampling locations except station SS-10. Regional Board staff suggest that these metals also be included in the list of COPCs for the site.

5. **page 14, Section 3.3, Identification of Storm Water COPCs, para 1, sentence 3:** The Navy should explain what is meant by "... *regional and marine* chronic water quality criteria."

6. **page 14, Section 4.0, Conceptual Site Models and Figures 9 and 10:** Some minor changes need to be made to the models presented for Treasure Island (Figure 9) and Yerba Buena Island (Figure 10) as follows. Both models should indicate an exposure route from groundwater to terrestrial floral receptors via root uptake. Secondly, both models should indicate exposure to terrestrial fauna via ingestion and dermal contact from surface water.

7. **page 15, Section 6.0, Threatened and Endangered Species Survey:** The Navy should specify who the "local scientists" are that will provide information for the T&E survey and their affiliation. In addition, The Navy should specify who will be performing the additional plant and bird surveys and what specific survey methods will be used.

8. **page 17, Section 7.1, Proposed Terrestrial Asssessment Methodologies, sentence 6:** The Navy should describe in more detail what is meant by "... a semiquantitative risk characterization will be conducted on receptors of concern at the site" and what it will consist of.

9. **page 22, Section 7.3, Aquatic Measurement Endpoints, para 2, sentence 2:** There is some confusion in this document as to the use of the echinoderm fertilization verses larval development test for measuring toxicity in porewater. In this section, the Navy recommends using the echinoderm (urchin) fertilization test for sediments at this site, although the protocol described in Appendix B-2 is for urchin larval development. There apparently has been a misunderstanding as to the sensitivity of the urchin fertilization test based on communication between the Navy contractor and Karen Taberski of the RWQCB (PRC 1994c). Ms Taberski has been referenced as saying that the fertilization test is a sensitive bioassay for measuring toxicity in porewater. However, Ms Taberski believes that the fertilization test is unreliable in SF Bay porewater tests, but that the larval development test is sensitive and has presented consistent results in her work in the Bay Protection and Toxic Cleanup Program (BPTCP). Ms Taberski has initiated contact with the Navy contractor to rectify this misunderstanding.

   The Navy should follow up with the contractor and modify sentence 2 in paragraph 2 to reflect the correction with Ms Taberski. Also, correction will be needed in Table 2 to indicate what test is proposed. Based on experience with the BPTCP, Regional Board staff are in favor of using the urchin larval development test only.

10. **page 22, Section 8.1, Additional Offshore Sampling Locations:** HIs were developed as a screening method to identify locations requiring additional sampling. The ER-Ls were used as a reference concentration for the hazard quotients to compare to concentrations in site sediments. The Navy should

describe (i) what specific compounds were included for each class of chemicals, (ii) what reference concentrations (denominator values) were used for those constituents which have no ER-L value, (iii) how non-detects were used in the media concentration value (numerator), and (iv) how the results of the HI screening were used to select areas for additional sampling.

Although referred to, Section 13.1, **Offshore Sampling Locations** does not specify how locations were selected based on "... areas with elevated HIs..." The Navy should describe what is meant by *elevated*. Does this mean all HIs greater than 1 or some other cut off value?

On this same topic, Figure 11, **Comparison of Phase I Hazard Indices,** represents HI bar graphs for each class of chemicals. If a reference concentration (denominator) other than ER-Ls has been used for any of these hazard quotients, they should be segregated, calculated and represented separately. Figure 11 should also indicate what specific compounds in each class of chemicals has been included in the HI.

11. **page 23, Section 8.2, Sediment Collection and Testing, para 1:** Ammonia should be included in the list of parameters to be measured in sediment samples used for bioassays to assist in interpretation of the results.

12. **page 23, Section 8.2, Sediment Collection and Testing, para 2:** A number of parameters will be used to estimate bioavailability of the metals and organic constituents. The document states that these estimates will be used to evaluate the toxicity of the sediments. The Navy should describe in detail how these estimates of bioavailability will be correlated to the proposed toxicity tests.

13. **page 24, Section 9.0, Clipper Cove Skeet Range Assessment, para 2:** The proposed approach for chemical analyses at the 1 to 2 foot and 2 to 3 foot level will be verified by sampling 10% to 15% of all cores to 3 feet. The Navy should provide rationale for (i) how the three foot maximum depth was determined to be sufficient vertical characterization and how it relates to any sediment erosion or accretion in Clipper Cove, (ii) what is the rationale for selecting 10% to 15% of cores for the complete depth sampling, and (iii) how many additional samples will the Navy analyze if the verification step indicates that the approach was flawed. In addition, when will the 'action level' be determined?

14. **page 25, Section 10.1, Characterization of Ecological Risk to Benthic Receptors, item #4:** Please see comment number 4 above. We suggest the Navy contractors consult with the agencies prior to proceeding with the EqP approach.

15. **page 33, Section 10.2.2.1, Ecological Effects Assessment:** Regarding the selection of Toxicity Reference Values (TRVs) for the assessment, we request that proposed TRVs be discussed and agreed upon among all the parties prior to completion of the effects assessment.

16. **page 35, Section 10.2.2.4, Population and Community-level Responses, para 2, sentence 2:** Please describe what an "event tree" is and how it will be utilized in determining this level of effects.

17. **page 35, Section 10.2.3, Multiple Stressors:** No mention is made as to how multiple stressors will be handled in the risk assessment.

18. **page 38, section 13.1, Offshore Sampling Locations:** The Navy should provide rationale for the distance, as well as depths, proposed for offshore sediment sampling in terms of determining the extent of contamination emanating from the site. The Navy should provide the reference for paragraph 1, sentence 2, page 39 confirming that "... storm and wave action is not expected to resuspend sediments from below this depth [of three feet]." The SF Bay Sediment Budget Study indicates that as much as six feet of erosion or deposition has occurred between 1950 and 1989. It is not clear how sediment movement or areas of dredging were considered in designing the offshore sampling locations. Because of the dynamic nature of the Bay, Regional Board staff are typically requesting that sediment transport be considered when designing sediment sampling plans for both vertical and lateral extent. Possible sources for historical trends related to transport could include bathymetric surveys, dredging or construction records (pre- and post-dredging surveys).

    An additional offshore area which should be investigated is at YBI, west of the Bay Bridge near IR 28, directly downslope of the onshore area of lead contamination. Steep slopes in that area indicate that erosion and runoff from the upland soils could have occurred.

    Lastly, the Navy should describe how they intend to use the homeporting sample results in the data analysis of the proposed samples.

19. **page 40, Section 13.3, Reference Sediments, para 3:** The sediment characteristics and chemistry for the proposed reference sites should be confirmed as appropriate for use as reference location. The Navy should provide rationale for the selection of these as reference locations, including consideration of areas of comparative erosion and deposition. The Navy should provide rationale for why bioassays will be performed on only one of the three stations. The Navy might consider two of the three stations for bioassays in the event that sediment characteristics or chemistries invalidate the use of one or more as a reference location.

20. **page 41, Section 13.4.2, Station Location Methods:** In the report submittal for results of this effort, Regional Board staff request that latitude and longitude for bioassay locations be included. Regional Board staff are making an effort to track and enter into our internal GIS a listing of bioassays and chemistry results for all SF Bay samples.

21. **page 53, Section 13.9.1, Tissue Residue Studies - Test Organisms:** The proposed approach for this portion of the ERA is to analyze amphipods from the acute toxicity tests for tissue burdens, should there be inadequate biomass collected from the field. Regional Board staff request that amphipods from toxicity tests not be utilized because they will underrepresent the contaminant body burden due to the limited amount of exposure time to sediments (10 days for the acute toxicity test). If enough organisms cannot be collected in the field, we suggest using a separate test organism, such as *Macoma*, and appropriate laboratory protocol to determine bioaccumulation.

22. **Figure 4, Habitats at NAVSTA TI:** Please indicate that the habitats depicted here are *terrestrial* habitats, or include the aquatic habitats as well.

Concur: Shin-Roei Lee

Shin-Roei Lee, Section Leader