



California Regional Water Quality Control Board

San Diego Region



Terry Tamminen
Secretary for
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Protection

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Arnold Schwarzenegger
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SSIC NO. 5090.3.A

April 20, 2004

Mr. Jose Payne
BRAC Environmental Coordinator
Southwest Division Naval Facilities Engineering Command
Base Realignment and Closure (BRAC) Operations
1230 Columbia Street, Suite 1100
San Diego, CA 92101

In reply refer to:
SMC:30-0092.05:komec

Dear Mr. Payne:

FINAL REMEDIAL INVESTIGATION REPORT FOR IR SITE 12, THE BOAT CHANNEL, FORMER NAVAL TRAINING CENTER, SAN DIEGO, CALIFORNIA

The Regional Board (RWQCB) received the above document dated October 30, 2003 on November 14, 2003. The document was submitted in response to comments jointly developed by the RWQCB, NOAA, and CDFG in a RWQCB's transmittal letter dated May 13, 2003. Staff has reviewed this document and found that significant changes have been made in the subject document to reflect agencies' comments. The Navy also recommends advancing Areas of Ecological Concern (AOECs) and potential AOECs identified through this investigation phase to the feasibility study phase. Staff believes that good progress has been made towards a comprehensive assessment of sediment contamination in the Boat Channel. However, there are still differences with regard to some of the methods used in data evaluation and risk assessment, and the results derived, as well as recommendations made by the Navy. Please revise the Final RI Report in accordance with the following comments provided by the RWQCB, NOAA, and CDFG:

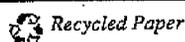
A. REFERENCE STATIONS

None.

B. SEDIMENT CHEMISTRY

1. The Navy used the 95% upper predictive limit (UPL) of the five reference stations as the background reference value for sediment chemistry evaluation of the Boat Channel stations. On the other hand, the Navy used the 95% upper confidence limit (UCL) of the reference station pools for toxicity and other assessments. As stated in Comment No. 13 of RWQCB's May 13, 2003 letter, the agencies required the Navy to use the 95% UCL for all assessments. This is based on the fact that the number of reference stations is insufficient to provide meaningful statistics, and the use of 95% UPL can exaggerate background conditions resulting in less environmental protection. The 95% UCL (5% significance one-tail test) is a more conservative approach where the number of reference

California Environmental Protection Agency



- stations is small. The Navy should have used the 95% UCL in all calculations for the Boat Channel sediment investigation. Please note that, staff has applied both 95% UCL and 95% UPL criteria for Boat Channel stations, the results showed that all stations have elevated sediment chemistry even using the 95% UPL criterion (see Table 1, Summary of Boat Channel Sediment Chemistry).
2. The Navy normalized metals to percent fines, and organic chemicals to percent total organic carbon (TOC), and used such normalized data to compare with similarly normalized 95% UPL reference values. This approach is inappropriate because all five reference stations have low percent fines and TOC, yet most Boat Channel stations contain a high percentage of fines and TOC. To make such a comparison sound, a reference baseline (slope) must be established based on clean reference locations with a wide range of percent fines and TOC, so that the variability of percent fines and TOC of reference stations is accounted for during calculations. Without a calibration between two variables (percent fine and TOC vs. normalized reference values), any comparison would be incorrect and inaccurate. Until such calibration is available, the Navy should have used measured concentrations for all calculations. Staff has re-calculated the mean ratio of sediment chemistry using measured values of heavy metals, organotins, total PCBs, total PAHs, and total chlordane. All Boat Channel sampling stations have elevated sediment chemistry (mean ratio > 1) using both 95% UCL and 95% UPL criteria. Total PAHs are normalized to TOC and compared to the consensus-based Threshold Effect Concentration value of 290 µg/g. Table 1, Summary of Boat Channel Sediment Chemistry also listed results of other sediment evaluation criteria as discussed in Comment No. 15 and 17 of RWQCB's May 13, 2003 letter.
 3. As indicated in Table 2 – Summary of Station Locations Exceeding Two or More Criteria, based on RWQCB re-calculation results, six stations (S2S2, S2S9, S2S10, S2S12, S2S14, and S2S16) in the southern portion of the boat channel are re-categorized as potential AOEC.

C. SEDIMENT TOXICITY

4. Section 6.1.1.3, Page A6-10, Paragraph 3 and Appendix H of the RI Report: It is not clear how statistical analyses were performed. ANOVAs for amphipod survival and echinoderm development are missing. Please clarify the statistical methods described for data analysis. If parametric or non-parametric methods are used, please demonstrate how they are appropriate.
5. Amphipod bioassay results (Section 6.4.1.1) showed that station S1S1 had 66% survival rate, which met all three criteria for sediment toxicity because the result is:
 - a). Significantly different from laboratory negative controls ($p < 0.05$);
 - b). Less than MSD threshold (77% of laboratory negative control); and
 - c). Less than 95% LCL of 75.9.

Yet, this station is categorized non-toxic by the Navy citing grain size confounding effect. Staff believes that this screening step is not appropriate based on the following facts:

- a). The grain size effect on toxicity test was not discussed or agreed upon between the regulatory agencies and the Navy;
- b). Even using the protocol developed by DeWitt et al. (1988) as cited by the Navy, the station's predicted survival rate of 73.8% is still significantly higher than the observed 66% survival rate;
- c). The Navy uses 95% lower predictive limit (LPL) of 65.9% to screen out the station. As discussed in Comment No. 1 above, a 95% LPL is less protective to the environment and underestimates the environmental impact at this station;
- d). The 65.9% LPL value is practically no different from the observed 66% value in consideration of laboratory and mathematical errors.

The Navy should have re-categorized Station S1S1 as having sediment toxicity.

6. Results of the 12.5% pore water sea urchin larval development bioassay (Section 6.4.1.2) showed that Station S1S8 had a 33.3% developmental rate, which met all three criteria for sediment toxicity because the result is:
 - a). Significantly different from laboratory negative controls ($p < 0.05$);
 - b). Less than MSD threshold; and
 - c). Less than 95% LCL of 74.3%.

Yet, this station is not considered toxic by the Navy citing that this station performed well in the 25% and 50% pore water tests. Staff believes that this statement is inconsistent with Navy's contention that confounding interference from ammonia exists at higher percent pore water testing, and the fact that the same station performed poorly at 75% and 100% pore water tests. The Navy suggested using 12.5% pore water results for sea urchin larval development test since the reference stations performed well at this concentration level. It is implied that the results from this 12.5% pore water test is most reliable. Although the cause for the discrepancy between the 12.5% and the 25%, 50% pore water results is unclear, the Navy should not discard any results from the 12.5% pore water test. The Navy should have re-categorized Station S1S8 as having sediment toxicity.

7. The pore water at the following stations exceed the California Toxics Rule (CTR) Water Quality Criteria for chronic copper exposure (3.1 ppb): S1S4, S1S5, S1S9, S2S11, and S2S16. The CTR criteria for chronic lead exposure (8.1 ppb) is exceeded at S1S4, S1S5, and S2S11. The CTR criteria for DDD chronic exposure, 0.001 ppb, and chlordanes chronic exposure, 0.004 ppb, is exceeded at S1S4. Exceedance of these concentrations in pore water is important because this is the fraction of water to which organisms that live in the sediments are exposed. Any exceedance of water quality criteria, especially given the questionable results of some of the testing, should trigger further evaluation.

8. As indicated in Table 2 the Navy should have re-categorized Station S1S1 as an AOEC and Stations S1S8, S1S9, S2S11, and S2S16 as potential AOEC.

D. BENTHIC COMMUNITY

9. The Navy should discuss how the Benthic Response Index (BRI) values were derived with supporting calculations.

Section 6.1.4, PA6-33, Diversity Indices, Margalef's Diversity. For completeness, it would be helpful to include the information that the Margalef diversity at stations S2S2, S2S10, and S2S11 were lower than the minimum reference value.

10. Station S2S3 has a Benthic Response Index value of 42, and should be categorized as having degraded benthic community. The Navy shall therefore re-categorize Station S2S3 as a potential AOEC as indicated in Table 2.

E. BIOACCUMULATION

11. The Navy used a "refined" biota-sediment accumulation factor (BSAF) to calculate clam tissue concentrations where no direct measurements were obtained. Such refined BSAF values were obtained based on a regression line between logarithm concentrations of clam and sediment data. Using the maximum BSAF values derived from Boat Channel sampling stations, 10 stations (Tables 6-61 & 62) had calculated lead hazard quotients (HQ) exceeding 1 for Surf Scoter and Lesser Scaup; while using the refined BSAF, only 2 stations (Table 6-63) exceeded 1 for Surf Scoter and Lesser Scaup, respectively. Although there is merit to the regression approach, staff believes that the regression method is subject to a larger error due to a logarithm regression, and underestimates the environmental hazard to wildlife. The Navy should use either the 95% UPL (n=15) of the regression, or the maximum BSAF value to recalculate HQ values.
12. The justification used by the Navy for using alternative toxicological benchmarks for Surf Scoter and Lesser Scaup in ecological risk assessments is not acceptable. Consistent with the review of other military sites, it is recommended that the Navy use toxicity reference values (TRVs) that have been developed for mammalian and avian receptors by the Navy and the U.S. EPA Region 9 Biological Technical Advisory Group (DON/BTAG).

These TRVs were developed in a consensus process that involved the Navy, and should be thought of as a standard. New data shall be presented and evaluated in a consensus process in order to change the TRVs. Until this process has been completed the original TRVs shall be used. Therefore, the use of an alternative TRV of 0.25 mg/kg-day for lead at Site 12 is not acceptable. Current DON/BTAG lead TRVs for mammals and birds are 1 mg/kg-day and 0.014 mg/kg-day, respectively. The Avian lead HQs may be refined by including the relative absorption of the different types of lead and the estimation of an ingested dose.

F. WILDLIFE EXPOSURE ESTIMATES

13. Table 6-24 provides assumptions and parameters used in the risk assessment. The following comments apply to these assumption and parameters used by the Navy:
- a.) Section 4.5.1, PA4-14, Paragraph 2: Since the first sentence mentions ecosystems at the Boat Channel, it would be helpful to restate that dermersal fish are the primary receptors in the conceptual model because sediment is the main exposure medium. More consideration should have been given to a possible pathway from sediments through surface-dwelling fish to endangered birds.
 - b.) Section 5.3, PA5-114, Paragraphs 3 & 4: Additional exposure information is needed. What are the assumed exposure frequency and exposure duration?
 - c.) Section 8.2.3, PA8-69: The "dose" of the wildlife was not conservative because mean values were used for the BW and IR. Please discuss these in the uncertainty analysis. Also, please discuss the effect of assumptions of exposure duration on the uncertainty.
 - d.) The Site Use Factors (SUFs) used by the Navy are too low. The USEPA cited 1.8 km to 22 km as a home range is a generic number and does not consider whether a population is resident, or whether an easily available food supply is existent near by. The DON only used the large home range to determine the SUFs. The Navy should perform a screening step using a SUF value of 1.
 - e.) For Lesser Scaup and Surf Scoter, 1 ha is assumed for a single station. At least 13 stations have lead HQ>1 using the maximum BSAF. The Navy should add all stations in the calculations and use SUF value of 1 and the 95% UCL for the ducks.
 - f.) The body weights for the following shall be adjusted:

	<u>Body Weight Used</u>	<u>Revised Value</u>
Harbor Seal	80.55 kg	99 kg
Lesser Scaup	1	0.647 kg

The ingestion rates for the following shall be adjusted:

	<u>Ingestion Rate Used in Current Document</u>	<u>Revised Value</u>
Harbor Seal	0.07	0.10
CA Least Tern	0.535	0.79
Pelican	0.149	0.29
Scaup	0.195	0.349

The appropriate ingestion rates for the heron and scoter shall also be calculated using Nagy 2001.

14. The Navy should provide a revised matrix table for the following parameters: chemistry, toxicity, bcnthic, and bioaccumulation/wildlife for all stations.

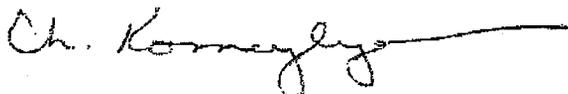
G. HUMAN HEALTH RISK ASSESSMENT

15. Tables 5-36 and 5-37 Fish Data: Mercury effects concentrations in spotted sand bass exceeds the human health consumption advisory of 0.3 ppb wet weight for all trawls conducted in the channel. The barred sand bass concentration of mercury exceeds the NOAEL (no effects concentration) of 0.15 ppm wet weight for fish at FT01, FT03, and FT06. The trawls were conducted between sampling locations S2S8 and S2S11. Based on this data the Navy should have re-categorized Stations S2S9, S2S10, and S2S11 as potential AOEC.

The heading portion of this letter includes a Regional Board code number noted after "In reply refer to:" In order to assist us in the processing of your correspondence please include this code number in the heading or subject line portion of all correspondence and reports to the Regional Board pertaining to this matter.

If you have any questions regarding this letter, please contact me at (858) 467-2734.

Sincerely,



Chehreh Sherrie Komehyan
Water Resource Control Engineer
Site Mitigation and Cleanup Unit

References: Nagy KA (2001). Food Requirements of Wild Animals: predictive equations for free-living mammals, reptiles, and birds. *Nutrition Abstracts and Reviews*, Series B 71, 21R to 31R.

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Table 1. Summary of Boat Channel Sediment Chemistry

Station	MR>1	SQGQ1>0.5	5 Chemicals Exceed ERM	Chemicals w/ >80% Incidence Rate Exceed ERM
S1S1	Y	Y		
S1S2	Y	Y		
S1S3	Y	Y		
S1S4	Y	Y	Y	CU,PB,DDT,DDE,PCB,CHLORDANE
S1S5	Y	Y		PCB,CHLORDANE,DDT,
S1S6	Y	Y		PCB,CHLORDANE,DDT,DDE
S1S7	Y	Y		CHLORDANE,DDT
S1S8	Y	Y		PCB,CHLORDANE,DDT,
S1S9	Y	Y		PCB,CHLORDANE,DDT,
S1S10	Y	Y		PCB,CHLORDANE,DDT,
S2S1	Y			
S2S2	Y			PCB
S2S3	Y			PCB
S2S4	Y	Y		PCB,CHLORDANE,DDT,
S2S5	Y			
S2S6	Y			PCB
S2S7	Y			CHLORDANE
S2S8	Y			PCB
S2S9	Y			
S2S10	Y			PCB,DDT
S2S11	Y			PCB
S2S12	Y			PCB
S2S13	Y			
S2S14	Y			PCB
S2S15	Y			PCB
S2S16	Y			PCB

Table 2 – Summary of Station Locations Exceeding Two or More Criteria

Station	Elevated Chemistry	Degraded Benthic Community	Potential Risk to Wildlife	Toxicity	Potential AOEC	AOEC
S1S1	Y	Y		Y		X
S1S2	Y					
S1S3	Y					
S1S4	Y	Y		Y		X
S1S5	Y			Y	X	
S1S6	Y	Y		Y		X
S1S7	Y	Y			X	
S1S8	Y			Y	X	
S1S9	Y			Y	X	
S1S10	Y					
S2S1	Y					
S2S2	Y			Y	X	
S2S3	Y	Y			X	
S2S4	Y			Y	X	
S2S5	Y			Y	X	
S2S6	Y					
S2S7	Y					
S2S8	Y					
S2S9	Y			Y	X	
S2S10	Y			Y	X	
S2S11	Y			Y	X	
S2S12	Y			Y	X	
S2S13	Y					
S2S14	Y			Y	X	
S2S15	Y					
S2S16	Y			Y	X	