

John McCammon  
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## MEMORANDUM

**TO:** John McCammon  
Acting Director  
Department of Fish and Game

**FROM:** Joan E. Denton, Ph.D.

**DATE:** March 13, 2008

**SUBJECT:** SAN FRANCISCO OIL SPILL: OEHHA MUSSEL EVALUATION

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The California Office of Environmental Health Hazard Assessment (OEHHA) has assessed the results from follow-up sampling and analysis of resident mussels from Berkeley Marina and Rodeo Beach and, as a result, we are rescinding the mussel advisory for these areas. Attached is an addendum to the "Report on the Safety of Consuming Fish and Shellfish from Areas Impacted by the M/V Cosco Busan Oil Spill in San Francisco Bay, California," by OEHHA. The addendum summarizes the follow-up sampling, analysis, and assessment of the risk of consuming resident mussels from Berkeley Marina, Rodeo Beach, and other sites potentially impacted by the Cosco Busan oil spill.

Mussels collected from Berkeley Marina and Rodeo Beach shortly after the spill were found to have elevated levels of polycyclic aromatic hydrocarbons (PAHs) expressed as benzo[a]pyrene equivalents (BaPE). As a result, OEHHA issued consumption advice recommending that the public not eat mussels from these locations. Follow-up sampling was conducted for Berkeley Marina, Rodeo Beach and nearby sites in December 2007, to determine if human consumption of resident mussels at or near these locations continued to pose a significant health risk. Additional sites were also sampled for confirmation of continued safe levels of PAHs in other locations in the area impacted by the spill.

Although pre-spill background levels for these sites have not been established, based on this assessment, OEHHA and the California Department of Public Health concur that humans who consume mussels from the spill impacted area no longer face significant health risks from exposure to oil-based contaminants. Consequently, OEHHA is rescinding the consumption advice for Berkeley Marina and Rodeo Beach. The pre-spill fish consumption advisory for San Francisco Bay remains in effect.

Attachment

## Appendix 3

### **EVALUATION OF FOLLOW-UP MUSSEL SAMPLES IN AREAS IMPACTED BY THE M/V COSCO BUSAN OIL SPILL IN SAN FRANCISCO BAY, CALIFORNIA**

#### Follow-up Sampling and Analysis

The oil spill sampling and analysis team, originally convened on November 13, 2007, met again on November 30, 2007, to develop a follow-up sampling plan to determine when the level of PAHs in resident mussels at Berkeley Marina and Rodeo Beach fell below the public health protective concentration for significant human health risk. Mussels from both of these sites were to be collected until the benzo[a]pyrene equivalent (BaPE) levels fell below this criterion. The team also considered whether contamination might extend to other areas near Berkeley Marina or Rodeo Beach, resulting in mussels that were above the criterion. The team looked at two samples from north and south of the Berkeley Marina that had been collected and analyzed by Natural Resources Damages Assessment teams and that had not been included in OEHHA's initial assessment. The BaPEs in the north sample collected near Point Isabel in Richmond and south sample collected at the east side of the Bay Bridge were 4.06 and 6.02  $\mu\text{g}/\text{kg}$ , respectively. Because both results were below the criterion of 44  $\mu\text{g}/\text{kg}$ , sample sites closer to Berkeley Pier were selected for follow-up analyses (Golden Gate Fields to the north and Emeryville Marina to the south). The team also decided to sample Muir Beach near Rodeo Beach, to analyze archived mussels from Hyde Street Pier collected November 16, 2007, and from Angel Island collected on November 28, 2007, and to collect new mussel samples at Hyde Street Pier and Angel Island as confirmation that PAH levels in mussels continued to be below the criterion. Original and follow-up sampling sites for mussels are presented in Figure 1.

#### Results and Rescinding Health Advisory

Three composites of 50 mussels were collected by California Department of Fish and Game collectors at each of the follow-up sampling sites. Samples were again shipped on ice overnight to TDI-Brooks for preparation and standard analysis of PAHs. Table 1 shows the date of collection and individual composite results for each of the follow-up mussel samples. All of the mussel samples were below the criterion for significant risk for human consumption and are considered safe to eat. Consequently, OEHHA will rescind the consumption advice for Berkeley Marina and Rodeo Beach. OEHHA discussed these results with the sampling team. Because all sampled sites in the area impacted by the spill were determined to be below the public health protective concentration, the team determined that no additional sampling was necessary.

The pre-spill health advisory for San Francisco Bay that has been in place since 1994 because of contamination of fish with mercury and PCBs is the only current set of consumption recommendations for the bay. This advisory is shown below.

### **Health Advisory for San Francisco Bay**

- **Women of childbearing age and children** should eat no more than one meal per month of San Francisco Bay sport fish, including sturgeon and striped bass caught in the delta. In addition, they should not eat any striped bass over 27 inches or any shark.
- **Women beyond their childbearing years and men** should eat no more than two meals per month of San Francisco Bay sport fish, including sturgeon and striped bass caught in the delta.
- **Women beyond their childbearing years and men** should not eat any striped bass over 35 inches.
- One meal for a 160-pound adult is about eight ounces before cooking.
- This advisory does not apply to salmon, anchovies, herring, and smelt caught in the bay; other sport fish caught in the delta or ocean; or commercial fish.
- In addition to the above advice, no one should eat any croakers, surfperches, bullheads, gobies or shellfish taken within the Richmond Harbor Channel area because of high levels of chemicals detected there.

**Table 1. BaPE concentration<sup>1</sup> in mussel samples in ppb ( $\mu\text{g}/\text{kg}$ ) wet weight.**

<i>Sample #</i>	<i>Collection Date</i>	<i>Location</i>	<i>BaPE (<math>\mu\text{g}/\text{kg}</math>)</i>	<i>Mean BaPE by Location (<math>\mu\text{g}/\text{kg}</math>)</i>
MS30430-ENV1733	12/05/07	Golden Gate Fields Rep 1	13.11	
MS30430-ENV1733	12/05/07	Golden Gate Fields Rep 2	7.62	9.20
MS30430-ENV1733	12/05/07	Golden Gate Fields Rep 3	6.87	
MS30430-ENV1733	12/6/2007	Muir Beach Rep 1	10.58	
MS30430-ENV1733	12/6/2007	Muir Beach Rep 2	14.79	13.18
MS30430-ENV1733	12/6/2007	Muir Beach Rep 3	14.17	
MS30430-ENV1733	12/6/2007	Rodeo Beach Rep 1	8.44	
MS30430-ENV1733	12/6/2007	Rodeo Beach Rep 2	10.32	10.98
MS30430-ENV1733	12/6/2007	Rodeo Beach Rep 3	9.81	
MS30430-ENV1733	11/28/2007	Angel Island Rep 1	3.89	
MS30430-ENV1733	11/28/2007	Angel Island Rep 2	2.57	2.57
MS30430-ENV1733	11/28/2007	Angel Island Rep 3	2.85	
MS30429-ENV1730	11/16/2007	Hyde Street Pier-SF Rep 1	8.87	
MS30429-ENV1730	11/16/2007	Hyde Street Pier-SF Rep 2	6.07	7.13
MS30429-ENV1730	11/16/2007	Hyde Street Pier-SF Rep 3	6.44	
MS30429-ENV1730	12/05/07	Hyde Street Pier-SF Rep 1	3.61	
MS30429-ENV1730	12/05/07	Hyde Street Pier-SF Rep 2	5.71	4.77
MS30429-ENV1730	12/05/07	Hyde Street Pier-SF Rep 3	4.98	
MS30429-ENV1730	12/05/07	Emeryville Marina Rep 1	2.42	
MS30429-ENV1730	12/05/07	Emeryville Marina Rep 2	2.35	2.51
MS30429-ENV1730	12/05/07	Emeryville Marina Rep 3	2.75	
MS30429-ENV1730	12/05/07	Berkeley Marina Rep 1	8.84	
MS30429-ENV1730	12/05/07	Berkeley Marina Rep 2	7.31	8.48
MS30429-ENV1730	12/05/07	Berkeley Marina Rep 3	9.28	

<sup>1</sup>Sum of BaP equivalents for Benz[a]anthracene (PEF 0.10), Chrysene (0.01), Benzo[b]fluoranthene (0.10), Benzo[k]fluoranthene (0.10), Benzo[a]pyrene (1.00), Indeno[1,2,3-cd]pyrene (0.10), Dibenz[a,h]anthracene (0.36), naphthalene (0.01).

Figure 1: Post Spill Mussel Sampling Locations: Original and Follow-up Locations

