

5090
Ser 18312GK/L5185
24 Jul 1995

From: Commanding Officer, Engineering Field Activity, West, Naval Facilities
Engineering Command

To: Distribution

Subj: RESPONSE TO COMMENTS ON THE DRAFT ECOLOGICAL
ASSESSMENT AND DRAFT REPORT AMENDMENT (WITH UPDATED
SEMIVOLATILE ORGANIC COMPOUND DATA), NAVAL AIR STATION
(NAS) ALAMEDA, CALIFORNIA

Encl: (1) Response to comments from the USEPA, USFWS, NOAA, DTSC, RWQCB,
and RAB Members Roberta Hough and Tom Okey on the Subject Documents

1. Enclosure (1) are responses to comments on the Draft Ecological Assessment and Draft Report Amendment (with updated Semivolatile Organic Compound Data) for NAS Alameda. The comments addressed here are to finalize both documents. Work plans for future follow-on ecological assessments and characterization is currently under development.

2. If no additional comments are received within 15 days, the Draft Ecological Assessment and the Draft Report Amendment for NAS Alameda will be finalized.

2. If you have any questions regarding the Navy response to comments, please contact Mr. George Kikugawa, Code 18312GK, (415) 244-2549, FAX (415) 244-2654.

Original signed by:

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By direction of
the Commanding Officer

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RAB Member (Attn: Tom Okey)

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**NAVY RESPONSES TO AGENCY COMMENTS ON THE
DRAFT ECOLOGICAL ASSESSMENT REPORT AND SVOC AMENDMENT
NAVAL AIR STATION, ALAMEDA**

The following responses were prepared to address the comments provided by the U. S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service (USFWS), the National Oceanographic and Atmospheric Administration (NOAA), the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC), and the San Francisco Bay Regional Water Quality Control Board (RWQCB),

The critical comments of each agency and the Navy's responses to those comments are presented in the order listed above. Where comments are repeated, the previous response is referenced. Therefore, the entire set of comments and responses should be reviewed together.

The Navy is in the process of developing a program-wide approach to assessing ecological in the San Francisco Bay area. Although the responses to comments contained in this document represent the Navy's position at this time, the Navy reserves the right to alter plans for follow-on work as the program-wide approach develops.

GENERAL COMMENTS OF EPA

- 1. Comment:** What are the contaminant concentrations in sediment and surface water samples collected from NAS Alameda? The results of this Navy effort clearly show that the contaminants have impacted the biological resources in the areas examined, the West Beach Landfill, the Seaplane Lagoon, the Nearshore Area on the bay side of NAS Alameda (Western Bayside) and Oakland Harbor on the perimeter of NAS Alameda.

Response: Complete results of the chemical analyses are presented in Sections 3 and 4 of the EA report. Additional analyses will focus on the cause of the toxicity and the overall risk to ecological resources at the site. Sediment samples from two additional offshore sites will be collected and analyzed as part of the follow-on work (see Specific Comment 15 of EPA).
- 2. Comment:** What are the potential impacts on biota resulting from exposure to site sediments and surface water in the vicinity of NAS Alameda? A fairly thorough effort is reported for the wetlands, the landfills, the shallow and the subtidal sediment areas. The apparently extensive efforts related to the least tern are not included as part of this report. It is not clear from the material presented that the upland sites have been adequately sampled and described. As from discussions at various meetings, the Navy will insure the development of a strategy to evaluate the areas where the least tern is nesting and propose a management plan for the least tern. The relatively short write-up does not offer any suggestion for habitat analysis such that toxicity impacts could be separated from habitat impacts.

Response: The least tern was not the focus of the ecological assessment as it was designed by the biological technical advisory group (BTAG) in the late 1980s. Recent guidance on

conducting ecological risk assessments (DTSC 1994) outlines the selection of measurement and assessment endpoints as the focus of risk assessments. The revised ecological assessment (EA) and the work plan for the follow-on ecological assessment will present the least tern and other native species in this context. Threatened and endangered species are commonly selected as assessment endpoints, and the Navy is currently planning to include analysis of risk to assessment endpoints in the follow-on ecological assessment. However, formal selection of endpoints will occur in cooperation with regulatory agencies and natural resource trustees. The Navy has contracted a separate study of the habitat requirements of the least tern at NAS Alameda. The results of that study will be available some time in 1995. The potential for exposure of the least tern and other assessment endpoints to contaminants through food chain transfer will be investigated during the follow-on ecological study.

The Phase I EA did not include the upland areas. Those habitats are being investigated in the terrestrial assessment currently in progress. A subsequent basewide risk assessment, to be conducted prior to base closure, will include both aquatic and terrestrial ecosystems.

3. **Comment:** What are the potential impacts from storm water discharges to Seaplane Lagoon? Storm water discharges were sampled in three locations during one storm period, December 12-14, 1993. Stormwater samples from these stations contained measurable concentration of metals and a limited number of organics, perhaps reflecting the very limited sampling effort of these contaminant sources.

Response: A full review of existing storm water data will be included in the scope of the follow-on ecological work. Additional sampling locations will be selected as necessary to fill gaps in the existing data, with the goal of assessing the effect of storm water discharges on aquatic organisms in the area.

4. **Comment:** What are the boundaries and characterization of two potential wetlands on NAS Alameda? The extent of wetland habitat was addressed using techniques described in the "Corp of Engineers Wetlands Delineation Manual" (U.S. Army Corp of Engineers, 1987) and by sediment and water samples collected to measure the chemical contamination and biological organisms present. This effort appears to be sufficient.

Response: As mentioned in the comment, the two wetland sites in OU4 were delineated using 1987 Army Corps of Engineers methods. The Navy agrees that this delineation is sufficient.

SPECIFIC COMMENTS OF EPA

Study Design

- 1. Comment:** General Level of Toxicity. The choice of reference area and samples was not adequate and the study suffers from the lack of a general reference area.

Response: The reference area was selected by the BTAG without comprehensive knowledge of the existing levels of contaminants present at that location. It is not the Navy's intent to directly compare the concentrations of contaminants at NAS Alameda and the reference site as a measure of risk at NAS Alameda. The selection of a more appropriate reference location, or an alternative to the use of reference locations in general, will be discussed in meetings with the regulatory agencies and natural resource trustees as the follow-on work is planned.
- 2. Comment:** Definition of contamination. The use of Effects Range-Median from Long and Morgan (1990) is not appropriate for at least a couple of reasons. First, as presented Long and Morgan state, ". . .the consensus ER-L and ER-M concentrations may be used by others as guidance in evaluating sediment contamination data, there is no intent expressed or implied that these values represent. . .standards." These estimates are not the appropriate data to develop standards for determining whether contaminants exceed the safe level at NAS Alameda.

Response: The BTAG included technical experts from NOAA, DTSC, EPA, and the San Francisco RWQCB, agencies charged with regulating and protecting the environment in the region. The use of the ER-M values as a decision criterion for advancing a sampling station to Tier II, as well as the rest of the study design, was developed by the BTAG after many months of discussion and compromise. Without repeating the entire investigation, the results of using the ER-M values in this way cannot be changed. What can be changed is the interpretation of the existing chemical data. The Navy agrees that the Long and Morgan ER-M values may not be the appropriate standard of toxicity. In response to NOAA's recommendation in May 1994 that the MacDonald (1992) values for ER-L and ER-M were more appropriate, the Navy presented the chemical data to the Restoration Advisory Board (RAB) based on the ER-L values. Subsequent interpretation of the chemical data will reflect the most appropriate criteria, in discussions with current regulatory agencies and natural resource trustees.
- 3. Comment:** Significance Level. Secondly, the Long and Morgan ER-M data may not be appropriate because the median value as derived by the authors, "a concentration approximately midway in the range of reported values associated with biological effects" is an implicit assumption that the toxicological, biological and ecological impacts are directly related to the data summarized by Long and Morgan (1990) and that the ER-M as the "median" value is analogous to an LC50 or an estimate along the concentration response gradient of the data presented in the Long and Morgan report. A median value is not conservative enough to insure that for those areas of NAS Alameda where the concentration did not exceed this value, a biological impact would

not be expected. If these data are to be used, I would prefer that the ER-L be used to identify COCs, in other words, any concentration above the ER-L value reported by Long and Morgan (1990) should be considered a contaminant of concern for the sediment data. Also, Long and Morgan data along with the appropriate endpoints can provide guidance for setting the detection limits for measuring levels of contamination.

Response: ER-M values may not be the most appropriate screening criteria for the sediments around NAS Alameda. The Navy is working with the regulatory agencies to adopt a more appropriate set of screening values for sediments in the San Francisco Bay area. The Navy is interested in working with the regulatory agencies and natural resource trustees to derive toxicity reference values (TRV) for avian predators, based on published scientific literature and regulatory guidance. Subsequent data analyses will compare both the mean and maximum contaminant levels to the TRV for each chemical of concern.

4. **Comment:** Species Specific Endpoints. If the ER-L data are used, they should be used with consideration of the specific endpoints for the NAS Alameda site. The data set is a compilation of many endpoints rather than the endpoint of concern at NAS Alameda and therefore less likely to have site and endpoint specificity. For instance, the data from Long and Markel (1992) is more relevant to the site having been derived from the San Francisco Bay area rather than the entire U.S. continent as was done with the Long and Morgan (1990) data. The data set from Long and Markel (1992) can be used to select the data i.e., species tested and endpoints measured that best relates to the species tested at NAS Alameda. This avoids the comparison of other species data that do not relate to the test endpoints evaluated at the site. Because both data sets contain test results summarizing numerous species and test for the particular chemical contaminant the data set should be sorted for contaminant first, then species second and endpoint last rather than use the summary of the contaminant data with a mixture of species (Long et al. 1994, *Environmental Management*, in press).

Response: At the time the BTAG developed the work plan for the EA, the use of specific endpoints in ecological assessment was not standard practice. The Navy plans to revise the criteria to reflect more site-specific conditions. (See Specific Comment 3 of EPA.)

5. **Comment:** Trigger for Chronic Tests. The trigger for Tier II tests, bioaccumulation, was based on the, "...detection of contamination, i.e. levels above the Effects Range-Median in sediments or the determination that sediments from a particular station were toxic to selected indicator (bioassay) organisms i.e., mortality or depressed function at a level of 20 percent greater than the same response in control organisms. With the concentration of the contaminants at the ER-M level, the response of the organism is at the 50 percent level or is in a serious impact situation. The apparently arbitrary choice of 20 percent impact may be statistically important, but biologically the critical level of certain responses may be 10 to 15 percent. The critical response level must be selected for the particular species and endpoint being measured to represent the specific endpoints selected for the site, something that was not done for NAS Alameda.

- Response:** The Navy followed the protocols agreed to by the BTAG and described in the work plan for this study. During the follow-on ecological work, the chemical and biological data collected in Phase I will be reanalyzed in the context of sediment screening values appropriate to San Francisco Bay.
6. **Comment:** The emphasis and use of only "significant" Tier I results to perform Tier II tests biases the results and limits the ability for evaluation of the "low" end of the impact spectrum. Because only those samples above ER-M were used to evaluate the bioaccumulation, there are no data from samples at or below the level of the ER-L that can provide the comparison of the no effects level and to fully interpret the results of Tier II results. In effect, the Navy cannot decipher the impact to ecological resources between contaminants and other causes.
- Response:** No data on bioaccumulation at "low" impact locations were collected. Again, this protocol was agreed to by the BTAG, and was considered appropriate at the time of its implementation. The Tier II analyses cannot be used to compare ecological effects along a contamination gradient, but they can be used to describe bioaccumulation at the most contaminated stations.
7. **Comment:** Appropriate Endpoints. There is no mention concerning the identification of specific values that are being protected at NAS Alameda, nor is there specific discussion that the bioassays represent the appropriate values that are important for the site. The identification of assessment and measurement endpoints are central to the risk assessment guidelines provided by EPA in the "Risk Forum" document and the later "SETAC" publication authored by the same group Norton et al, 1992.
- Response:** No guidance on the selection of measurement or assessment endpoints was available at the time this project was designed. The apparent effects threshold (AET) approach adopted by the BTAG was thought to be adequate to predict the effect of contaminated sediment on benthic organisms. The Navy believes that the data obtained by this method are valid, and agrees that these data can be interpreted in the context of current guidance (DTSC 1994) on ecological risk assessment.
8. **Comment:** The cores were sieved through a 1-mm mesh screen, preserved in 10 percent formalin, and taken to KLI in Santa Cruz to be archived for future benthic infauna analysis. A screen of 0.5 mm is preferable to a 1.0 mm screen because much of the sample is lost and therefore available information is lost. It is not clear what material was retained, that captured on the 1.0 mm screen or the water and presumably organisms that passed through the 1.0 mm screen.
- Response:** Sieving with the smaller mesh size would have greatly increased the time and effort of the sampling event. Although some of the smaller organisms do pass through the larger mesh, the Navy considered this method the best use of resources at the time.
9. **Comment:** In several places in the document, the citations are shown from a secondary source e.g., PSEP, 1989 or Puget Sound Estuary Program and PRC documents when the

citations particularly for protocols should show the original, published reference not an internal report or another report for another site.

Response: The revision will list the primary literature wherever possible.

10. **Comment:** The list of "variables and indices" for infauna should be supported by citations for all indices (even though some of these are straight forward) with justification for the reasons why each particular index was selected. For instance, "species composition" could be the number of species per sample, the number of individuals per species, species per volume, species area, etc. The authors must provide the list of analyses that were performed by "KLI" software. I can't find the results of the Bray-Curtis similarity evaluation i.e., the cluster analysis as dendrograms.

Response: The revision will incorporate changes as suggested.

11. **Comment:** The Runway Wetland was the only location that showed contamination in water samples which is curious because the source of contamination in this area is unknown.

Response: The source of contamination in this area will be investigated in subsequent sampling events.

12. **Comment:** The sediment bioassay testing was apparently "paired with chemical analyses enabling a direct comparison of bioassay results with chemical results" (p3-10) which should be presented in a summary table to demonstrate the possible relationship between chemical contamination and bioassay results. What is the relationship between the data for the sediment samples, the bioassay samples, and the community structure samples.

Response: The revision will present the data in summary format.

13. **Comment:** p. 3-33. There are significant contradiction of summary statements based on the data presented, "Chemical analyses demonstrate that the West Beach Landfill Wetland is affected by contaminants in the landfill. However, based upon the results of chemical, biological, and bioaccumulation analyses conducted on samples from the Wetland Reference station at Skaggs Island, it is impossible to demonstrate any differences in the suitability of either site as a habitat; neither appears to be conducive to supporting diverse and abundant biological populations." This is an area with large breeding populations of several species of birds.

Response: The text will be revised to read: "Chemical analyses suggest that the West Beach Landfill Wetland (WBLW) has elevated levels of some contaminants. No significant difference in chemical, biological, or bioaccumulation analyses were detected between samples from the reference area and the WBLW."

Ecological Assessment

14. **Comment:** The use of an Apparent Effects Threshold (AET) is appropriate, however I don't see that the data collected and presented can be used to define the apparent threshold, that is demonstrate that concentration of contaminant(s) that are associated exclusively with sediments exhibiting statistically significant biological effects relative to reference sediments. Although on p7-1, the statement is made, all three kinds of data (bulk chemistry, bioassay, and bioaccumulation) that are necessary to complete an AET were collected, it is not clear that the Navy has fully evaluated what are the concentrations at NAS Alameda that have resulted in significant biological effects. These data must be presented in a manner that show the concentration and the results of tests to identify what the magnitude of response is at a certain concentration.
- Response:** The Navy agrees that additional evaluation and interpretation of the chemical and biological data are necessary to fully assess ecological risk. The revised EA report and the work plan for follow-on ecological work will attempt to correlate biological effects with chemical concentrations in sediment.
15. **Comment:** An important question concerns the number of samples to "adequately" delineate the zones of concern. For instance, with only seven samples in the West Beach Landfill and the level of contamination and the resultant impacts from all of the endpoints, what is the extent of the significant contamination? What is the suggested distance from the samples taken and evaluated that is assumed to include the significantly impacted area. The same question can be asked for the other areas.
- Response:** The offshore sediment and water sampling was not designed as a full investigation of the extent of contamination, but as a purposive investigation of areas expected to be impacted by known historical activities. Additional sampling events will fill some spatial gaps in areas of concern, specifically in the area near dock 5 (south of the Seaplane Lagoon), and in the offshore area near the Runway Wetland. Additional sampling to characterize contamination of the Seaplane Lagoon will be planned in the spring of 1995. No additional sampling locations are proposed for the other four sites already sampled.
16. **Comment:** I take issue with the statement, "Toxic areas were well-defined within the five study areas sampled during the ecological assessment." (p. 7-9) Toxicity, however was well defined whereas the areal extent was not well defined.
- Response:** The text will be deleted.
17. **Comment:** There was significant toxicity in the Oakland Inner Harbor showing a gradation. One of the more serious deficiencies related to the doubt about the exact source of contamination (pp 7-11 and 12). At some of the sites, however the source is clear. The West Beach Landfill Wetland shows a gradient of toxicity from the site. While the sources of contamination at Station R3 in the Runway Wetland are unknown, the general sources of contamination at the Seaplane Lagoon are easily inferred.

Apparently there is insufficient data to suggest the source of contaminants in the Western Bayside area, however I am not convinced that the level of toxicity observed in this area might be a result of general contamination of the San Francisco Bay.

Response: Chemical analyses of soil and groundwater samples collected from terrestrial locations at NAS Alameda under the RI will be available in early 1995. Potential migration of contaminants from landfills and other terrestrial sources to nearshore sediments, including the Western Bayside site, will be investigated during the follow-on ecological work. A separate investigation of storm water as a source of contamination in the offshore sediments is also being planned.

18. Comment: Since the physical characteristics of the sediment is mentioned here, the Navy should present sediment statistics for each site, in particular the median value which could be used in appropriate comparisons of chemical and biological information and might be very instructive in associations of certain biological/toxicological data with median sediment sizes. Statements like the ones made on page 7-13 concerning the variation of toxicity and chemical concentration and the suggestion that mortality might be due to "something" else suggest that all of the data collected should be utilized to help explain these results. The poor design in the work scope prohibited the evaluation of benthic samples and bioaccumulation for sediments that were not toxic i.e., no control. The Navy can't determine whether or not the community structure is a result of chemicals or other alterations.

Response: All available physical data will be presented in the revision, and evaluated for their usefulness in explaining trends in toxicity.

19. Comment: What is meant by "harsh ecological conditions" on page 7-16, section 7.5?

Response: The last sentence in that paragraph will be amended to read, "Because no control area was sampled, the current data cannot distinguish natural from chemically reduced species richness in the West Beach Landfill Wetland."

COMMENTS OF U.S. FISH AND WILDLIFE SERVICE

Alameda Ecological Assessment

- 1. Comment:** Only four stations were sampled at Runway Wetland. This small number of sampling stations does not allow the wetland to be accurately characterized. The addition of four to five more sampling stations, particularly around existing site R, would better determine the extent of contamination of Runway Wetland.

Response: No additional sampling locations are proposed for the Runway Wetland at this time. During the follow-on work, the Navy will investigate potential sources of contaminants to the Runway Wetland, and select additional sampling locations at that time, if necessary.
- 2. Comment:** p. 1-5. The phrase "toxicity defined as mortality (or depressed function)" is unclear. Depressed function could be measured as decreased growth, decreased reproduction or a combination of factors. The meaning of "depressed function" should be clarified.

Response: The text will be revised to read, "Toxicity was defined in terms of both lethal and sublethal effects. For lethal effects, toxicity was defined as less than 80 percent survival; for sublethal effects, toxicity was defined as an adverse effect on test organisms that was at least 20 percent greater than on control organisms, as measured by the number of individuals affected. In addition to mortality, sublethal effects such as changes in behavior, reduced growth, and depressed reproductive function were measured."
- 3. Comment:** p. 1-6. It is unclear whether sampling was performed more than once. Given that ecological conditions can change from season to season or even low tide to high tide, multiple sampling of the IRP sites (and Runway Wetlands) would better characterize the contamination. It is recommended that sampling be done once or twice more at these sites.

Response: For phase I of the EA, sampling events were not repeated. No additional sampling events are currently planned for these areas.
- 4. Comment:** p. 1-6. The contamination in the West Beach Landfill Wetlands seems to be a result of the West Beach Landfill. It is possible that storm runoff from the landfill is carrying contaminants into the wetland. Monitoring the runoff from the wetland, either by collecting the storm water as it runs off the landfill or by sampling and analyzing the wetland immediately before and immediately after a rain event may help to answer this. This is recommended as part of the stormwater monitoring plan.

Response: Surface soils in Site 2 near the West Beach Landfill Wetland show high levels of PCB. Rainfall, wind, historic fill activities, and accidental deposition during transport could have resulted in the contamination of the adjacent wetland with PCBs. Both the RI data and the Navy's storm water monitoring plan is being reviewed. The potential for storm

water to deliver contaminants to the West Beach Landfill Wetland and other aquatic sites will be addressed as part of the follow-on ecological work.

5. **Comment:** p. 1-7. ER-L is, by definition, the lowest concentration of a contaminant at which effects to test organism are seen. These values may not be protective enough to use as the cut off point for "elevated concentrations." It is more protective to use numbers slightly lower than the ER-L. Elevated means higher than baseline conditions or higher than levels at uncontaminated reference sites. The levels you are calling "elevated concentrations" would be better termed "toxic concentrations." It is recommended that this wording be changed to reflect the definition of "elevated."

Response: The word "elevated" in the EA report was meant to denote concentrations above the ER-L value for that contaminant. Although this meaning is generally clear from the context, the document will be revised to make the use of the term more explicit. For example, rather than writing simply "elevated," the text will be revised to read, "elevated above the ER-L." However, the Navy does not agree that any concentration above the ER-L is, by definition, toxic. Variation in target species and bioavailability of contaminants affect actual toxicity. In this report, bioassay results were used as the primary measure of toxic effects.

6. **Comment:** p. 1-12. The storm water event sampled was only 1/4" to 1/2" of rain. This amount is not always considered sufficient to flush the drains and sumps of "old" water. Although electroconductivity was taken to ensure only fresh water was collected, it would be beneficial to re-test at a larger storm event.

Response: See response to EPA general comment #3 on planned storm water investigations.

7. **Comment:** p. 1-14. Taxiway 6 is adjacent to Runway Wetlands and a possible contamination source. Monitoring of the runoff from the taxiway and the nearby industrial shops would determine the extent this area is contributing to the contamination found in the Runway Wetlands.

Response: The Navy will consider the potential for contamination of the Runway Wetland by runoff. If appropriate, the runoff will be included in the storm water investigation.

8. **Comment:** p. 1-17. IRP site 10: "It is unknown whether any wastes were discharged to storm sewers that emptied into the Seaplane Lagoon." To answer this question, searching available historical record and interviewing current and former personnel is recommended.

Response: Records will be queried as part of the storm water investigation.

9. **Comment:** p. 1-18. "Part of the NAS Alameda storm sewer system" discharges to Seaplane Lagoon. Where does the rest discharge?

- Response:** Storm sewer outfalls are located in several areas around the installation. Exact locations will be provided in the revision, as well as in the RI report.
10. **Comment:** p. 1-21. IRP Site 20: The U.S. Army Corps of Engineers study at this site showed mortality yet there is no mention of any follow up study. A closer look at this study and the causes of mortality would help characterize this site.
- Response:** Contaminants discharge into the Oakland Inner Harbor from numerous locations. The EA focused on the shore of NAS Alameda and did not attempt to investigate other sources of contaminants to the harbor. Subsequent investigation into the causes of toxicity in the area may require this type of summary. The Navy currently has no plans to review the U.S. Army Corps of Engineers study because it focused on the north bank of the harbor and not specifically on Navy property. However, the basewide risk assessment to be performed prior to base closure will include a broader review of contamination in the area, including the OIH.
11. **Comment:** p. 1-22. IRP Site 15: The soil in this area has the potential for PCB contamination. Soil testing should be done here to determine the extent of contamination and enable the clean up to proceed faster.
- Response:** Chemical analyses of soil samples was conducted under the RI. The Navy is currently conducting a removal action using soil washing technology to remove PCBs and lead from the soil. Lead concentrations will be reduced to 130 parts per million; PCB concentrations will be reduced to 1 part per billion. The EPA is providing oversight of the project under the SITE Program. In addition, the Navy will conduct a terrestrial ecological risk assessment at the installation.
12. **Comment:** p. 3-2. While Runway Wetlands may not have a specific "contaminant source," R3 showed the most toxicity. More sites need to be sampled on this wetland to narrow down the source of contamination (see also Comment #1).
- Response:** The source of contamination in the Runway wetland will be investigated under the follow-on ecological work.
13. **Comment:** Figure 1-7. On this map the landfill is directly north of the West Beach Landfill Wetlands. This does not correspond to the text. The map or the text need to be modified to show the correct location of the landfill and the wetlands.
- Response:** The text will be changed in the revision.
14. **Comment:** p. 3-9 paragraph 3. D.O. values taken at these sites are unreliable because of interference with H₂S. The values for BOD and COD are dependent on the D.O. value and may not be reliable. Explain on how it was determined that H₂S was interfering with the D.O. readings. If values were taken for H₂S, include them in the results.

Response: According to Kinnetic Laboratory employee Ken Kronschnabl, who helped perform sediment sampling at NAS Alameda, the dissolved oxygen meter equipment user's manual states that H₂S causes the meter readings to be unreliable. Ken Kronschnabl stated that no measurements of H₂S were made. H₂S was detected during sediment sampling based on the smell of the sediment, and in the presence of H₂S, the dissolved oxygen readings were off the meter's scale. Therefore, H₂S was suspected to interfere with the readings. This explanation of the interference caused by H₂S will be included in the revised text.

15. Comment: p. 3-11 paragraph 1. "The results of bioassay testing with Wetland Reference sediments were not used as a baseline for comparison with sediments from the West Beach Landfill Wetlands." A baseline must be used for the results to be meaningful. A baseline bioassay test needs to be performed.

Response: The Wetland Reference station was determined to be inappropriate for use as a "clean" control (see response to EPA specific comment 1). The Navy is interested in the recommendations of the regulatory agencies for selecting a "clean" reference area. So far, no appropriate area has been located. The criterion for inferring toxicity from bioassay results was any negative effect greater than 20 percent of the test control.

16. Comment: p. 3-16. There is no comparison for the R3 benthic population evaluation. Without a comparison site, the results of the benthic population evaluation of site R3 is not meaningful. A comparison benthic population evaluation needs to be done.

Response: The Navy agrees that the single sample from station R3 is not representative of the benthic community of the Runway Wetland. The EA report will be revised accordingly. The lack of comparison among sites does limit the usefulness of the benthic community data at this time; if an appropriate reference site can be identified, then the benthic community data can be put in a more relevant context.

17. Comment: p. 3-16. Since the lowest benthic population diversity at NAS Alameda was seen at R3, this site and wetland as a whole should be studied further. Further testing and characterization of this site and the contaminants, especially in relation to their impacts on benthic population, is recommended.

Response: As stated in the response to the comment above, the single sample from station R3 cannot be used to characterize the benthic community at the site. Rather than conduct additional study of the organisms in the area, the Navy will commit resources to identifying and controlling or removing sources of contamination to the offshore areas. The use of benthic community structure as an endpoint is inherently difficult due to the large number of natural (for example, temporal and spatial) and anthropogenic (for example, fill and chemicals) variables affecting such communities. Because impact of these variables is not well understood, differences in benthic community structure among sites can not be easily apportioned among the variables, including that of environmental contamination.

18. **Comment:** p. 3-19/20. It is unclear where the fill for Runway Wetlands was obtained. Historical records or interviews of present and former personnel may answer this. The source of the fill for Runway Wetland needs to be determined to aid in pin-pointing a source of contamination for the wetland.
- Response:** The source of contamination to this site will be investigated during the follow-on ecological work. The source and chronology of fill placement in the Runway Wetland will be included in the study.
19. **Comment:** p. 3-22. At the May 17, 1994 meeting on the Ecological Assessment at WESTDIV, it was agreed that the last paragraph on this page was going to be changed to prevent a misunderstanding in the value of these wetlands. The Service would like a copy of the re-worded paragraph when it is completed.
- Response:** The text will be rewritten as discussed and included in the revised EA.
20. **Comment:** p. 3-26. Include a sentence on the change in delineation of Runway Wetland after the base is closed. Air and runway traffic will decrease, lowering the disturbance around Runway Wetland and possibly making the wetland more attractive to migrating waterfowl.
- Response:** No reuse plan has been approved for the installation; therefore, all assumptions about future activities on the runway are speculative at this time. The reevaluation of the wetland will be based on several alternative scenarios of future use.
21. **Comment:** p. 3-27. The second sentence needs to be rephrased to recognize that this judgement is only under the current circumstances and will change once the environment surrounding the wetland (i.e. the closing of NAS Alameda) changes. This will prevent general misunderstanding about the important role of wetlands on this site.
- Response:** The text will be revised to reflect this point.
22. **Comment:** p. 4-2. Based on Figure 4-4, site B10 was to be off the southwestern tip of West Beach Landfill Wetlands. In future testing, a site should be included in this area. Having a site centrally located off the shore of the West Beach Landfill Wetlands will help characterize the extent of contamination and help determine whether the contaminants are being carried from the landfill, through the wetlands and into the bay.
- Response:** If any resampling of this area is done in the future, location B10 will be included.
23. **Comment:** p. 4-4/5. The highest areas of sediment metal contamination occur right off the northern shore of West beach landfill. This may be caused by runoff from the landfill. More storm water monitoring needs to be done to provide an answer to this question.
- Response:** See response to EPA general comment 3.

24. **Comment:** p. 4-41. It is suggested here that sediments from San Francisco Bay have been carried into Seaplane Lagoon to settle and accumulate over time. A study of the tidal flow in this area would determine if it is likely that San Francisco Bay sediment can be transported into the Seaplane lagoon in high enough quantities to explain the contamination seen here. It is recommended that tidal patterns and sediment loads in this area of the San Francisco Bay be included in any future study.
- Response:** As part of future reports, the Navy will discuss tidal flow and other physical dynamics influencing the movement of sediment into and out of the Seaplane Lagoon.
25. **Comment:** p. 4-41. 1993 storm water sampling was unable to be carried out. Rescheduling storm monitoring and runoff testing should be a priority. Many of the questions in the Ecological Assessment and the concerns of the Service may be answered through thorough storm monitoring and runoff testing.
- Response:** See response to EPA General Comment 3.
26. **Comment:** p. 4-41. It is suggested in the last sentence that the contamination seen in Seaplane Lagoon may be from the "gradual mobilization of chemicals from deeper sediments into surficial sediments over time." The likelihood of these contaminants mobilizing upward into the surficial sediment layer needs to be addressed further.
- Response:** See response to USFWS Comment 24 above.
27. **Comment:** p. 4-41. Sample analysis reveals that the deepest sediments are cleaner than the intermediate core sediment samples. It is unclear how contaminants would be mobilized from deeper sediments if the deepest sediments are cleaner than the surface sediments. If this idea is to be included in the Ecological Assessment, it needs to be expanded upon.
- Response:** Gradual mobilization of chemicals from deeper sediments is not expected to be significant. The text will be revised accordingly.
28. **Comment:** p. 5-3. There is currently a Least Tern predator reduction program at NAS Alameda. This program should be continued after the base closes. The Reuse Committee should address this.
- Response:** The Navy has advised the reuse committee of the current agreement with the USFWS to manage the least tern population at the installation, including predator control programs.
29. **Comment:** Section 5: It would be helpful to include the listing status, if any, for each species mentioned in this section.
- Response:** The revised EA will include the listing status of all species mentioned.

30. **Comment:** Section 5: There is no mention of a wildlife survey. A complete wildlife survey, performed by biologists familiar with the species in this area needs to be done. Once the survey is completed, include the results in the Ecological Assessment. A map, outlining the species and the locations they were seen in during the survey, would help in determining the areas of concern.
- Response:** A survey for threatened and endangered species is being conducted as part of the terrestrial ecological assessment, and will include nearshore aquatic species. The results of that survey will be reported in subsequent reports.
31. **Comment:** Section 6: December 13-14 was the third storm event of the 1993 Northern California rain season. The first storm event was in late October, the second storm event was the first week of December. Most toxicity in storm runoff is seen in the first event due to the extended summer dry season. When storm monitoring is re-scheduled, a first storm event sampling and analysis should be sampled to find the "worst case" run off scenario.
- Response:** This will be taken into account in the storm water sampling plan to be developed as part of the follow-on ecological work.
32. **Comment:** p. 7-2. "If the concentrations fall above the ER-M. . .biological effects could occur." This is true of any levels of contaminant above the ER-L. If the sentence must include the "ER-M" it should be re-phrased to say "biological effects are likely to occur."
- Response:** The text will be revised as suggested.
33. **Comment:** p. 7-3. Since there are only 5 areas, it would be beneficial to see PRC's ranking of more than the top 3 contaminated areas.
- Response:** Although the Seaplane Lagoon is the most contaminated site, ranking the remaining four sites on overall contamination is not straightforward. Because bioassay results and bulk chemistry were not well correlated at all locations, the nature and extent of contamination is best evaluated at each site separately.
34. **Comment:** p. 7-9. The last sentence would be better phrased "and did not contain concentrations of metals or organic compound at levels above the ER-L."
- Response:** The text will be revised as suggested.
35. **Comment:** p. 7-10. The last sentence should be changed to: "but did not cause toxicity in laboratory bioassay tests."
- Response:** The text will be revised as suggested.
36. **Comment:** p. 7-11. "It is possible that water from the Seaplane Lagoon or San Francisco Bay periodically floods the wetland, accumulates in the ponds, and evaporates, leaving an

increasing mass of trace materials behind in the sediments at that station." This theory should be followed up on. A check of available historical records will reveal the dates of flooding to this area. Computer projections and tidal charts will judge the likelihood of this occurring. A geological map of this area will determine if there are any geographical features between Runway Wetlands and Seaplane Lagoon that would either facilitate or prevent flooding. This does not explain, however, why areas closer to the Bay and closer to Seaplane Lagoon do not show contamination at the high levels seen at R3. Until there is more than a sentence outlining this flooding idea, it seems more likely the contamination is from runoff from the taxiway and shop area.

Response: The potential sources of contamination of this and other sites will be investigated more thoroughly in the follow-on ecological work and the basewide ecological assessment.

37. **Comment:** p. 7-12. The first sentence should be reworded to include all three factors.

Response: The text will be revised as suggested.

38. **Comment:** p. 7-12. See USFWS Comment 24.

Response: See response to USFWS Comment 24 above.

39. **Comment:** p. 7-12. Contamination is directly offshore to NAS Alameda and the major areas of contamination are linked to outflow areas of NAS. It is difficult to unilaterally accept the claim that the contamination "cannot be attributed specifically to NAS Alameda." Tidal flow studies showing how contaminants could be brought in from other areas could help clear up this claim.

Response: See response to USFWS Comment 36 above.

40. **Comment:** p. 7-12. "Although the areas of greatest chemical contamination in the Oakland Inner Harbor sediments were adjacent to major outfalls from NAS Alameda, they were also areas that were under the influence of discharges from major industrial centers such as the Port of Oakland and Todd Shipyards." Outfalls from other sources and including their locations need to be mapped out to better understand the strength of this claim.

Response: Subsequent ecological work will include tracing potential sources of contamination in the harbor. Maps of outfalls and other known sources of contaminants will be provided in the report of that investigation.

41. **Comment:** p. 7-16 paragraph 3. "It cannot be determined if the paucity of benthic populations in the West Beach Landfill Wetland was due to chemical contamination or to the harsh ecological conditions in the study area." This is the first time harsh ecological conditions have been mentioned. Please detail what these conditions are. See also EPA Specific Comment 19.

- Response:** See response to EPA Specific Comment 19.
42. **Comment:** p. 7-17 paragraph 3. The contamination from E4 is highly localized, yet contamination from other industrial centers in Oakland Inner Harbor and San Francisco Bay is suggested as a possible source of contamination. It is unclear how this is possible. Please expand upon this idea.
- Response:** The text will be revised to eliminate the reference to sources of contamination from other industrial centers in the Oakland Inner Harbor and San Francisco Bay. The actual sources of contamination at this location have not been identified. Distinguishing the contribution of contaminants originating on NAS Alameda from those discharged by other facilities in the area is time-consuming and is not currently a high priority for the Navy. The Navy's priority is to evaluate the toxicity of sediments and to investigate pollution prevention options for known terrestrial sources of contamination.
43. **Comment:** p. 7-17 last paragraph. Tidal and wind pattern analysis would help confirm this idea.
- Response:** No studies of tidal and wind patterns are proposed at this time. However, analyses of those processes would probably be included in any feasibility study the Navy conducted prior to designing a remedial action for the area.
44. **Comment:** p. 7-18 second paragraph. This sentence would be better as "toxicity was not expressed in laboratory bioassay tests."
- Response:** The text will be revised as suggested.
45. **Comment:** p. 7-18/19. There is no mention of Runway Wetlands in the Summary section. The Summary needs to be re-written to include Runway Wetland.
- Response:** A paragraph summarizing conditions at the Runway Wetland will be included as suggested.

Updated SVOC data for the Draft Ecological Assessment, Alameda

1. **Comment:** There is no discussion section at the end of Section 3 to discuss the results of the organic analysis of the Wetland area. This needs to be written and included at the end of Section 3 for the Ecological Assessment.
- Response:** Additional discussion will be included in the revision as suggested.
2. **Comment:** At the May 17, 1994, meeting at WESTDIV, PRC agreed to look into the possibility of contamination from the small arms range. The Service would like a copy of any plans to study the small arms range when they are prepared.
- Response:** An investigation of the small arms range will be included in the follow-on ecological work. A representative from the USFWS will be invited to the discussion meetings

prior to the development of the work plan for that task, and the draft work plan will be submitted for agency review.

3. **Comment:** p. 7-1 paragraph 2. Runway Wetlands also seems contaminated. Since there are only five sites, it is recommended that all five sites be listed in PRC's ranking order of most contaminated sites, not just the top three.

Response: As stated in the response to comment 33, ranking sites based on overall contamination is not straightforward because bioassay and bulk chemistry results were not well correlated. Although the Navy considers the nature and extent of contamination to be best evaluated at each site separately, complete data summaries will be provided in the revision, making it easy to rank the five sites based on whatever criterion one chooses.

4. **Comment:** There is no mention of a survey of the migrating waterfowl utilizing this area. A survey of all wildlife on NAS Alameda needs to be performed and the results need to be reported in the Ecological Assessment.

Response: See response to USFWS Comment 30 above.

COMMENTS OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

1. **Comment:** The conclusions drawn in the EA were widely spread throughout the document. The summary discussions in Sections 7.5 and 7.6 focused on the most contaminated sites, the West Beach Landfill Wetland and the Seaplane Lagoon, as opposed to all sites, and did not discuss any data gaps. It is recommended that Sections 7.5 and 7.6 be combined and changed into a "Conclusions" Section. This conclusions section should summarize the data and all conclusions reached for all of the sites as presented throughout the document, discuss data gaps and how these are to be addressed.

Response: The revised EA report will include tables summarizing the chemical data and bioassay results. In addition, sections discussing conclusions, data gaps, and proposed follow-on ecological work will be added.

Comments 2-6 address data gaps.

2. **Comment:** There are several data gaps that should be addressed in future evaluations. One, the sources and pathways of contaminants to the Western Bay side and Oakland Inner Harbor sites should be identified. Since sediment contamination and acute toxicity to *E. estuaries* has been observed at both of these sites, this evaluation is necessary to determine the extent of on-going contamination and the potential for future contamination at the sites. These data are needed prior to the remedial design phase so that remedial strategies will be effective and the possibilities of re-contamination are minimal.

Response: The Navy is planning an investigation of the sources of contamination to the nearshore area around NAS Alameda.

3. **Comment:** In addition, sediment samples should be taken to define any potential gradient of contaminants outside of the Seaplane Lagoon. It is recommended that sediment samples be collected on the other side of the piers located outside of the Seaplane Lagoon and any other nearshore area where Navy related activities may have taken place.

Response: Data from Navy dredge sediment surveys will be compared to chemical concentrations in the Seaplane Lagoon. See responses to EPA Specific Comment 15 and USFWS Comment 24.

4. **Comment:** It is also recommended that the seasonal wetlands located along the border of OU1 and OU2, and along the north runway be delineated and evaluated for potential contamination. This evaluation is warranted since these wetland provide important habitat and historical information about contamination potential may not be accurate.

- Response:** The U.S. Army Corps of Engineers is evaluating the seasonal wetlands in this area as part of the terrestrial ecological assessment currently underway. The report on that assessment will be submitted for agency review.
5. **Comment:** The mechanics of the groundwater hydrology in the West Beach Landfill should be further characterized to define the pathway for potential contaminant migration into the wetland. This is information that will be necessary to determine an appropriate remedy for the West Beach Landfill.
- Response:** The sources of contamination in the West Beach Landfill wetland will be investigated as part of the follow-on ecological work, using data collected under the RI. Groundwater will be evaluated as one potential pathway of contaminants from the landfill to the wetland.
6. **Comment:** Finally, high detection limits for PCBs, attributed to matrix interference, were used in many sediment samples, particularly at the West Beach Landfill Wetland. Resultant detection limits were up to an order of magnitude above ER-L concentrations. PCBs have not been adequately characterized in the West Beach Landfill Wetland and should be resampled and analyzed using better clean-up conditions for the extracts to achieve detection limits near the ER-L concentration.
- Response:** No decision on the reanalysis for PCBs has yet been made. The Navy is interested in discussing this matter further with NOAA, in the context of eventual remedial action decisions.
7. **Comment:** Use of ER-L/ER-M screening numbers. Concentrations should be compared to the newer ER-L/ER-M concentrations presented in Chapter 14 of the EPA document number 823-R-92-006, Sediment Classification Methods Compendium. In the EA, all comparisons of sediment chemistry to ER-L/ER-M concentrations were using mean concentrations as opposed to maximum concentrations. It is recommended that maximums as well as means to be compared to ER-L/ER-M concentrations. It is also recommended that summary tables showing maximum, minimum, and mean concentrations, and frequency of detection be created and referred to in the text for each site. This is necessary to determine worst case scenarios as well as the average case scenarios, and provide greater resolution when evaluating the data.
- Response:** The Navy agrees that the Long and Morgan ER-M values are not the most appropriate screening criteria for the sediments around NAS Alameda. The Navy is interested in working with the regulatory agencies and natural resource trustees to derive toxicity reference values (TRV) acceptable to all parties, based on published scientific literature and regulatory guidance. Subsequent data analyses will compare both the mean and maximum contaminant levels to the TRV for each chemical of concern.
8. **Comment:** Summary. The EA conducted at the five sites has demonstrated that contaminants are present at levels that have shown toxicity in bioassays. There are some data gaps which must be filled in order to better define the pathways and sources of

contamination, and to determine appropriate remedial actions for the sites. NOAA is interested in providing input and reviewing any additional work plans designed to fill the outstanding data gaps. If you have any questions about these comments or require further explanation or elaboration, I may be reached at (415) 744-3126.

Response: The Navy welcomes NOAA's participation as a natural resource trustee, and will continue to work toward consensus with other trustees and regulatory agencies in the ecological work being conducted at NAS Alameda.

COMMENTS OF CAL/EPA DTSC

- 1. Comment:** Denise Klimas, the National Oceanic and Atmospheric Administration (NOAA) Coastal Resources Coordinator (CRC) for EPA Region 9 who participated in developing the study plan, is not a member of the National Marine Fisheries Service (Section 1.5, page 1-6).

Response: The reference to NMFS will be deleted.
- 2. Comment:** The figure showing the location of the stormwater sampling stations is figure 1-4, not figure 1-2 referenced in the text (Section 2.1.3.4, page 2-9).

Response: The figure number will be corrected.
- 3. Comment:** The calculation of "cumulative ER-L values" employs a procedure which produces an index which is the deviation from the mean for each analyte standardized by the standard deviation of that analyte (Section 2.3.1.1., page 2-20). While this is a standard statistical methodology for producing a normally distributed variate, the more common method in risk assessment is to divide the analyte concentration by the ER-L without dividing by the standard deviation.

Response: The Navy will evaluate the method.
- 4. Comment:** Dendrograms portraying the results of the cluster analysis should be included in the appendices (Section 2.3.4, page 2-25).

Response: Bray-Curtis dendrograms are being prepared for the revised report.
- 5. Comment:** Total petroleum hydrocarbon (TPH) results in water from the Seaplane Lagoon are reported in units of mg/kg where mg/l are probably the more appropriate units for water (Section 4.2.3.5, page 4-21).

Response: The units for TPH in water will be changed.
- 6. Comment:** The text describing potential sources of contaminants to the Seaplane Lagoon (Section 4.6, page 4-41) should be modified to make clear that stormwater samples from the stormwater system leading to the Seaplane Lagoon were sampled during a storm event in 1993 (Section 6.0, page 6-1), but the stormwater system itself was not sampled during the 1993 storm season makes it impossible to ascertain the degree to which stormwater serves as a source of chemicals in Seaplane Lagoon sediments." could be interpreted to mean that storm water was not sampled.

Response: The current phrasing will be replaced by the following phrasing: "Stormwater drains leading to the Seaplane Lagoon were sampled at three stations in December, 1993. Sampling protocols and analytical results are discussed in Section 6.0 of this report."

7. **Comment:** Two statements on the same page seem contradictory (Section 4.6, page 4-43). We agree with the statement that "The contamination at stations E7 through E10 cannot all be attributed to NAS Alameda activities; the sites are adjacent to major discharges from the industrial portion of the base, and the roster of chemical toxicant measured was consistent with the toxicant known to be discharged from NAS Alameda industrial activities." However, we do not agree with the statement, several lines later, that "...it is difficult to conclude that all (or, indeed, any) of the contaminants present in sediments at E7 through E10 is derived from NAS Alameda discharges or NAS Alameda activities." There appears to be sufficient correlation between NAS Alameda outfall location, sediment chemistry results and toxicity testing to conclude that present or past discharges from NAS Alameda contribute to the demonstrated toxicity regardless of any contamination attributable to port facilities across the Inner Harbor Channel.

Response: The text will be revised to eliminate the sentence beginning, "Under such circumstances, it is difficult to conclude that all (or, indeed, any)...." Contaminants discharge into the Oakland Inner Harbor from numerous locations. The EA focused on the shore of NAS Alameda and did not attempt to investigate other sources of contaminants to the harbor. Distinguishing between the contribution of contaminants originating on NAS Alameda from those discharged by other facilities in the area is time-consuming and is not currently a priority for the Navy. Instead, the Navy's focus is to evaluate the sediment chemistry near known terrestrial sources of contamination. Please also see USFWS Comments 10, 36, 40, and 42.

8. **Comment:** We agree with the conclusions that some NAS Alameda sediments and wetland locations are contaminated with metals and/or organic compounds which are toxic to benthic invertebrates and that the storm water runoff is contaminated with soluble and particulate metals which are toxic.

Current sources of contaminant transport from NAS Alameda to the surrounding aquatic habitat and on-site wetland habitat should be identified and terminated. As contaminants associated with the West Beach Landfill appear to have migrated to the West Beach Landfill Wetland (section 7.4.1, page 7-9), transport of contaminants from the West Beach Landfill into San Francisco Bay should be investigated. Migration of soluble contaminants into San Francisco Bay with subsequent distribution by tidal action may be the reason demonstrated toxicity cannot be tied to Western Bayside sediment chemical concentrations. Flux chambers may be useful in quantifying the rate of transport. Mitigation of the West Beach Landfill Wetland (W4, W5, W6, and W7) and Runway Wetland (R3) areas identified as toxic should be completed to minimize the exposure of terrestrial and aquatic receptors. Preservation of the wetlands should be given high priority during further investigation and subsequent remediation. The storm water runoff which enters the Seaplane lagoon, which was not assessed, should be evaluated to determine the potential threat.

Response: The Navy will investigate the source of contaminants to the West Beach Landfill Wetland, the Western Bayside, and other sites at NAS Alameda as part of the follow-on ecological work and basewide ecological assessment. No decisions on mitigation of the wetland habitats have yet been made. The Navy welcomes the participation of regulatory agencies and natural resource trustees in the process of developing the work plans and reviewing the results of the work. Storm water issues are addressed in the responses to EPA General Comments 3 and EPA Specific Comment 17.

9. **Comment:** As some sediment and wetland location are demonstrably toxic, subsequent investigations should focus on the extent of the contamination. More extensive evaluation of contaminant concentration at depth should be conducted as part of the Remedial Investigation/Feasibility Study process. Consideration should be given to combining the review and selection of a final remedial alternative for NAS Alameda with the review and selection of a final remedial alternative for the nearby Fleet Industrial and Supply Center Oakland (FISCO) and the FISCO Alameda Annex Facility. This consolidation would provide a more complete examination of potential remedial alternatives for the entire area.

Response: The Navy will consider the idea of combining the remedial alternatives for NAS Alameda with other nearby Navy property.

SPECIFIC COMMENTS OF THE SAN FRANCISCO BAY RWQCB

1. **Comment:** The Navy needs to comply with the provisions set forth in the existing Site Cleanup Requirements for the Alameda Naval Air Station Skeet and Trap Club (Order Number 93-129), adopted by this office on October 20, 1993. The sources of pollution that the Order is concerned with are two skeet and trap shooting ranges, located on the upper, eastern corner of Site 1--the 1942-1956 Disposal Site. At this site lead pellets were shot directly into San Francisco Bay. The Site Cleanup Requirements directs the Navy to do three things. First, characterize the biology in the area where the lead was deposited. Second, characterize the lateral and vertical extent of lead sediment pollution, including what is in the particulate and what is dissolved in the sediment. Lastly, the Navy must conduct remedial action necessary to eliminate any risk. The Ecological Assessment (EA), currently being conducted at NAS Alameda, is the most appropriate place to address the concerns outline in the Order. Part of the EA's scope includes looking at the Western Bayside--the shoreline and sediments just west of the two landfill sites. This covers the area impacted by the two skeet ranges. The follow-on work for the EA at NAS Alameda shall be tailored to meet the provisions outlined in the Site Cleanup Requirements mentioned above.

Response: An investigation of the small arms range will be included in the follow-on ecological work. A representative from the San Francisco Bay RWQCB will be invited to the discussion meetings prior to the development of the work plan for that task, and the draft work plan will be submitted for agency review.

***SPECIFIC COMMENTS ON THE DRAFT REPORT BY ROBERTA HOUGH, RESTORATION
ADVISORY BOARD MEMBER (Dated 3 June 94)***

Typographic Errors

- 1. Comment:** Please correct the triangular diagram for sediment composition from B5 in the appendix.

Response: The values for B5 will be added to Figure A1.5-5. The values are 48 percent clay, 49 percent sand, and 3 percent gravel.
- 2. Comment:** Please add B5 as having significantly lower *Mytilus edulis* larvae survival (p4-31).

Response: The data presented in Table 4-15 show the mean survival of test organisms to be 81.2 percent, the lowest of the 14 stations; survivorship of control organisms was 105.9 percent. The difference between the test and control was less than the 20 percent established as the criterion for defining a toxic response. All of the bioassay results are being evaluated for the revision of the EA report, and a thorough discussion of the appropriate interpretation of bioassay results will be included.

Clarifications

- 3. Comment:** Please give the "logistical reasons" for not collecting a surficial sediment sample at B10 (pg 1-18) mentioned at the 5/17 meeting; the compacted sediment condition caused by scouring.

Response: No surface sediment was collected at station B10 because the Van Veen sampler was unable to penetrate the hard bottom at that location. This statement will be added to the revision.
- 4. Comment:** Since bioaccumulation tests were not performed when sites showed contamination greater than ER-M levels (e.g. B4, B6, B4, B8), please eliminate this supposedly independent criterion from page 1-7.

Response: The meaning of this comment is unclear. In fact, sediment samples advanced to bioaccumulation testing when bioassay results demonstrated toxicity or when chemical concentrations exceeded the ER-M.
- 5. Comment:** It would be helpful to state on pg 1-7 the actual criterion used for bioaccumulation testing, e.g. amphipod survival < 80.0%.

Response: Toxicity was defined as mortality or depressed function among test organisms at least 20 percent greater than the same response in control animals. See also response to EPA Specific Comment 5 and USFWS Comment 2.

Report Organization

6. **Comment:** Since an executive summary is more than an abstract it should include the recommendations for further work. These include the "additional surveys for threatened, endangered or other special status species and terrestrial communities" prior to base closure as well as additional core sampling in the Seaplane Lagoon to determine the depth of contamination.
- Response:** The executive summary will be revised to reflect issues raised since the development of the work plan, particularly those issues related to the closing of the base and subsequent transfer of property. The summary will also briefly outline the nature of the follow-on ecological work to be performed, including the survey of threatened and endangered species. The revised EA report will be submitted during the second half of 1995.
7. **Comment:** Please provide a table of contents for each volume of an appendix.
- Response:** Tables of contents for each volume will be provided in the final report.
8. **Comment:** Although I believe I have gone through it carefully, some data appears to be missing. These include:
- a. Water depth of sub-tidal grab sediment samples and/or location on bathymetric map
 - b. Topographic map of the base showing the watershed determination for the wetlands
 - c. Topographic map of the wetlands assessment area
 - d. Analysis of Skaggs Island wetland reference grab sample of April 9, 1993 for semivolatiles, TOC, tributyl tin, TPH and chlorinated hydrocarbons
 - e. Analysis of Skaggs Island wetland reference grab sample of June 3, 1993 for salinity
 - f. Particle size distribution for the control sediment
- Please provide an explanation if the data is missing or a location if it is not.
- Response:**
- a. Sediments were collected in 2.2 to 3.1 meters (7 to 10 feet) of water (page 1-22).
 - b. Graphic information on the wetlands is provided in Figures 3-16 through 3-20.
 - c. Topographic maps are provided in Figures 3-16 through 3-20. Quality of photocopies in the draft report was poor and will be improved in the final report.
 - d. Data on semivolatile organic compounds, TOC, tributyl tin, TPH, and chlorinated hydrocarbons was provided in an update to the report issued July 1, 1994.
 - e. Salinity in the June 3, 1993, sample was measured at 26.10 ms/cm (page 3-10).

f. Particle size distribution in the control sediments can be found in Appendix A1.5, Tables A1.5-12 and A1.5-13.

9. **Comment:** Please make long reports with their data appendices alternately available on computer diskette. With 1.44 Mb diskettes less than 50 cents apiece, it must be cheaper than paper reproduction. However, figures should still be available in hard-copy. WordPerfect 5.1 for PC's is very common; other formatted files could be translated.

Response: Navy policy currently prohibits distribution of electronic copies of documents in an effort to minimize unauthorized alteration of data or text. This policy is subject to change as the Navy reviews the costs and benefits of this policy.

Wetlands Description

10. **Comment:** I assume that a water balance is required to project the variation in open water as well as salinity in the wetlands assessment area. Please explain why assumptions of insignificant surface flow and groundwater recharge... [comment unreadable].

Response: Modelling the flow of water through the wetland habitats was beyond the scope of the Phase I EA. These habitats will be further characterized during the follow-on ecological work. In addition, groundwater data collected under the RI will be made available in the coming months, and will be integrated into the analysis of water transport in the wetlands.

11. **Comment:** What is the projected variation in salinity for the open water at the wetlands? Since some sediment interstitial salinity values are extremely high, have you assumed this geographic variation exceeds any seasonal variation?

Response: Salinity in the open water in the wetlands is expected to vary according to the patterns of rainfall and tidal influence. Measurements of salinity in the open water demonstrated only that the water was saline during the study period. The data were not used to make assumptions about salinity at any other time of year.

12. **Comment:** The USGS Oakland West quadrangle topographic map as photorevised in 1980 implies that the Runway watershed might extend north and east of that indicated in the WET Analysis Area Map. Please describe the watershed criterion.

Response: The watershed was delineated by visual inspection during the study period. Because the map as photorevised predates the ecological assessment by 13 years, the more recent observation is expected to be more accurate. During the follow-on ecological work, the WET analysis will be reperformed and new habitat descriptions written to reflect changing conditions related to base closure. The final report of the terrestrial preliminary endangerment assessment will contain habitat maps of the wetlands.

13. **Comment:** Please confirm that the watershed acreage exclude the assessment areas (total acreage were absent).

Response: The acreage of the evaluation areas were as follows:

Assessment area 22.3
Watershed of assessment area 270.0
Wetlands in assessment area 22.3
Wetlands in watershed of closest
service area..... 0.0
Wetlands and deepwater in watershed
of closest service area: 36.0

14. Comment: The argument that since the wetland is manmade and contaminated it has no value in terms of social significance, "effectiveness", and "opportunity" appears to ignore the loss of historic tidal marsh in this northern portion of the south bay. Has an addendum been contracted to reevaluate the wetland parameters under reuse? Please include in the main report some contextual data to indicate the importance of the wetlands (e.g. 92% reduction from historical tidal marsh areas in the bay) or state that these parameters have not been technically evaluated.

Response: Due to public concerns about the value of the wetlands at NAS Alameda, the WET analysis will be reperformed and the report revised to reflect current value and function as well as conditions expected to exist after the Navy has transferred the property. The report will include a discussion of the benefits and limitations of the WET techniques. Discussion of the historical value of the wetlands will be discussed in the follow-on ecological report.

Interpretation of Subtidal Sediment Data

15. Comment: The dredged area of the southeast portion of the Seaplane Lagoon should be indicated on a sample location figure, even if the exact areal extent is unavailable.

Response: The lagoon has been dredged repeatedly in many different locations. Any rendering of the boundaries of dredging operations in the Seaplane Lagoon would be misleading because the exact boundaries are not known. During the feasibility study, the Navy will compile more detailed information on the dredging history and current bathymetry of the Seaplane Lagoon.

16. Comment: Following the 5/17 meeting, it seems useful to detail other possible contaminant sources at the 1940-1956 landfill (pg 15), e.g. the incineration site at the northwestern tip and the rifle range along the western shore. This may reduce undue speculation regarding transport of contaminants from the Oakland Harbor into the area.

Response: The Navy has not identified all potential sources of contamination in the area. The follow-on ecological work and the RI will include such investigations. See also response to EPA Specific Comment 15, USFWS Comment 4, NOAA Comments 5 and 6, DTSC Comment 8, and RWQCB Comment 1.

Conclusions Regarding Environmental Impacts

17. **Comment:** Didn't the relative semivolatiles analysis, tri-butyl tin, and salinity improve the mortality correlation for the wetlands sediments? Shouldn't this be included?
- Response:** The Navy is reviewing the bioassay test data at this time to determine what conclusions can be drawn from the sometimes conflicting results. Additional analysis of the bioassay results will be included in the revised EA report, with associated tables and figures.
18. **Comment:** Dr. Christopher Kitting of California State University at Hayward emphasized the biological value of eel grass beds, which are located south of NAS Alameda, during the March 12 symposium. Please include these in your biological impact assessment, i.e. how far are they from NAS, what are the surface current flow estimates between the beds and NAS.
- Response:** Dr. Kitting stated that the nearest eel grass beds to NAS Alameda were more than 1 mile to the south. The Navy's investigation did not extend that far from the property boundaries. However, any animals associated with the eel grass beds that also use the waters directly offshore NAS Alameda are of concern and will be included in the follow-on ecological assessment.
19. **Comment:** Please include the location and distance of the Pacific herring spawning area relative to the Seaplane Lagoon.
- Response:** According to Frank Henry of the California Department of Fish and Game, Pacific herring spawn throughout the bay in areas near Angel Island, Paradise Cay, Richardson Bay, Redwood Dock, Hunters Point, Alameda, Oakland Harbor, PG&E Power Plant, Mission Rock, and other locations. Males enter the bay up to two months prior to spawning; all adults leave the bay after spawning. Larvae and juvenile herring can remain in the bay for up to ten months, but residency time in any one area of the bay is expected to be brief.
20. **Comment:** A reference map of near shore surface and bottoms currents would be generally helpful in visualizing the convection of contaminants from NAS Alameda.
- Response:** The Phase 1 ecological assessment focused on the effects of contaminants on resident organisms using the sediment triad approach. Subsequent ecological work will include analysis of sources of contaminants and some fate and transport modelling. However, analysis of offshore or bottom currents is beyond the current scope of the remedial investigation at NAS Alameda. The scope of the feasibility studies that will probably follow the RI will be likely to include study of water and sediment movement off the shore of NAS Alameda.

21. **Comment:** The contamination found at the runway wetland suggests that the adjacent subtidal sediments should be tested as discussed in the 5/17 meeting.

Response: See response to EPA Specific Comment 15.

Implications Derived from Report

22. **Comment:** The BRAC Cleanup Plan of March 6, 1994, chapter 5 on scheduling, suggests that no additional ecological assessment work will be required for the West Beach Landfill wetland (page 5-5, Figure 5-1 page 3) and that a second round ecological assessment for the sediments in the estuary and Seaplane Lagoon is being planned (page 5-5, Figure 5-1 page 3). Since these conclusions differ somewhat from the report recommendations, there should be an explanation provided, e.g. in an addendum to this report, which is referenced in the executive summary. EPA guidelines suggest that the administrative record should provide justification for agency decisions during the process, not merely at the ROD. Also, the question of whether further biological assessment is required (as raised at the 5/17 meeting) is semantically ambiguous given that additional sediment testing is being planned unless the bulk chemical analysis is interpreted as sufficient evidence for remediation.

Response: Since the publication of the EPA guidance on ecological assessment, and in response to agency and public comments on the draft EA report, the Navy has made a commitment to perform follow-on ecological work in both terrestrial and aquatic habitats at NAS Alameda. Meetings to develop the work plan for the follow-on work are already under way, and the final work plan is expected to be submitted by the end of 1995. Details of the nature of the follow-on work are discussed throughout the response to comments from regulatory agencies, natural resource trustees, and the public. Briefly, the follow-on work will include a survey of threatened and endangered species, a reevaluation of wetland function, an investigation of potential terrestrial sources of contamination to the aquatic sites, including the stormwater system, and a revision of the conceptual framework in which the results of the Phase 1 EA were interpreted to better reflect current DTSC and EPA guidance. The BRAC cleanup plan for NAS Alameda is regularly updated and its next revision will reflect the current scope of the investigations at NAS Alameda.

23. **Comment:** Please include the revised organic AET's (exclusive of the fresh-water data) mentioned at the 5/17 meeting.

Response: To the Navy's knowledge, no revised AETs are yet available from the published literature or regulatory guidance. The Navy plans to discuss the development of site-specific AETs and other toxicity reference values with the regulatory agencies and natural resource trustees during the planning of the follow-on ecological work. Published literature from many sources will be evaluated during the process of reaching consensus on the most appropriate data to use in developing screening criteria and cleanup values for NAS Alameda.

SPECIFIC COMMENTS ON THE SVOC AMENDMENT BY ROBERTA HOUGH, RESTORATION ADVISORY BOARD MEMBER (Dated 15 September 94)

Environmentally Sensitive Habitat/Wetlands Assessment

1. **Comment:** The recommendation that "additional surveys for threatened, endangered or other special status species and terrestrial communities should be completed to allow a more complete characterization of NAS Alameda prior to base closure" (Section 7.6 Amendment page 7-6) effectively acknowledges that the biota potentially impacted have not been adequately identified.

Response: The sediment triad approach outlined in the work plan developed by the BTAG did not focus on identification of specific taxa present at NAS Alameda. That approach has since been revised, and current ecological risk assessment guidance requires greater knowledge of species using the contaminated area. See response to EPA General Comment 2 and USFWS Comment 30.

2. **Comment:** Since characterization of the ecosystem potentially at risk from the toxic stressors occurs in both problem formulation and analysis stages of the EPA's Framework for Ecological Risk Assessment (1992) (pages 9-11, 18-19) it is unclear who the EA is "in accordance" with this document. Please confirm that sec 1.1.0 will be revised to indicate how this EA fits into the framework, e.g. as a first stage.

Response: The revised EA report will include a discussion of current DTSC and EPA guidance, including how existing data at OU4 fit into the framework for ecological risk assessment.

3. **Comment:** Although others will provide expert comments, we would like to note the following:

a. Several species were listed as observed in the runway wetland on "Wet Form C: Supplementary On Site Observations" of sub-appendix A but were not included in the table "Wildlife Species Observed or Predicted to Occur at the Runway Site" of sub-appendix C for the assessment area. These include both the brown pelican and the surf scoter which were not listed at all, and the western grebe, eared grebe, and meadowlark which were listed as possible rather than observed, and the mourning dove which was listed as possible but only for the 300 foot input zone around the wetlands assessment area and the wetlands watershed area.

b. The brown pelican was not listed in the Table, "Special Status Wildlife Species of the Runway Site".

c. The California Gull was omitted from the tables of special species for both wetlands. It was included as a special species in the handout presented by Dr. June Mire at the July 5, 1994 RAB meeting. It is a "Species of Special Concern" as designated by the California Dept. of Fish and Game (Fenney and Collins 1993).

- d. Birds protected under the Migratory Bird Treaty Act were not identified. These include the Western gull, Canada Geese and Caspian Terns.
- e. The "Low" rating for breeding wildlife of both wetlands appeared to neglect reports of nesting in the wetland habitat by several bird species included in the list by Feeney and Collins (1993): California Gull, Western Gull, Black crowned Night Heron, and Gadwall.
- f. Feeney and Collins also list 51 bird species that use the wetland habitat of NAS Alameda while the wetlands assessment includes only 25 for the West Beach Landfill and 16 for the Runway Wetlands.

Response:

- a. The species lists prepared for the final EA report will include the information as suggested.
- b. The brown pelican will be listed as a special status species in the final EA report.
- c. The California gull will be included as a species of special concern in the final EA report.
- d. The final EA report will contain extensive species lists, including migratory birds.
- e. The report by Feeney and Collins (1993) has been reviewed, and the data from that report will be included in the species lists in the final EA report.
- f. See response to comment 3e above.

4. **Comment:** Please confirm that the "Low" rating for migratory wildlife and "Medium" rating for wintering wildlife of the Runway wetland will be reviewed following incorporation of these and other relevant comments.

Response: The wetland evaluation will be reviewed during the follow-on EA work. See response to Roberta Hough Comment 14, dated June 3, 1994.

5. **Comment:** We disagree with the West Beach Landfill evaluation summary (p3 Appendix F) that its "value in terms of social significance, effectiveness and opportunity is absent". The authors apparently did not consider that tidal marsh was once extensive but has been eliminated by land fill practices. We also disagree with the similar conclusion for the Runway wetland (p8 App F).

Response: See response to Comment 4 above and response to Roberta Hough Comment 14, dated June 3, 1994.

6. **Comment:** We assert that "social significance" does not depend on public access and therefore is independent of base closure. For example, it could have been inferred from the species for which it provides needed habitat. Also, some of the bird species that use the base may be directly observed off-base.
- Response:** Social significance has been defined in many ways. The significance of the wetlands at NAS Alameda will be reevaluated in light of public interest in the issue that has become apparent since the base was slated for closure. See response to Roberta Hough Comment 14, dated June 3, 1994.
7. **Comment:** We wonder about the "reasoning" given for the Runway wetland (App F pg8) that, "Cultural and historical value are nonexistent because the wetland also occurs on a manmade island". This statement implies that a loss of wetland value occurred in 1902 because a tidal canal was dredged from the mouth of San Antonio Creek to San Leandro Bay (Merlin p84). For both wetlands, the main report (section 3.7) states that "uniqueness/heritage was rated high by the WET model, but because these wetlands are manmade, they have no cultural value and are not unique". Although this argument at least refers to the wetlands themselves, it still ignores the historic loss or tidal marsh in the area.
- Response:** These issues will be considered during the reevaluation of the wetlands. Discussion of the historical and current function and value of the wetlands will be included in the follow-on ecological report.
8. **Comment:** Would you please check whether the definitions given in Appendix F for "Effectiveness" and "Opportunity" have been typographically reversed or are the actual Army Corps of Engineers terms? Effectiveness is commonly associated with an actual performance relative to capability while opportunity could be associated with uniqueness of capability.
- Response:** The following definitions appear in the WET manual (Wetland Evaluation Technique (WET) Volume II: Methodology, Operational Draft, Department of the Army, 1987): "Effectiveness assesses the capability of a wetland to perform a function due to its physical, chemical, or biological attributes. Effectiveness does not estimate the magnitude at which a function is performed, only the probability that a wetland will perform the function. Opportunity assesses the chance or opportunity a wetland has to perform a function."
9. **Comment:** The rationale given for the "Low" and "Medium" ratings for migratory and wintering wildlife at the Runway Wetland could be explained further.
- a. It was given (pg9 App F) partly in terms of the surrounding environs, e.g. runways of NAS vs. woody vegetation. Please explain to what extent the environs affect the evaluation of the assessment area.

- b. It was also given partly in terms of the lower number of bird species observed relative to the West Beach Landfill. Yet several of those bird species observed at the Runway Wetland (per subappendix B) were not listed as observed in the West Beach Landfill Wetland. These include the brown pelican, the western grebe, the "double-breasted" (double-crested) cormorant and the surf scoter. Please explain whether the distribution of species affects the rating or only number of species.
- c. Please explain why this rating fails to reflect the relative scarcity of "freshwater tidal" wetland in the area?

Response: The Navy realizes that the assumptions underlying the WET analysis performed at NAS Alameda in Spring 1993 are no longer valid due to issues surrounding base closure and increased public access to the area. The assumptions will be reviewed based on these and other comments prior to the reevaluation of the wetlands.

10. Comment: The limitation of the assessment area to 51.8 dry acres out of the 59 dry acres and ~300 subtidal acres including the island breakwater that were requested by the U.S. Fish and Wildlife Service results in a very limited survey. The total area includes important resources including the night roost for the endangered California brown pelican, nesting area of the western snowy plover, federally listed as a threatened species, and nesting area of the northern harrier, a California species of special concern (Feeney and Collins, 1993). Please confirm that the follow-on work include the wetland watershed, the island and connected breakwaters and other environmentally sensitive habitat at NAS Alameda.

Response: The follow-on ecological work will consider the site in the context of potential exposure of assessment endpoints to contaminated media at NAS Alameda. See response to EPA Specific Comment 7 for discussion of endpoint selection.

11. Comment: The hydrogeology of the wetlands need further characterization.

- a. The areal extent of ponded water in winter of the Runway wetland was not given in the Appendix although a value of 2.8 acres of open water and 9.9 acres of brackish marsh are given in section 5.1.1.
- b. The observed gradient of toxicity in the West Beach Landfill Wetlands from the most toxic at the landfill to the least toxic near the bay suggest that the rate of contaminant migration needs to be determined.

Response:

- a. The preliminary endangerment assessment (PEA) to be performed in the terrestrial habitats will included a habitat survey of the Runway Wetland. Maps of this site, including areal extent of water, will be included in the PEA report.
- b. See response to USFWS Comment 4 and NOAA Comment 5.

Methodology

12. **Comment:** The comments by Tom Okey of Conservation Science Institute include many of the scientific and procedural concerns and include appropriate references. We agree with those comments. We also note that the workplan called for the ER-L rather than ER-M value to be the criterion for additional testing (p56). We support chronic testing although the endpoints may be less clear-cut than acute mortality studies.
- Response:** Selecting appropriate measurement endpoints is one of the most difficult tasks an ecological risk assessment team must accomplish. Although chronic testing is often the best choice for assessing toxicity of environmental media to organisms, standard protocols and variety of test organisms are limited, and results are often subject to interpretation. At this time, no single chronic test is widely accepted as the best measure of toxicity. The follow-on ecological work at NAS Alameda will benefit from the knowledge gained from this and other ecological risk assessments in San Francisco Bay and similar areas.
13. **Comment:** It is most unfortunate that the bioaccumulation tests were only performed where acute toxicity was expressed (Section 7.4.3). They would seem to be more useful as an independent indicator of biological impact as in the U.S. Army Corps of Engineers Green Book for sediment testing. It would seem more helpful as an indicator for chronic toxicity in the ambiguous cases where the bulk chemical analysis indicates contamination but acute toxicity was not expressed. Serial tests are particularly puzzling since the bioaccumulation data was not used for food-web modeling.
- Response:** See response to EPA Specific Comment 6. Bioaccumulation data will be reviewed for potential use in exposure modelling included in the follow-on ecological work.
14. **Comment:** An ecologically conservative interpretation of the existing data suggests that remediation will be required in all study areas. Some supporting arguments include the following:
- Subtidal sediments from all areas caused a negative biological response under laboratory conditions of exposure to biota; only station E6 had responses similar to controls. For example, station B6 had a survival of 81% +/-10% but apparently was not considered "toxic". Stations where the mean less the standard deviation encompass this "toxicity" criterion would also seem to pose a threat to biota. These include B6, B12, B1, B4 and B5. Without further information, we suggest that these stations should also be considered toxic.
- Response:** The Navy is currently engaged in discussions with regulatory agencies and natural resource trustees to reach consensus on the most appropriate measure of toxicity at NAS Alameda. Revised tables of bioassay data will include both the mean and the maximum values so that average and worst case scenarios can be readily evaluated. See also response to EPA Specific Comments 2, 3, and 5.

15. **Comment:** The least risk appears along the western portion of the estuary channel where contaminants may be scoured off by high flowrates as indicated by the low fraction of fines at stations E1, E2, E3, E5, and E6. However in the middle of this section, around pier 4, "contaminated" and "toxic" sediments were found at station E4. (A search of records that could confirm the "indications from subsurface profiles of this area" of earlier dredging around pier 4 (as suggested in the workplan, p28) would help determine when the current contaminant deposition could have started).
- Response:** The follow-on ecological work will include an evaluation of sources of contaminants and a limited review of offshore sediment migration patterns.
16. **Comment:** Some of the stations within an area which did not show statistically significant amphipod mortality may be a result of variations that are on a shorter time scale which are not captured by a single sampling event. Modelling of the flow conditions at the various locations would help distinguish the possibility of temporal variation among stations.
- For example, station B6 was considered non-toxic although stations north (B5) and south (B7) were found to be toxic. Yet B6 also varies in that it is closer to shore, possibly with a location on the steep incline joining the fill and the native bay elevations. Downslope transport of contaminants along the western bayside is consistent with lower observed toxicity of the proximal stations B4, B6, B8 and to a lesser extent B12 relative to the distal nearshore stations B3, B5, B7, B9 and B11. Of these latter stations only B9 near the southwest corner of the West Beach Landfill did not meet the "toxicity" and "contaminated" criteria. However, this station is likely subject to scouring as indicated by the low fines content as well as the reported inability to obtain a sediment sample from nearby B10 due to substrate consolidation (5/17/94 WestDiv briefing).
- Response:** No data from a single sampling event can be used to describe conditions that fluctuate on a short time scale. However, the estimation of risk to ecological receptors in the offshore habitats at NAS Alameda is based on chronic exposure to contaminated media. The large spatial area being investigated in this study precludes sampling for small-scale temporal variation in contaminant levels at a single location.
17. **Comment:** The possibility of downslope transport was acknowledged in the final sampling work plan (PRC, May 1992 p27). Since the landfills have been documented to leak toxins such as monochlorobenzene (PRC 1993), it appears feasible that toxins from the landfill could sorb onto particles and have a relative rapid migration down the incline followed by slower diffusion outward into the bay. This is consistent with the contaminant and toxicity gradient in both cases where sample latitudes and depths are similar, B7/B13 and B3/B14.
- Response:** See response to EPA Specific Comment 17.

18. **Comment:** The significantly reduced growth observed in the 20 day chronic *Neanthes* toxicity test at station B12, was not considered toxic.

Response: As presented in Table 4-15, the growth of *Neanthes* test organisms was significantly reduced at Station B12 compared to the test control. However, none of the other tests of growth, behavior development, or reproduction were significantly different from controls at this station. This illustrates the difficulty in defining "toxicity," as discussed throughout these comments.

19. **Comment:** The conclusion "that metals in sediments from all five study areas are available to aquatic biota and may be accumulated over time" sec 7.3.2 pg 7-6 vol 1, also suggests that feasibility studies should address all areas.

Response: All five sites of OU4 will be included in the follow-on ecological assessment.

EA Conclusions

20. **Comment:** The EA concludes that toxic stormwater continues to contribute metals to Seaplane Lagoon with total species concentrations an order of magnitude greater than the San Francisco Bay. Since only three of the sewer outfalls into the lagoon were sampled but all were found toxic, yet sampling of the remaining stormwater drains was not recommended, we expect that the feasibility study will address all stormwater drains.

Response: See response to EPA General Comment 3.

21. **Comment:** The EA also concludes that the Seaplane Lagoon is highly contaminated with DDT and PCB concentrations in sediment core samples among the highest that have been observed in San Francisco Bay. It recommends taking additional core samples in the Seaplane Lagoon to determine the "extent" of contamination. This is interpreted as the depth of contamination, which needs to be determined for removal plans. However, there is also concern over possible interpretations of the areal extent. Bioaccumulation testing and benthic analysis were not performed at three of the stations, S1, S4 and S6, in spite of their being "contaminated", that is, in excess of the ER-M. S4 is high in silver and S6 is high in nickel and are listed as such in Table 4-4. Unlike the high chromium values, these metals also exceed the 1992 ER-M values of McDonald presented by Dr. June Mire at the RAB meeting of July 5, 1994. The high levels of PCB's at station S1 exceed the 1992 ER-M while high levels of DDE at station S4 exceed both the 1990 and 1992 ER-M values. Apparently, the narrow "toxicity" criterion was actually used to neglect further testing at these stations as acknowledged in section 7.4.3 but in contradiction to the assertion made in section 1.5.0 (pg 1-7).

Response: The Navy has acknowledged that the Seaplane Lagoon is contaminated and poses a risk to ecological resources. Rather than commit scarce resources to further ecological study of the site, the Navy has chosen to proceed with the feasibility study to investigate remedial design alternatives. The areal extent of contamination at the offshore area is being addressed in part by the proposal to sample sediments in deeper

water near the Runway Wetland and south of the Seaplane Lagoon. As mentioned in previous comments, the definition of toxicity is complex; the Navy is working with the regulatory agencies and natural resource trustees to reach consensus on the appropriate measurement of toxicity at NAS Alameda.

22. Comment: Certain findings of the EA suggest that additional sampling will be required to complete the preliminary characterization.

- a. Given the discovered toxicity of the Runway wetland station R3 and its nickel contamination, sediments south of the runway but north of the dredged channel should be sampled as well. (The latter was discussed during the 5/17/94 presentation at WestDiv but was not included in the recommendations of the July 1 amendment.)
- b. Given the discovered toxicity of the stormwater entering the Seaplane Lagoon, stormwater drains which empty along the eastern portion of the estuary channel should be tested as possible continuing sources for the contamination and toxicity found at all those stations, e.g. E7, E8, E9 and E10.

Response: a. See response to EPA Specific Comment 15.

b. See response to EPA General Comment 3.

23. Comment: The amended section 7.6 calls for risk management analysis for areas of the Western Bayside and Oakland Inner Harbor "affected by contamination". This is consistent with the EPA's Framework for Ecological Risk Assessment (1992) which shows management concerns included in problem formulations and notes pg2: "...risk assessments are not a solution for addressing all environmental problems, nor are they always a prerequisite for environmental management". However, considering the incompleteness of the EA we suggest that the professional judgement relied upon for the management analysis must be more protective of the environment when data is either lacking or ambiguous if the analysis is to be considered reasonable.

Response: The final EA report and the work plan for the follow-on ecological work will include a discussion of risk management as suggested.

24. Comment: Unfortunately, the vary narrow interpretation of "toxicity" was also used to exclude further testing at stations B4 and B6, in spite of their having met the "contamination" criterion as indicated in Table 4-7. These and several other stations, notably in the western bayside region, showed high variability in amphipod survival such that the range of a single standard deviation from the mean includes the "toxicity" criterion. The rigid use of an arbitrary definition of toxicity may satisfy the contractual obligations of the work plan as noted in section 7.4.3 but suggests that additional work may be required to reduce the uncertainty of interpreting the risk to resident biota from stations "where very high concentrations of toxicants were detected in samples, but toxicity was not expressed" (Sec 7.6).

Response: See response to EPA Specific Comment 5.

Satisfaction Of Interim Goals

25. Comment: It appears that the Ecological Assessment, EA, fell short of several of its objectives. Those include the following (Section 1.3 Volume 1 page 1-4):

"To identify potential impacts on biota resulting from exposure to site sediments and surface water in the vicinity of NAS Alameda";

"To delineate and characterize two potential wetlands on NAS Alameda".

We suggest that the presently available information on the ecosystem at NAS Alameda should be included in an ecological risk assessment that does follow the EPA framework. Available information includes the sediment and surface water data presented in this Ecological Assessment, the species lists prepared by Ecology and The Environment in the Initial Assessment Study (1983) which the EA references (Section 1.2 Volume 1 page 1-2) and the "Partial Lists of Mammals, Reptiles, Birds, and Fishes of the Naval Air Station, Alameda" prepared for the East Bay Conversion and Reinvestment Commission's Environmental Committee by Leora R. Feeney and Laura D. Collins and dated October 16, 1993.

Response: See response to Comment 22 by Roberta Hough, dated June 3, 1994.

26. Comment: Additional characterization of the hydrogeology of NAS Alameda will also be needed for estimating contaminant transport rates, nutrient fluxes and temporal and spatial salinity variations of the wetlands. For example, although a gradient of toxicity from the landfill into the wetlands was observed the rate of transport will need to be evaluated to justify prioritizing remediation activities.

Response: See response to Comment 10 by Roberta Hough, dated June 3, 1994.

27. Comment: It appears that this document might better be termed a "biological assessment" to denote it as a subset of an ecological assessment since only individual toxicity testing for sediment exposure was performed without any population or ecological level impacts. The EPA's framework for Ecological Assessment and associated documents suggest several techniques for determining the ecological effects including food-web modeling and specific assessment of risks to endangered species. Although this document clearly did not intend to fulfill the EPA guidance, some particularly relevant questions should be addressed.

Response: As mentioned in the responses to many of the comments received on the draft EA report, the Navy realizes that the work plan developed by the BTAG in 1989 did not adequately address many of the components outlined in the current EPA guidance for

conducting ecological risk assessments. The revised EA report and the follow-on work plan will follow the current DTSC and EPA guidance more closely.

Future Work / Other Data Needs

28. **Comment:** The feasibility of collection of least tern eggs early in the nesting season for laboratory analysis for contaminants should be investigated.
- Response:** The least tern has been studied by a team of researchers for several years. The Navy will consult these researchers on the appropriate methods of assessing risk to the population at NAS Alameda.
29. **Comment:** Other expected uses for this ecological assessment data should be initiated to determine additional data gaps. For example, food web transfer of toxins is an identified concern especially for significant receptors such as the least tern, brown pelican, and peregrine falcon (BCP p3-32). Following food web modeling, the population effects on the suite of transferred contaminants needs to be assessed. For long-lived species such as the terns, it is particularly important to note when adults as well as juveniles may be affected. For example, one population based study of the probable effects of hydrocarbon exposure on terns showed that population recovery should require 20 years if 1/4 of the adults were affected. This information is likely to be needed for the Navy's environmental management plans and NEPA documentation for property transfer, but would benefit the ecological assessment as well. A preliminary model would help guide the follow-on sampling work.
- Response:** The Navy is interested in any published scientific data that would enhance the quality of the ecological assessment being performed at NAS Alameda. Please feel free to share such information freely.
30. **Comment:** A natural resources damage assessment screening seems likely although remediation and restoration efforts could satisfy the intent of such an assessment. However, those data gaps in the EA that would need to be filled for such an evaluation should be included in the follow-on work. Notable among these is the lack of a suitable control area(s) as a baseline (BCP pg3-31), since both the Skaggs Island wetland and San Pablo Bay subtidal reference stations were "contaminated" with nickel and exhibited acute "toxicity". Since the authors conclude that "Despite the widespread presence of metals, organic compounds, and chlorinated organic compounds among stations at NAS Alameda, it is possible to describe specific areas as more contaminated than others." (Sec 7.4.0 pg 7-9, italics added) it is unclear how they overlook the possibility of distinguishing less contaminated areas even within San Francisco Bay which may serve as more suitable references. Other comparisons might also be useful even if they cannot be considered true reference values. For example, how contaminated are sediments at other locations where the least terns forage?
- Response:** With respect to selecting an appropriate reference area to replace Skaggs Island, see response to EPA Specific Comment 1. The Navy understands that the RWQCB is in

the process of developing guidance for the use of reference sites in the San Francisco Bay area. For information about the quality of other foraging areas of the least terns, the least tern research team should be consulted. The Navy is not directly involved with least tern studies beyond the boundaries of NAS Alameda.

Source Identification and Characterization

31. Comment: In presentations on the Ecological Assessment of May 17 and July 5 it was suggested that the source of sediment contamination may be off-site, e.g. from the Port of Oakland. The March 1994 DEIS for the Port's deepening project includes some sediment chemical data in Appendix A which does not tend to support this verbal assertion. Although areas of the port are heavily contaminated, the southern portion of the estuary outlet has contaminant values which are lower than those of the nearby Western Bayside region of NAS Alameda. These include zinc, tributyl, total petroleum hydrocarbons, sum for DDD+DDE+DDT, and PCBs. Mercury and copper are also generally higher in the western bayside than at the mouth of the estuary. In the estuary, total petroleum hydrocarbons, sum of DDD+DDE+DDT, and PCBs are higher in the NAS estuary samples than in those of the port. Only port samples from the former Todd Shipyard area show zinc, mercury and lead values higher than those for the NAS Alameda estuary sediments.

Response: The Navy will review the data mentioned and revise the EA report accordingly. For more discussion of the Oakland Inner Harbor, see response to EPA Specific Comment 17 and USFWS Comments 10, 40, and 42.

32. Comment: It is true that chrome values are generally higher in the Port of Oakland sediment samples than in those for NAS Alameda. However, since the plating shops at the base are a known source of chrome, it seems unnecessary to postulate import to explain the contamination. Please confirm that the intent of suggesting outside sources of contamination such as the former Todd Shipyard is primarily to coordinate remediation planning with activities in these nearby areas.

Response: See response to USFWS Comment 42.

Sediment Remediation

33. Comment: We urge that feasibility studies for remediation of the environmentally sensitive subtidal sediments and wetlands and their contaminant sources (landfills and stormwater drains) be initiated concurrent with additional ecological risk assessment activities. This concurrence is recommended for several reasons:

The undisputed conclusion that remediation of the Seaplane Lagoon sediments is needed to stop the on-going release of hazardous chemicals into the environment;

Certain gross inadequacies of the ecological assessment, such as the lack of flow characterization at all sites including water input to the wetlands, will also be needed for the feasibility study;

The inadequacy of the list of remedial technologies identified in the Feasibility Study Plan (Canonie, 1985, Table 3-4b); and

Identification of acceleration opportunities for cleanup with base closure (BCP, 1994).

In addition, most sediment treatments are sediment specific and will also require preliminary treatability studies. This includes the metal extraction process of a local firm, Cognis Inc. of Santa Rosa, which was tested on Toronto harbor sediments.

Response: The follow-on ecological work will investigate the potential of landfills and stormwater as sources of contaminants. In addition, these areas will be investigated in future feasibility studies. See response to Comment 21 by Roberta Hough, dated September 15, 1994.

An Opportunity For Innovation

34. **Comment:** It appears likely that obtaining adequate information for a full ecological assessment will take significantly more resources than this phase I investigation document. Since useful testing of collected samples was not allowed under the scope of the work plan, a more flexible approach may be more cost-effective. This may take the form of an overall assessment contract which spans the different documentation stages that are expected.

Response: The Navy's contractual policies are separate from the scope of this discussion. The Navy prefers to take the iterative approach to conducting ecological assessments so as to allocate scarce resources as wisely as possible.

35. **Comment:** The schedule in the BCP (Figure 5-1) allows 2 years for the Follow-on EA Work which may be adequate to develop a comprehensive approach. Such an approach may be facilitated by involvement of local expertise including the Natural Resources department at the University of California at Berkeley or other local academic institutions. This would also minimize the potential controversy over the environmental management requirements after the Navy's departure and the corresponding NEPA documentation.

Response: All RI documents produced by the Navy are available to the public for comment. In addition, the public is invited to monthly RAB meetings to participate freely in open discussions of the issues. The Navy encourages all interested parties to take the opportunity to contribute to these discussions.

References Included with Comments of Roberta Hough:

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SPECIFIC COMMENTS OF THOMAS OKEY, M.S., CONSERVATION SCIENCE INSTITUTE (Dated August 1, 1994)

- 1. Comment:** The Apparent Effects Threshold (AET) approach is of questionable usefulness, and should be applied with extreme caution. No discussion of the uncertainties of this approach was included in the Ecological Assessment.

Response: The revised EA report will include a more detailed discussion of the benefits and limitations of the AET approach as applied at NAS Alameda. See also response to EPA Specific Comment 14.
- 2. Comment:** The Ecological Assessment (EA) bears little resemblance to the Framework for Ecological Risk Assessment (USEPA 1992) upon which the authors claim it was based.

Response: The framework was not published until well after the EA work plan was approved and the field and laboratory work had begun. The draft report acknowledged that the EPA framework had been published, but it was not possible to retroactively follow the guidance described in that document. As mentioned throughout the response to comments on the draft EA, the revised EA will address the EPA framework specifically, and the follow-on ecological work will be implemented according to both EPA and DTSC current guidance.
- 3. Comment:** The authors fell short of their stated goal of "...full assessment of the impacts of hazardous material disposal on ecosystems in and around NAS Alameda".

Response: The Navy acknowledges that the EA was not a full ecological risk assessment by current EPA and DTSC standards. Follow-on ecological work has been funded and planning is underway. See response to EPA Specific Comment 17.
- 4. Comment:** The EA contains useful bulk-chemical data, although further chemical sampling is needed to adequately characterize the vertical and horizontal distribution of sediment contamination.

Response: Additional chemical sampling is being planned for the follow-on work. See response to EPA Specific Comment 15.
- 5. Comment:** The EA contains some useful toxicity and bioaccumulation data, although they are presented as if the data have good statistical power (i.e. as if no *demonstration* of ecological impacts means that no impacts really exist).

Response: The large variances and non-normal distribution of chemical data collected in areas contaminated with hazardous waste makes attaining good statistical power extremely expensive; samples sizes in this type of investigation are rarely adequate to support true hypothesis testing of the sort suggested in the comment. Instead, phase 1 sampling of a small number of locations is conducted in order to ascertain whether additional

sampling is warranted. This iterative approach is preferred because it allows the Navy to allocate resources to the "worst first," meaning that areas of demonstrated contamination are given a higher priority than areas of potential contamination. The Navy has not "screened out" any sites in OU4 based on the draft EA report; the Seaplane Lagoon is moving into the feasibility study phase, and the remaining four sites are being reevaluated according to current EPA and DTSC guidance.

6. **Comment:** Benthic community studies in the EA are of little value; these studies were not appropriate for assessing ecological effects of contaminants since legitimate, multiple reference stations were not used.

Response: See response to USFWS Comment 17.

7. **Comment:** Sediment at the unreplicated reference stations was contaminated and toxic rendering these comparative stations virtually useless.

Response: See response to Roberta Hough Comment 30 dated September 15, 1994.

8. **Comment:** Food-web modeling and other fate-and-transport studies were left out of this EA. These types of studies are critical for identifying ecological receptors (at-risk organisms) and estimating exposure and effects throughout the ecosystem.

Response: See response to Roberta Hough Comment 27 dated September 15, 1994.

9. **Comment:** Objectivity, conservativeness, and completeness was lacking throughout the presentation and discussion.

Response: The Navy cannot respond to such an unspecific comment; please provide examples and suggested revision of statements to which you object.

The AET Approach

10. **Comment:** The Apparent Effects Threshold (AET) Approach has been used to identify concentrations of individual chemicals above which moderate or severe biological effects are likely to occur. These effects-level-low and effects-level-median values are based on observed effects and co-occurring concentrations in a wide variety of studies. Practical application of this approach has widely been abandoned in scientific, and even consulting, realms because of substantial logical and theoretical problems resulting in unacceptable uncertainty. Some of these problems are listed below:

Most contaminants-of-concern probably do not have threshold effects. Rather, chemical stresses on organisms and biological systems are exerted along a continuum from undetectable to sublethal and lethal effects (Underwood and Peterson 1988, Underwood 1989).

The concept of threshold effects has meaning only with respect to acute toxicity. It relates little to chronic toxicity and is arguably unrelated to mutagenicity, teratogenicity, and carcinogenicity.

The AET approach does not adequately address additive or multiplicative effects of complex mixtures of chemicals at specific sites (see Hutchenson 1973), nor does it take into account site-specific chemical and physical characteristics of the sediment, or changes in those characteristics.

The authors of this method recognized the tremendous uncertainty associated with this method, and they advised caution when applying it (Long and Morgan 1990, Long and Markel 1992). The severe limitations of this approach are not addressed in this EA.

Because the AET approach largely depends on crude toxicity tests to estimate toxicity, and on the statistical power of those tests, stations can erroneously be classified as non-impacted (SWRCB 1990).

Response: See response to EPA Specific Comment 7.

EPA Guidance

11. **Comment:** Despite the authors' claim that the EA was conducted in accordance with the Framework for Ecological Risk Assessment (USEPA 1992), it includes few components outlined therein. That framework divides assessments into three main parts: problem formulation, analysis, and risk characterization. Several important components outlined in each of those parts were neglected in this EA. According to the EPA guidance, the problem formulation phase should include identification and thorough description of the ecosystem potentially at risk, characteristics of the stressors of concern, and the possible ecological effects of those stressors. It also should include endpoint selection and the development of a conceptual model of ecological effects. The thoroughness and objectivity of the NAS Alameda EA suffers because none of these components were adequately addressed. Furthermore, the analysis and risk characterization sections of the EA did not include other important components called for in the EPA guidance, such as discussions of uncertainty.

Response: See response to Thomas Okey Comment 2.

Shortcomings of the Ecological Assessment

12. **Comment:** Some of the shortcomings of the Ecological Assessment are outlined in the following sections. These shortcomings prevent the Ecological Assessment from approaching reasonable completeness. The resultant lack of exposure and effects information leads the reader to presume worst-case-scenario.

Limited Bioaccumulation Testing

Bioaccumulation testing was undertaken only at the stations from which sediment was shown to be toxic to test animals. This is unfortunate because this particular tiered configuration makes it impossible to evaluate whether organisms bioaccumulate chemicals from the less contaminated sediment around the base. Studies of bioaccumulation and bioconcentration should be conducted as part of food web analyses and chemical fate and transport studies, especially in a setting where higher trophic-level organisms - like the Brown Pelican - are known to have undergone severe population declines as the result of DDT bio-magnification. There are benefits to tiered designs, but investigative questions should be clearly identified or revisited when adapting Army Corps of Engineers-type conventions such as upper-tier bioaccumulation testing and unreplicated reference sites.

Response: See response to EPA Specific Comment 5.

Neglecting Environmental Fate and Potential Impacts

13. **Comment:** It is probable that many of the contaminants from the sediment at, or surrounding, NAS Alameda accumulate in the tissues of higher food-web organisms such as fishes, birds, and humans. Moreover, many of these contaminants are known to biomagnify (increase in tissue concentration) as they make their way to higher trophic levels. Effects of these contaminants on higher food-web organisms include disruption of reproductive function, carcinogenicity, mutations, and developmental disruption. This should be of great concern because bioconcentration factors were estimated in this EA to be as high as six (6). Food web modeling, tissue-residue studies (of field-collected organisms), and other fate-and-transport studies were not undertaken in this EA.

Response: Food web modelling and other exposure assessments of ecological receptors at NAS Alameda will be conducted as part of the follow-on ecological work. The work plan will be developed in cooperation with the regulatory agencies and natural resource trustees, in accordance with current DTSC and EPA guidance.

Limitations of Ecological Effects Studies

14. **Comment:** Toxicity and bioaccumulation testing represent the only estimates of ecological effects made in the EA. An important complement to these rough estimates of effects are direct studies of effects, such as comparative and correlative studies of benthic communities. Such direct studies are considered important because of the high degree of field-realism they provide. Unfortunately, the investigators fell short of characterizing and evaluating suspected impacts of contaminants on the benthic community because benthic samples were taken only from the most contaminated sites at NAS Alameda and from unreplicated contaminated reference sites. Thus, community structure data may indicate highly stressed communities at every station around NAS Alameda, but correlative data are of little value without data properly evaluated only by comparison to multiple unpolluted reference stations and by correlative analyses that include unpolluted sites.

- Response:** See response to USFWS Comment 17 on the inherent difficulties of using benthic community structure as a measurement or assessment endpoint.
15. **Comment:** Multiple reference areas are necessary for comparative studies of community structure to be meaningful (Underwood 1992, 1994). This is because the real world is spatially variable, as statistically demonstrated in the EA. Thus, two randomly-chosen, apparently-similar areas would not be expected to have the same community structure. By comparing a potentially impacted site with a single reference station, one would not be able to distinguish whether the difference was due to the measured stress or simply to the natural variability between the two populations. Community impacts can only be evaluated by comparing the community at the potentially impacted site to the *range* of variability among multiple reference sites. Comparative studies of community structure that employ single reference sites result in data with dubious usefulness at best (Underwood 1992, 1994). Reference stations for many other San Francisco Bay studies have been located in Tomales Bay or Drake Estero.
- Response:** The Navy agrees that no single reference location is appropriate for comparison of benthic community structure. See response to EPA Specific Comment 1.
16. **Comment:** It is interesting that benthic samples were rinsed through a 1.0 mm mesh screen. With such a large mesh size, only a limited portion of the benthic community, the largest organisms, remains on the screen. The typical mesh size for benthic community studies is 0.5 mm, but an even smaller size is typically recommended for estuaries and wetlands because the fauna is smaller in these settings.
- Response:** See response to EPA Specific Comment 8.
17. **Comment:** Although bioassays provide useful estimates of ecological effects, no direct measurements of ecological effects were made on NAS ecosystems during this EA. Many different kinds of ecological effects can be measured in San Francisco Bay. Approaches to investigating direct effects of contamination include histopathological studies, studies of reproductive indicators, enzymatic function, blood disorders, and physiological stress (Long and Markel 1992, *also see* Underwood and Peterson 1988).
- Response:** The Navy knows of no standard or guidance for conducting ecological assessments that recommends such measurement endpoints during the Phase 1 investigation. In addition, these types of measures are not without problems; for example, the degree to which histopathological indicators in wild-caught fishes is caused by their exposure to contaminants at a specific site is not easily measured. The study designed by the BTAG for OU4 at NAS Alameda was considered extremely thorough at the time it was implemented, and has provided useful data to guide the next phase of the ecological assessment. See also response to EPA Specific Comment 7.

Western Landfills

18. **Comment:** Aside from brief descriptions of the western landfills, the EA does not include a thorough discussion of their role as a *source* of contamination. Sampling was conducted adjacent to these landfills but not within them. This lack of attention to the landfills themselves might lead the reader to believe that the Navy intends to completely remove the hazardous materials and the source-fill at these landfills. Conversely, the impression could be that the Navy does not wish to remind the public of the contents of the landfill because they intend to do nothing in these areas. The reader can only speculate because of the lack of discussion.
- Response:** See response to EPA Specific Comment 17, USFWS Comment 4, NOAA Comments 5 and 6, and DTSC Comment 8.
19. **Comment:** Furthermore, the authors did not attempt to determine the source of the Western Bayside sediment contamination, even though simple comparisons of existing data can help determine whether the primary source is the adjacent NAS landfill or nearby Oakland.
- Response:** The follow-on ecological work will investigate the sources of contamination for all five sites in OU4. In addition, chemical concentrations in soil and groundwater collected under the RI will be made available in the coming months. These data will be reviewed for potential information on sources of contamination.
20. **Comment:** At the Western Bayside there is a gradient of chemical concentrations from shore, with higher concentrations near shore and lower concentrations away from shore (compare Figs. 4-3 and 4-4 in draft report amendment). Concentrations of organic compounds at the Western Bayside (Fig. 4-3 and 4-4) were much higher than the same compounds at the Oakland Outer and Inner Harbor sediment (USACE/PO 1994; Table K-8). Furthermore, some organic compounds present in the Western Bayside sediment were not present in Oakland Harbor sediment. These clear patterns indicate that the historical Western Landfills on Alameda are the most likely source of contamination. It would have been extremely useful if the authors of the EA had pointed these patterns out and discussed the implications.
- Response:** The Navy will review the data mentioned and revise the EA report accordingly. For more discussion of the Oakland inner harbor, see response to EPA Specific Comment 17 and USFWS Comments 10, 40, and 42.

Striving for an Objective Assessment

Instead of pointing out all of the possible exposures, effects, and risks, the authors have created the feeling of a position paper in the EA. This subjective flavor does not serve the Navy because it affects their credibility. Examples of this lack of objective rigor can be found throughout the Ecological Assessment. Some of these are listed below:

21. **Comment:** The authors are creative when presenting assumptions and defining terms. For example, on page 1-5 they define "contamination" as synonymous with the ER-M. Here, effects are confused with exposure in a misleading way. Furthermore, they used the ER-M rather than the ER-L so that contamination would be synonymous with Long and Markel's (1992) criteria for severe effects. Also on page 1-5, the authors confuse toxicity with their designation of biologically significant toxicity, and they fail to point out the limited power of the tests.
- Response:** For a discussion of the Navy's position on the use of ER-L and ER-M values, see response to EPA Specific Comments 2, 3, 4, 5; USFWS Comments 5 and 32; and NOAA Comment 7.
22. **Comment:** The authors apparently rely on speculation only, when they argue that few individuals and low number of species are a natural state in the wetlands. They also argue that the extensive dead vegetation observed at the WBLW is natural. They seem to argue for a self-serving reality when faced with a lack of information resulting from a lack of uncontaminated reference areas in the design of the study.
- Response:** The Navy cannot respond appropriately to generalizations about the document. Please make comments specific, including page numbers, and suggest revised text.
23. **Comment:** The authors point out statistically significant patterns, but they do not point out numerical trends that are potentially detrimental to the Navy's interests. This is misleading because statistical significance is not the same as biological significance, especially when statistical tests have limited power. In other words, many numerical trends are biologically significant, but a limited number of samples or experimental replicates results in sufficient data-noise to render significant differences undetectable. For example, statistically significant differences were not detected between the growth of *Neanthes* and the control group at the West Beach Landfill, but the authors did not point out the real trend: growth was lower in each of the experimental groups relative to the control group. This indication of suppressed growth may be biologically significant.
- Response:** The Navy agrees that it can be extremely difficult to differentiate statistical from biological significance, particularly when sample sizes are low and variances are high. However, numerical trends are not always valid indicators of cause and effect, either. The bioassay results are currently being reevaluated, as suggested, as the Navy and the regulatory agencies plan the phase 2 work. The biological significance of the bioassay results will be discussed in greater detail in the revised EA report.
24. **Comment:** It is a mystery how the authors can claim that the wetlands on NAS Alameda have no recreational or cultural value and that their value in terms of social significance, effectiveness and opportunity is absent. This contention is absurd. Apparently, the authors did not consult with the public, government agencies and leaders, legislatures, businesses, schools, and environmental groups when making these statements of opinions.

Response: The methodology is published and open for discussion (Wetland Evaluation Technique (WET) Volume II: Methodology, Operational Draft, Department of the Army, 1987). Public consultation is not part of the WET analysis. However, the Navy realizes that the assumptions underlying the WET analysis performed at NAS Alameda in Spring 1993 are no longer valid due to issues surrounding base closure and increased public access to the area. The assumptions will be reviewed based on these and other comments prior to the reevaluation of the wetlands.

25. **Comment:** Either the WET analysis for wetland characterization is an inaccurate approach, or the authors commonly changed the outcome of the analysis to what suited them, or both. The text in the WET Analysis section of the report is frequently counter-intuitive and steeped in contradiction. This section is confusing and perhaps misleading because the WET analysis is supposed to be an objective and somewhat quantitative approach, yet many of the ratings seem subjective and short sighted; they do not take into account *potential* uses of wetlands. For example:

Wildlife Diversity/Abundance Breeding is rated low at the West Beach Landfill Wetland and at the Runway Wetland, despite the fact that several bird species are known to nest there, and many others rest and feed there. Surely many more would use this habitat if it were less contaminated.

Uniqueness and Heritage is rated low at WBLW, ignoring the history of wetlands on Alameda; one third of Alameda was once wetland and now there is almost none (Merlin 1977). *Uniqueness and Heritage* is rated high at RW by WET, but the authors claim that it is actually low because of the currently restricted access. This is silly, and it indicates that analyses are being manipulated to fit a pre-chosen outcome.

Sediment/Toxicity Retention is rated low at the Runway Wetland, but the authors state that all the characteristics suggest that it should be high.

Recreation is rated low at both wetlands despite the obvious potential.

Education Potential has not been included as a category.

The stated conclusion, "...neither (wetland) appears to be conducive to supporting diverse and abundant biological populations", is highly contestable.

Response: The WET analysis was performed by Habitat Restoration Group, an independent consulting firm specializing in wetland evaluations, using methods outlined in the WET manual (Department of the Army, 1987). The Navy has already made a commitment to have the WET analysis reperformed. See response to Thomas Okey Comment 24.

Recommendations

26. **Comment:** Further chemical sampling should be undertaken at all areas of concern to determine the vertical and horizontal distribution of contamination, as well as sources of contamination where unknown, so that remedial action and habitat enhancement can be planned and undertaken with minimal delay.
- Response:** Additional chemical data will be collected in offshore areas not previously sampled, but no new sampling is proposed for areas already sampled. See response to EPA Specific Comment 15.
27. **Comment:** Immediate remedial action should be undertaken in the Seaplane Lagoon. Engineering feasibility studies should be initiated immediately.
- Response:** The Navy has already made plans to initiate a feasibility study of the Seaplane Lagoon. See response to Roberta Hough Comment 21, dated September 15, 1994.
28. **Comment:** All potentially impacted ecological components around NAS Alameda should be identified including fishes, birds, humans, and other mammals.
- Response:** A complete species list will be included in the phase 2 work plan.
29. **Comment:** Food web studies, or at least food-web modeling, should be conducted to estimate exposure and effects on higher food-web organisms.
- Response:** See response to Thomas Okey Comment 13.
30. **Comment:** Investigations should include the full range of sub-lethal effects (Underwood and Peterson 1988, Long and Markel 1992).
- Response:** See response to Thomas Okey Comment 17.
31. **Comment:** Cleanup priorities should be determined and communicated. Managers should anticipate the needs for more funding, and secure it as soon as possible.
- Response:** The Navy is working with regulatory agencies, natural resource trustees, and the public to reach consensus on the appropriate measurement of evaluation of risk to ecological receptors. The Navy is aware of the need for additional funding for continued ecological work at NAS Alameda.
32. **Comment:** All parties should strive to conduct objective studies and present objective interpretations of data.
- Response:** The Navy agrees with this comment and welcomes the participation of all interested and qualified persons in this ecological investigation.

A Note on Efficiency and Flexibility

33. **Comment:** Several parties have expressed the need for flexibility and efficiency during the cleanup process. It has been suggested that investigators and regulators proceed using a "presumptive" rather than a strict approach. Thus, exhaustive assessments need not necessarily be undertaken for those areas that clearly must, and will, be cleaned up. However, the converse is not true; we assume that, faced with a lack of information, protective conservatism would dictate that investigators and regulators must presume the worst-case-scenario.

Response: The iterative approach to ecological investigations recommended by EPA and DTSC and adopted by the Navy yields ever-increasing levels of detail about the chemical, physical, and biological nature of a potentially contaminated site. The degree of conservatism is inversely related to the adequacy of the data to answer questions, as the comment suggests.

A Call for a Proactive Approach

34. **Comment:** We approach the Alameda base closure process with a certain idealism: that the interests of the United States Navy are the same as those of the public. We hope that the subjective and incomplete flavor of this Draft Ecological Assessment does not lead the public to believe that the armed forces, in some settings, can lose track of their mission to protect the citizens of the United States of America. We remain optimistic. We *know* that the Navy has the resolve to proceed on a thorough and honorable path. When *all* costs and risks are included in the calculation, the cleanest path will immediately be the straightest, easiest, and least expensive.

Response: The Navy also assumes that it is operating in the public's best interest by investigating and remediating hazardous waste sites at NAS Alameda. The draft EA report is but one of many documents to be produced as part of a comprehensive installation restoration (IR) program aimed at cleaning up and restoring the base to environmentally safe conditions. The IR program was in place long before base closure was an issue, demonstrating the Navy's fundamental commitment to environmental remediation of its property. The ecological assessment at OU4 was one of the first to be designed and implemented by the BTAG. While this approach is not without flaws, the Navy feels that the ecological work performed at OU4 is valuable and defensible as a phase 1 investigation of the wetland and offshore areas. As acknowledged elsewhere in the response to comments, the data collected during the phase 1 study will be reevaluated in the context of current EPA and DTSC guidance, and in response to the comments provided by reviewers. The participation of you and other members of the public is welcomed; we must all work together to develop the most scientifically defensible, socially responsible, and cost-effective solution to the environmental problems at NAS Alameda.

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