

## DEPARTMENT OF HEALTH SERVICES

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October 6, 1994

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Dear Mr. Song:

Thank you for the opportunity to attend the technical presentation and comment on the Navy's Phase 1B ecological risk assessment for the Naval Station Treasure Island Hunters Point Annex (HPA) site. As you know, we are concerned that off-site contamination from the HPA site may be affecting fish and shellfish in the areas. Although there is much recreational fishing in the waters near the HPA site, there has been very little study of fish contamination and its potential impact on human health.

In Task 6 of the ecological risk assessment, you have proposed fish and shellfish tissue residue studies to assess ecological impacts that may be linked by the HPA site. Such studies are planned to protect populations of birds, fish, and other organisms judged to be ecologically important in off-site areas near HPA.

We hope that you will consider expanding your ecological studies of fish and shellfish to include human health concerns. Although, as a health department, our primary concern is human health, we would like to point out that assessment of human health impacts from recreationally caught fish and shellfish meet some of the selection methodology presented in Task 6. Recreationally caught fish warrant study because they are valued by society for their economic and recreational value. These fish may have economic value because some people fish as a source of food. Recreational fish may also have ecological significance. Recreational and economic values may be lost if fish are affected by contamination and are unsafe for consumption.

In Task 6 you have proposed sampling two species of fish, the California halibut and native gobies. We suggest expanding the species sampled to include resident bottom-feeding fish that are consumed by recreational fishers, such as the white croaker and surfperch. Such fish can provide an indication of local contamination and are frequently consumed by recreational fishers. Furthermore, these fish have been collected the Regional Water Quality Control Board (RWQCB) in a pilot study of fish tissues in San Francisco Bay. The RWQCB data, which will be available by the end of November, will provide comparison values with other areas around the Bay. (Four composite samples from the Hunters

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We question the inclusion of halibut in further studies. Mature halibut migrate off-shore and, although they live along the bottom, they feed on fish which live in the water column such as anchovy. Immature halibut, which are more resident and feed off the bottom, would be a better indicator of contamination, but they may not have reached legal size for recreational fishing. Also, past studies such as in Santa Monica Bay, have shown that halibut are relatively clean when compared to other species. Thus they probably are not an ideal indicator of localized contamination.

On a final point, it was noted at the August 19 meeting that concentrations of contaminants found in mussel tissues were compared with human health values set by the Food and Drug Administration (FDA) and that no HPA samples exceeded the FDA level for PCBs. It was also noted that these FDA values were, in general, much higher than levels for protection of ecological health.

In fact, there are other comparison values for protection of human health that are considerably lower than the levels set by the FDA. For example, the U.S. Environmental Protection Agency screening value for fish tissue is only 10 ppb and the State Water Resource Control Board's Maximum Tissue Residue Level for fish and shellfish is only 2.2 ppb for PCBs (see attached). These values are 200 and 900 times lower than the FDA level of 2,000 ppb. We suggest that you consider these alternative values when interpreting analyses of fish and shellfish in further studies at HPA.

Thank you again for hearing our concerns.

Sincerely,

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Environmental Health  
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Enclosure

cc: See next page.

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**GUIDANCE FOR ASSESSING CHEMICAL CONTAMINANT DATA  
FOR USE IN FISH ADVISORIES**

**VOLUME 1: FISH SAMPLING AND ANALYSIS**

Contract No. 68-C3-0303

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Table 5-2. Dose-Response Variables and Recommended Screening Values (SVs) for Target Analytes

| Target analyte   | Noncarcinogens                | Carcinogens                                | SV <sup>a</sup> (ppm) |                                       |
|--|-------------------------------|--|-----------------------|---------------------------------------|
|  | RfD <sup>b</sup><br>(mg/kg/d) | SF <sup>b</sup><br>(mg/kg/d) <sup>-1</sup> | Noncarcinogens        | Carcinogens<br>(RL=10 <sup>-5</sup> ) |
| <b>Metals</b>  |                               |  |                       |                                       |
| Cadmium  | 1 x 10 <sup>-3</sup>          | NA   | 10                    | —                                     |
| Mercury <sup>c</sup>   | 6 x 10 <sup>-5 d</sup>        | NA   | 0.6 <sup>d</sup>      | —                                     |
| Selenium <sup>e</sup>  | 5 x 10 <sup>-3</sup>          | NA   | 50                    | —                                     |
| <b>Organochlorine Pesticides</b>   |                               |  |                       |                                       |
| Total chlordane (sum of cis- and trans-chlordane, cis- and trans-nonachlor, and oxychlordane) <sup>f</sup> | 6 x 10 <sup>-5</sup>          | 1.3  | 0.6                   | 0.08                                  |
| Total DDT (sum of 4,4'- and 2,4'-isomers of DDT, DDE, and DDD) <sup>g</sup>                                | 5 x 10 <sup>-4</sup>          | 0.34                                       | 5                     | 0.3                                   |
| Dicofol  | 1 x 10 <sup>-3 h</sup>        | NA   | 10                    | —                                     |
| Dieldrin   | 5 x 10 <sup>-5</sup>          | 16   | 0.6                   | 7 x 10 <sup>-3</sup>                  |
| Endosulfan (I and II)  | 1.5 x 10 <sup>-3 h</sup>      | NA   | 20                    | —                                     |
| Endrin   | 3 x 10 <sup>-4</sup>          | NA   | 3                     | —                                     |
| Heptachlor epoxide   | 1.3 x 10 <sup>-5</sup>        | 9.1  | 0.1                   | 0.01                                  |
| Hexachlorobenzene  | 8 x 10 <sup>-4</sup>          | 1.6  | 9                     | 0.07                                  |
| Lindane (γ-hexachlorocyclohexane; γ-HCH)   | 3 x 10 <sup>-4</sup>          | 1.3 <sup>i</sup>                           | 3                     | 0.08                                  |
| Mirex  | 2 x 10 <sup>-4</sup>          | NA <sup>j</sup>                            | 2                     | —                                     |
| Toxaphene  | 2.5 x 10 <sup>-4 h,k</sup>    | 1.1  | 3                     | 0.1                                   |

See notes at end of table

(continued)

Table 5-2 (continued)

| Target analyte                           | Noncarcinogens                | Carcinogens                                | SV <sup>a</sup> (ppm) |                                       |
|--|-------------------------------|--|-----------------------|---------------------------------------|
|  | RfD <sup>b</sup><br>(mg/kg/d) | SF <sup>b</sup><br>(mg/kg/d) <sup>-1</sup> | Noncarcinogens        | Carcinogens<br>(RL=10 <sup>-5</sup> ) |
| <b>Organophosphate Pesticides</b>        |                               |  |                       |                                       |
| Carbophenothion                          | 1.3 x 10 <sup>-4 h</sup>      | NA   | 1                     | —                                     |
| Chlorpyrifos                             | 3 x 10 <sup>-3</sup>          | NA   | 30                    | —                                     |
| Diazinon                                 | 9 x 10 <sup>-5 h</sup>        | NA   | 0.9                   | —                                     |
| Disulfoton                               | 4 x 10 <sup>-5</sup>          | NA   | 0.5                   | —                                     |
| Ethion                                   | 5 x 10 <sup>-4</sup>          | NA   | 5                     | —                                     |
| Terbufos                                 | 1.3 x 10 <sup>-4 h</sup>      | NA   | 1                     | —                                     |
| <b>Chlorophenoxy Herbicides</b>          |                               |  |                       |                                       |
| Oxyfluorfen                              | 3 x 10 <sup>-3</sup>          | 1.3 x 10 <sup>-1</sup>                     | 30                    | 0.8                                   |
| <b>PCBs</b>                              |                               |  |                       |                                       |
| Total PCBs (sum of Aroclors)             | NA <sup>i</sup>               | 7.7 <sup>m</sup>                           | —                     | 0.01                                  |
| <b>Dioxins/dibenzofurans<sup>n</sup></b> |                               |  |                       |                                       |
|  | NA                            | 1.56 x 10 <sup>5</sup>                     | —                     | 7 x 10 <sup>-7</sup>                  |

NA = Not available in EPA's Integrated Risk Information System at this time (IRIS, 1992).

PCB = Polychlorinated biphenyl.

RfD = Oral reference dose (mg/kg/d).

RL = Risk level (dimensionless).

SF = Oral slope factor (mg/kg/d)<sup>-1</sup>.

<sup>a</sup> Except for mercury, screening values (SVs) are target analyte concentrations in fish tissue that equal exposure levels at either the RfD for noncarcinogens or the SF and an RL=10<sup>-5</sup> for carcinogens, given average consumption rates (CRs) and body weights (BW) of 6.5 g/d and 70 kg, respectively, for the general adult population (U.S. EPA, 1989d). **Note:** These values have been determined by rounding the final calculated value

(continued)

5. SCREENING VALUES FOR TARGET ANALYTES

Table 5-2 (continued)

to one significant figure. EPA believes that using more than one significant figure would imply a degree of precision that is not warranted given the large uncertainty factors generally used in deriving SVs. For target analytes with both carcinogenic and noncarcinogenic effects, the lower (more conservative) of the calculated SVs should be used. **Note:** Values in the shaded boxes are SVs recommended for use in State fish/shellfish consumption advisory programs for the general adult population. States may choose to use other SVs based on different CRs, BWs, and/or an RL ranging from  $10^{-4}$  to  $10^{-7}$ .

- <sup>b</sup> Unless otherwise noted, values listed are the most current oral RfDs and SFs in EPA's IRIS (IRIS, 1992).
- <sup>c</sup> Because most mercury in fish and shellfish tissue is present as methylmercury (NAS, 1991; Tollefson, 1989) and because of the relatively high cost of analyzing for methylmercury, it is recommended that total mercury be analyzed and the conservative assumption be made that all mercury is present as methylmercury. This approach is deemed to be most protective of human health and most cost-effective.
- <sup>d</sup> For the purpose of calculating an SV, the RfD for methylmercury currently available in the EPA IRIS database ( $3 \times 10^{-4}$  mg/kg/d) has been lowered by a factor of 5 to a value of  $6 \times 10^{-5}$  mg/kg/d. The EPA is reevaluating the RfD for methylmercury and is especially concerned about evidence that the fetus, and possibly pregnant women, are at increased risk of adverse neurological effects from exposure to methylmercury (WHO, 1976, 1990; Piotrowski and Inskip, 1981; Marsh et al., 1987). In the general adult population, blood methylmercury concentrations of 200 µg/L (corresponding to approximately 50 µg/g in hair) have been associated with a 5 percent risk of paresthesia; whereas for the fetus, a 5 percent risk of neurological and developmental abnormalities is associated with peak mercury concentrations of 10-20 µg/g in the maternal hair (WHO, 1990). These findings suggest a possible fivefold increase in fetal sensitivity to methylmercury exposure. Consequently, the EPA has chosen to apply an uncertainty factor of 5 to the current IRIS RfD for methylmercury. This approach was deemed to be the most prudent as an interim measure until the current reevaluation of the methylmercury RfD is completed.
- <sup>e</sup> The RfD for selenium is the IRIS (1992) value for selenious acid. The evidence of carcinogenicity for various selenium compounds in animal and mutagenicity studies is conflicting and difficult to interpret. However, evidence for selenium sulfide is sufficient for a B2 classification (IRIS, 1992).
- <sup>f</sup> The RfD and SF values listed are derived from studies using technical-grade chlordane (purity ~95%) or a 90:10 mixture of chlordane:heptachlor or analytical-grade chlordane (IRIS, 1992). No RfD or SF values are given in IRIS (1992) for the cis- and trans-chlordane isomers or the major chlordane metabolite, oxychlordane, or for the chlordane impurities cis- and trans-nonachlor. It is recommended that the total concentration of cis- and trans-chlordane, cis- and trans-nonachlor, and oxychlordane be determined for comparison with the recommended SV.

(continued)

Table 5-2 (continued)

- <sup>g</sup> The RfD value listed is for DDT. The SF value is for DDT or DDE; the SF value for DDD is 0.24. The U.S. EPA Carcinogenicity Assessment Group recommended the use of SF = 0.34 for any combination of DDT, DDE, DDD, and dicofol (Holder, 1986). It is recommended that the total concentration of the 2,4'- and 4,4'-isomers of DDT and its metabolites, DDE and DDD, be determined for comparison with the recommended SV.
- <sup>h</sup> The RfD value listed is from U.S. EPA (1993b).
- <sup>i</sup> IRIS (1992) has not provided an SF for lindane. The SF value listed for lindane was calculated from the water quality criteria (0.063 µg/L) (U.S. EPA, 1992e).
- <sup>j</sup> The National Study of Chemical Residues in Fish (U.S. EPA, 1992c, 1992d) used a value of SF = 1.8 for mirex from HEAST (1989).
- <sup>k</sup> The RfD value is the Office of Pesticide Programs value; this value was never submitted for verification.
- <sup>l</sup> The National Study of Chemical Residues in Fish (U.S. EPA, 1992c, 1992d) used a value of RfD =  $1 \times 10^{-4}$  for Aroclor 1016 from ATSDR (1987c). The Great Lakes Initiative uses an RfD =  $8 \times 10^{-6}$  for total PCBs (i.e., all PCB isomers and Aroclor mixtures) (U.S. EPA, 1992e). The EPA Environmental Criteria and Assessment Office, Cincinnati, OH, is also currently developing RfDs for the noncancer toxicity of various commercial mixtures of PCBs (Michael Doursan, Chief of Systemic Toxicants Assessment Branch, EPA Office of Research and Development, Cincinnati, OH, personal communication, April 21, 1992).
- <sup>m</sup> The SF is based on a carcinogenicity assessment of Aroclor 1260. The SF of Aroclor 1260 is intended to represent the upper bound risk for all PCB mixtures (IRIS, 1992).
- <sup>n</sup> The SF value listed is for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (U.S. EPA, 1986c). The National Study of Chemical Residues in Fish used a value of RfD =  $1 \times 10^{-9}$  for 2,3,7,8-TCDD from ATSDR (1987d). It is recommended that, in both screening and intensive studies, the 17 2,3,7,8-substituted tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans be determined and a toxicity-weighted total concentration be calculated for each sample for comparison with the recommended SV, using the revised interim method for estimating Toxicity Equivalency Concentrations (TECs) (Barnes and Bellin, 1989; U.S. EPA, 1991h). If resources are limited, the 2,3,7,8-TCDD and 2,3,7,8-TCDF congeners should be determined at a minimum.

**Maximum Tissue Residue Levels (MTRs)**  
 in Fish and Shellfish for Enclosed Bays and Estuaries

| Substance  | MTRs<br>(edible tissue) |
|--|-------------------------|
| <b>Carcinogens</b>                                     | <b>(ug/kg. ppb)</b>     |
| acrylonitrile  | 11.0                    |
| aldrin <sup>b</sup>                                    | 0.33                    |
| benzene  | 110.0                   |
| benzidine  | 0.02                    |
| beryllium  | 2.5                     |
| bis(2-chloroethyl) ether                               | 4.3                     |
| bis(2-ethylhexyl) phthalate                            | 1300.0                  |
| carbon tetrachloride                                   | 72.0                    |
| chlordane (total) <sup>b</sup>                         | 1.2                     |
| chloroform   | 1800.0                  |
| DDT (total) <sup>b</sup>                               | 32.0                    |
| 1,4 dichlorobenzene                                    | 3600.0                  |
| 3,3'-dichlorobenzidine                                 | 3.0                     |
| 1,2-dichloroethane                                     | 150.0                   |
| 1,1-dichloroethylene                                   | 18.0                    |
| dichloromethane  | 1400.0                  |
| 1,3-dichloropropene                                    | 60.0                    |
| 2,4-dinitrotoluene                                     | 35.0                    |
| 1,2-diphenylhydrazine                                  | 14.0                    |
| dieldrin <sup>b</sup>                                  | 0.7                     |
| halomethanes   | 1800.0                  |
| heptachlor <sup>b</sup>                                | 1.9                     |
| heptachlor epoxide <sup>b</sup>                        | 0.8                     |
| hexachloroethane                                       | 780.0                   |
| hexachlorobenzene <sup>b</sup>                         | 6.0                     |
| hexachlorobutadiene                                    | 140.0                   |
| hexachlorocyclohexane (alpha) <sup>b</sup>             | 1.7                     |
| hexachlorocyclohexane (beta) <sup>b</sup>              | 6.0                     |
| hexachlorocyclohexane (gamma) <sup>b</sup>             | 3.1                     |
| isophorone   | 2700.0                  |
| N-nitrosodimethylamine                                 | 0.7                     |
| N-nitrosodiphenylamine                                 | 1200.0                  |
| pentachlorophenol <sup>b</sup>                         | 90.0                    |
| PAH's (total) <sup>b</sup>                             | 0.93                    |
| PCBs (total) <sup>b</sup>                              | 2.2                     |
| 1,1,2,2-tetrachloroethane                              | 54.0                    |
| tetrachloroethylene                                    | 210.0                   |
| toxaphene <sup>b</sup>                                 | 3.0                     |
| 1,1,2-trichloroethane                                  | 160.0                   |
| trichloroethylene                                      | 980.0                   |
| 2,4,6-trichlorophenol                                  | 150.0                   |
| 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD equivalents) | 0.00007                 |
| vinyl chloride   | 40.0                    |

- a. Based on water quality objectives in the State Water Resources Control Board's November 1992 "CALIFORNIA ENCLOSED BAYS AND ESTUARIES PLAN - Water Quality Control Plan for Enclosed Bays and Estuaries of California". MTRs were not developed for human health objectives based on maximum concentration levels (MCLs) or taste and odor.
- b. Substances currently measured in the Toxic Substances Monitoring Program (TSMF).

**Maximum Tissue Residue Levels (MTRLs)  
in Fish and Shellfish for Enclosed Bays and Estuaries <sup>a</sup>**

| Substance                       | MTRLs<br>(edible tissue) |
|---------------------------------|--------------------------|
| <b>Non-Carcinogens</b>          |                          |
|                                 | (mg/kg, ppm)             |
| acrolein                        | 170.0                    |
| antimony                        | 4.3                      |
| chlorobenzene                   | 46.0                     |
| bis(2-chloroisopropyl)ether     | 430.0                    |
| chromium (III)                  | 11000.0                  |
| cyanides                        | 220.0                    |
| di-n-butyl phthalate            | 1100.0                   |
| 1,2-dichlorobenzene             | 970.0                    |
| 1,3-dichlorobenzene             | 150.0                    |
| 2,4-dichlorophenol              | 32.0                     |
| diethylphthalate                | 8600.0                   |
| 2,4-dimethylphenol              | 220.0                    |
| dimethylphthalate               | 110000.0                 |
| 4,6-dinitro-2-methylphenol      | 4.2                      |
| 2,4-dinitrophenol               | 22.0                     |
| endosulfan (total) <sup>b</sup> | 0.5                      |
| endrin <sup>b</sup>             | 3.2                      |
| ethylbenzene                    | 1100.0                   |
| fluoranthene                    | 62.0                     |
| hexachlorocyclopentadiene       | 75.0                     |
| mercury <sup>a</sup>            | 1.0 <sup>c</sup>         |
| nickel <sup>b</sup>             | 220.0                    |
| nitrobenzene                    | 5.4                      |
| phenol                          | 6500.0                   |
| thallium                        | 0.7                      |
| toluene                         | 3200.0                   |
| tributyltin                     | 0.3                      |
| 1,1,1-trichloroethane           | 62.0                     |

- a. Based on water quality objectives in the State Water Resources Control Board's November 1992 "CALIFORNIA ENCLOSED BAYS AND ESTUARIES PLAN - Water Quality Control Plan for Enclosed Bays and Estuaries of California". MTRLs were not developed for human health objectives based on maximum concentration levels (MCLs) or taste and odor.
- b. Substances currently measured in the Toxic Substances Monitoring Program (TSMP).
- c. The MTRL for mercury is the FDA action level.