DRAFT FINAL SEAPLANE LAGOON REMEDIAL INVESTIGATION REPORT ALAMEDA POINT, CALIFORNIA

RESPONSE TO COMMENTS U.S. DEPARTMENT OF INTERIOR FISH AND WILDLIFE SERVICE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES

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DRAFT FINAL SEAPLANE LAGOON REMEDIAL INVESTIGATION REPORT
ALAMEDA POINT, CALIFORNIA
RESPONSE TO COMMENT

U.S. Department of Interior Fish and Wildlife Service
Response to June 21, 2004 Comments

SECTION 5: ECOLOGICAL RISK ASSESSMENT

1. **Page 144. Special status species should have assessment endpounts at the level of the individual, as well as the community**

   Response: Comment noted.

2. **Page 145 and Figure 5-2: The use of only surface (0 – 0.3 ft depth) sediment data is a major confounding factor in the interpretation of the risk assessment results. Many physical and biological processes make relatively deeper sediments bioavailable either through direct contact with these sediments by benthic organisms or indirectly through the disturbance and bioturbation that resuspends deeper sediments. On Page 14, the text refers too disturbance and mixing as possible reasons for the ongoing contamination of surface sediments. Similarly, the test on Page 15 states that "the depth and degree of vertical mixing have not been quantified." Therefore, the assumption that the only top four inches of sediment is bioavailable and the only source of exposure is not supported by site-specific scientific evidence or earlier test within the document itself. In addition, please revise Figure 5-2 to include these potential processes.**

   Response: As noted on Pg. 145, surface sediment (the top 0.3 ft) was considered the *primary* exposure medium for the ERA as it is most representative of current conditions. This does not mean that there is not the potential for exposure to deeper sediments, just that exposure to deeper sediments is unlikely to be as significant as exposure to surficial sediments. The use of surficial sediments (0 – 0.3 ft depth) is an appropriate methodology for the purposes of evaluating the potential risk posed by Seaplane Lagoon sediments to ecological receptors based on current conditions (which is the stated objective of the ERA – see pg 141) and is consistent with other San Francisco Bay programs. For example, it is consistent with the sediment sampling methodology used by the Regional Monitoring Program (RMP). The RMP monitors the top 5 cm to evaluate current conditions in San Francisco Bay as this horizon is representative of the active layer of undisturbed sediments (SFEI 2001, pg. 35). In a similar vein, the SFRWQCB has defined the top 15 cm of surficial sediments as being representative of the active layer when developing the PCB Total Maximum Daily Load (TMDL) (SFRWQCB 2003). By being consistent with other ongoing programs in San Francisco Bay, the Navy is able to use existing, long-term datasets for comparison purposes. This is especially important when comparing sediment concentrations to ambient conditions, or when interpreting toxicity bioassays and bioaccumulation data.

   Discussion on pages 14 and 15 regarding physical processes related to fate and transport of contamination within sediment found in Seaplane Lagoon is more germane as it relates to feasibility study issues than it does to ERA issues. The definition of the active layer and the importance of resuspension and bioturbation will be explored more fully in the FS for Seaplane Lagoon.

SFEI. 2001. Field Sampling Manual for the Regional Monitoring Program for Trace Substances.

SFRWQCB. 2003. PCBs in San Francisco Bay. Total maximum Daily Loads Project Report.

3. **Page 149. Please identify whether concentrations are in wet or dry weight for each term used and what metrics of concentrations were used for sediment and prey (e.g., maximum or upper precentile).**

Response: Dry weight units were used for all sediment and tissue concentrations as well as prey and incidental sediment ingestion rates. In the screening-level ecological risk assessment (SLERA) described on page 149, the exposure point concentration (EPC) for sediment (Csed) and tissue (Cprey) is the maximum concentration detected in the surficial sediments or tissue at Seaplane Lagoon. For the baseline ERA (BERA), the 95% upper confidence limit (UCL) of the mean or the maximum concentration (whatever was lower) was used as the EPC.

4. **Page 161. In the comments on the draft document the Service previously requested that the Navy revise the site use factor (SUF) for the least terns and recommended a value of 0.25. The service appreciates the Navy's use of several different SUF (0, 0.094, 0.25, 0.5 and 1) in evaluating risk to the least terns in this version.**

Response: Comment noted.

5. **Pages 163-164 and Tables 5-25 and 5-26. The hazard quotient with the low TRV for cadmium exposure to least terns is greater than 1.0 with bivalve tissue based on the SUFs recommended by the Service (0.25) and the Navy (0.094) and greater than 1.0 with forage fish tissue and the higher SUF (see table below). Given the uncertainty in the SUF and the need to protect individual least terns, the Service recommends that cadmium be retained as a chemical of concern for least terns.**

	SUF = 0.25	**SUF = 0.094**
Source of SUF	**Maximum observed plus uncertainty factor for marked to unmarked individuals, Service recommended**	**Average, Navy recommended**
Bivalve Tissue	**HQ_{lowTRV} = 6.92**	**HQ_{lowTRV} = 4.32**
Forage Fish Tissue	**HQ_{lowTRV} = 1.05**	**HQ_{lowTRV} = 0.624**

Response: Because the HQ_{low} was less than 1 at lower SUFs with relevant prey diets (e.g., fish), cadmium was not specifically identified in the last bullet of page 165 as a significant driver for birds at SPL. However, all COPECs with HQs greater than 1, including cadmium, were evaluated in more detail in Section 7. Based on this indepth evaluation of the relative contribution of reference versus Seaplane Lagoon exposure, cadmium and PCBs, followed by chromium, lead and DDx were identified as the main risk drivers to birds. PRGs were then developed for cadmium, DDx and PCBs.

6. **Figure 5-2. Please include the use of forage fish tissue in evaluating least tern exposure on the site model.**

Response: Figure 5-2 correctly indicates that piscivorous birds feed on both piscivorous-feeding fish and benthic-feeding fish. However, the text in the figure is incomplete because the description of the measurement endpoint for the least tern focuses solely on *Macoma nasuta* as the modeled prey to the tern while the use of the forage fish as prey was mistakenly not included.

SECTION 7. DEVELOPMENT OF PRELIMINARY REMEDIATION GOALS

7. **Page 242. The assumption that fish exposure to cadmium will primarily occur through sediment and prey is inconsistent with the text on Page 19 that describes cadmium's ability to leach from sediments (up to 40% in 90 days) and the observed flux of cadmium into the water column.**

Response: While cadmium in sediments at Seaplane Lagoon has been shown to leach and to flux into overlying water and may contribute to exposure to fish, surface water concentrations of cadmium measured in Seaplane Lagoon are well below ambient water quality criteria (Table 5-1). These data reinforce the conclusion that while cadmium may be fluxing from sediment into overlying water, tidal flushing of Seaplane Lagoon results in rapid dilution and/or transport of constituents out of Seaplane Lagoon (see Section 5.1.1.2). Therefore, the main pathway of exposure to fish is assumed to occur primarily through sediment and prey.

8. **Pages 243. Please note whether the distribution of the bioaccumulation factor (BAF) was tested to determine the appropriate measure of central tendency (e.g., mean, geometric mean, median).**

Response: Tissue concentrations of organisms exposed to Seaplane Lagoon sediments were used in conjunction with sediment chemistry results to quantify the biotic uptake rate. A bioaccumulation factor (BAF) was estimated for analytes accumulating into tissue by using the collocated data (Macoma) and proximal locations (forage fish). A ratio estimate using the sediment chemistry results and tissue results was then used to model the bioaccumulation response. The following ratios of concentrations were estimated.

BAF = $\frac{C_{tissue}}{C_{sed}}$, where

C_{sed} = COPEC-specific concentration in surface sediments (milligrams COPEC per kilograms sediment dry weight).

C_{tissue} = COPEC-specific concentration in tissue (milligrams COPEC per kilograms tissue dry weight)

A ratio estimate (Cochran, 1963) is a statistic used to estimate the rate or ratio between two variables both of which vary from sample to sample. The ratio estimate is simply the ratio of the averages of the two variables. Thus, BAF=average tissue concentration / average sediment concentration, using all paired sediment and tissue results. The ratio estimate has the advantage of being less variable (less uncertainty) and less biased than the average of the individual station ratios. It is preferred over regression-based analyses that have slopes that may be dominated by a single influential point, a tendency even more pronounced when the regression is modeled through the origin to obtain a simple rate based on slope alone.

Cochran, W. G. (1963). Sampling Techniques, second edition. John Wiley and Sons, Inc., New York.

SECTION 8. UNCERTAINTY ANALYSIS

9. **The Service reiterates its request that hazard indices also be used to evaluate potential additive impacts of chemicals that act by similar mechanisms or affect similar endpoints. The text change proposed in the Navy's response to comments did not adequately address the Service's recommendation for hazard indices and was not included in the Risk Characterization section. The toxicity reference values (TRVs) used in the risk assessment were specifically selected to evaluate reproductive endpoints, if available. The cadmium TRV is based on observations of kidney degeneration in juvenile birds, the PCB TRV is based on observations of decreased egg production in adult birds, and the total DDTs TRV is based on observations of egg failure to hatch. This suggests that the above compounds could have cumulative effects on the reproductive success of avian receptors, even though they act through different biochemical mechanisms, because they all affect key parameters associated with the number of young fledged per nest-number of eggs produced, number of eggs that hatch successfully, and number of young hatched that survive to fledge. An additive hazard index is therefore justified.**

Response: The Navy apologizes that the proposed revisions to the Risk Characterization Uncertainty Section in the Draft Final RI, as outlined in the response to comments dated XX, were inadvertently left out. While this results in a less comprehensive uncertainty analysis, it has no impact on the conclusions of the RI. Risk to avian receptors were characterized on a COPEC by COPEC basis. As a result, potential additive, synergistic or antagonistic interactions within a contaminant mixture were not evaluated; this may have resulted in the over- or underestimation of risk. The actual impact of this uncertainty on the development of PRGs and the FS footprint is believed to be minimal as the main avian risk drivers (cadmium, DDXs and PCBs) have different modes of toxic action.

As recommended by the US EPA, a hazard index (HI) approach can be used to evaluate additive, synergestic or antagonistic effects for those COPECs that have similar modes of action (USEPA 1997). It is not recommended for contaminants that affect similar endpoints as the mode of action may be different. A HI based on a low TRV (i.e., based on a no effect level) assumes that a mixture of COPECs with $HQ_{low}<1$ but with a $HI_{low}>1$ has some meaning; however, adding fractions based on no effect levels does not translate into an effect. A $HI_{high}>1$ has some significance when HIs are developed by using high TRVs (which are generally based within the mid range of low effect levels) and by adding those COPECs that have the same mode of action. This is because a $HI_{high}>1$ for COPECs with the same mode of action is likely to relate to a meaningful location on a dose-response curve.

HIs developed appropriately (by adding together only those COPECs that have similar modes of action and basing the HI on high TRVs) may be a useful tool to help reduce the potential for false negative errors when all individual HQs are less than 1. Those COPECs with the largest contribution to the HI can then be evaluated further as potential risk drivers. However, since risk drivers have already been identified at SPL using simple HQs, there is no need to be concerned about the potential for false negative errors. Because the application of HIs would require time-intensive evaluation, and would not aid in the development of PRGs or redefine the FS footprint, the Navy does not agree that they are required at this site.

US EPA 1997. Interim Final: Ecological Risk Assessment Guidance for Superfund: Process for designing and conducting ecological risk assessment. EPA/540/R-97/006.