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Winston H. Hickox
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July 15, 1999

Commanding Officer
Engineering Field Activity, West
Attention: Code 18, Mr. Richard Powell (1832)
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, California 94066

Re: **DTSC's Review of Draft Validation Study Report, Parcel E, Hunters Point Shipyard, San Francisco, California**

Dear Mr. Powell:

The Department of Toxic Substances Control (DTSC) has completed the review of the above-mentioned document and our comments are provided in the attachments. In addition, the report was discussed at a meeting today, held at the office of LFR Levine Fricke, in Emeryville. At the meeting, action items with respect to the report were identified by DTSC, the United States Environmental Protection Agency, and the California Department of Fish and Game. Action items raised at that meeting are herein considered part of these comments from DTSC. A summary of the action items is under preparation by LFR Levine Fricke.

If you have any questions, please contact me at (510) 540-3822.

Sincerely,

Eileen Hughes

Eileen Hughes, for:
Chein Kao, P.E.
Senior Hazardous Substances Engineer
Office of Military Facilities

Enclosure

cc: next page

cc: Ms. Sheryl Lauth
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Mr. Jim Polisini, Ph.D.
Department of Toxic Sustances Control
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MEMORANDUM

TO: Chein Kao, Project Manager
Berkeley Office of Military Facilities
700 Heinz Street, Building F, 2nd Floor
Berkeley, CA 94704

FROM: James M. Polisini, Ph.D., Staff Toxicologist
Human and Ecological Risk Division (HERD)

DATE: July 14, 1999

SUBJECT: HUNTERS POINT ANNEX PARCEL E DRAFT VALIDATION STUDY
[SITE 200050-47 PCA 14740 H:82]

Background

We have reviewed the document titled *Draft Validation Study Report Parcel E, Hunters Point Shipyard, San Francisco, California*, dated June 14, 1999. This report was prepared by Tetra Tech EM, Inc. of San Francisco, California. This review is in response to your written work request.

Parcel E consists of approximately 135 acres of shoreline and low elevation coastal areas. The terrestrial Ecological Risk Assessment (ERA) for Parcel E evaluated the potential ecological risk associated with site-specific soil concentrations using literature-derived exposure parameters. The major source of uncertainty was the use of literature-based biotransfer factors to estimate plant, invertebrate and vertebrate tissue concentrations. This Phase II Validation Study (VS) was performed to develop site-specific tissue concentrations for use in the food web modeling for vertebrate receptors.

General Comments

Having participated in meetings and conference calls on March 12, 1998, June 4, 1998, August 4, 1998 and August 18, 1998 we generally agree with the methodology used in the VS. However, we disagree with some of the proposed ecological remedial goals proposed in Appendix A.

Specific Comments

1. The VS states that no Toxicity Reference Values (TRVs) are available for antimony, molybdenum and silver (Executive Summary, page ES-3). Mammalian toxicity values are available for antimony potassium tartarate (Schroeder, et al., 1968, cited in Sample et al., 1996). A toxicity value is available for molybdate (Schroeder and Mitchner, 1971, cited in Sample et al., 1996). These TRVs should be used in assessment of food web exposures to Parcel E vertebrate receptors.

2. Please explain the cause of the cause of elevated detection limits and high frequency of non-detected values for mercury and DDT (Executive Summary, page ES-3).

3. Please state in the text whether the de minimus areas (areas of isolated, low concentrations where no releases were identified) are included in the areas assessed in the VS (Section 1.1, page 1-1 and Section 3.1, page 3-1).

4. The 'redelineation' of the previously-identified wetlands in Parcel E (Section 2.0, page 2-2) should be coordinated with the California Department of Fish and Game (DFG) as the California designated co-trustee for natural resources.

5. Please identify any of the oily waste ponds in IR-11/14/15 which were used by the Navy as oil/water separators prior to transfer of the separated oil to the Navy power plant in IR-11/14/15 (Section 4.4, page 4-3). Contamination at the oily waste ponds is currently identified as attributable solely to Triple A activities at these sites.

6. Radium dials are present in IR-02 Central (Section 4.3, page 4-2). An attempt should be made to assess the potential ecological effects associated with radium-226 (^{226}Ra) and radioactive daughter products in the Parcel E Feasibility Study (FS). If there is a lack of toxicological information, then this is a data gap which should be noted. Elimination of ^{226}Ra based on a 'high rate of excretion and low rate of metabolic absorption' (Section 5.1, page 5-1) would not be applicable to all ecological receptors. For example, ground foraging birds which preferentially ingest grit to aid in digestion may be more susceptible to adverse effects from weathering radium-painted dials exposed at the surface of the landfill.

7. It is important to note in the text the reason that target cleanup goals (TCGs), based on human health, are used to provide 'ambient' level for organic compounds because these are the highest concentrations that will remain after remediation based on human health effects (Section 5.2, page 5-2 and Section 7.1, page 7-1). The Navy has agreed that remediation to human health-based concentrations will definitely be performed. Please include some similar statement in the text. Otherwise, HERD would not agree to use of human health-based criteria in an ERA.

8. The risk ranking criteria for hazard quotients presented in the text (Section 5.2, page 5-3) does not agree with the column headings in the associated table (Table 1). We agree that those presented in the table are reasonable, but do not agree with those presented in the text. Please amend the text to agree with the table.

9. The receptor species used in the VS are not assessment endpoints (Section 6.1, page 6-1). Protection of the populations of the guild of species to which these representative species belong are assessment endpoints for the ERA.

10. Please identify the specific parametric analysis assumptions to which the house mouse tissue and the reptile tissue conformed (Section 9.1, pages 9-1 and 9-2).

11. Please provide a more complete description of the multiple regression and partial correlation analysis performed on the house mouse tissue concentrations (Section 9.1.1, page 9-1). Please explain whether the allocation of 42.99 percent by soil concentration, 16.66 percent by seed concentration and 11.9 percent by leaf and

stem tissue concentration is the average for all the contaminants, the highest correlation or the lowest correlation.

12. Please provide a more complete description of the multiple regression and partial correlation analysis performed on the reptile tissue concentrations (Section 9.1.2, page 9-2). Please explain whether the allocation of 42.38 percent by soil concentration, 30.68 percent by seed concentration and 24.38 percent by leaf and stem tissue concentration is the average for all the contaminants, the highest correlation or the lowest correlation.

13. The exposure parameters and arithmetic conversions for the house mouse, American kestrel and red-tailed hawk were checked and, on the whole, found to be accurate within rounding errors (Section 10.1, pages 10-1 through 10-1-6). The only exposure we seriously question is the home range for the red-tailed hawk of 3,048 acres (Section 10.1.3, page 10-6). This value is the mean of all home range values for this species in the EPA Wildlife Exposure Factors Handbook (1993). The range for California foothills is much smaller (60 to 160 acres). The mean of 3,048 acres is elevated because of the Colorado uplands home range of 17700 acres. We agree that the habitat at Parcel E is definitely not equivalent to the habitat in California foothills. However, a home range based more on California data should be considered for the red-tailed hawk. Even at 10 times the higher California foothill value of 160 acres, the home range would be about half of the 3,048 acres used. A qualified ecologist or wildlife biologist should assess the quality of habitat at Parcel E for comparison with the 'Colorado uplands' referenced in the Exposure Factors Handbook to develop a site-specific home range for Parcel E.

14. Where sites lack invertebrate or mouse tissue the amount of these tissues ingested is apportioned among the other dietary items (Section10.2, page 10-8) to calculate intake. This methodology does not account for differences in the biotransfer factors among different tissues. The mean or some upper bound on the mean biotransfer fatctor for that tissue from other Parcel E sites should be used as an estimate of generalized intake across Parcel E. As an alternative method, the biotransfer factor from a sample location with similar soil concentration could be used as a surrogate for sample sites where tissue concentrations are not available.

15. We agree with the general statement that hazard quotients (HQs) based on relatively minor physiological effects, such as increased serum cholesterol, are not the most appropriate indicators of significant ecological hazard (Section 11.3, page 11-3). However, it is our understanding that similar physiological effects are not the basis for the TRVs developed by in the BTAG/EFAWEST effort. The fact that the BTAG/EFAWEST TRVs are not based on minor physiological effects should be stated in the text.

16. We agree that wet weight-based calculation of intake is more appropriate than dry weight –based calculation of intake (Section 11.3, beginning page 11-6). However, we cannot find any statement of the relationship between the wet weight soil concentrations used in the intake calculation, the soil concentrations presented in tabular form (Table 3a through 3l) and the proposed ecologically-based soil remediation concentrations (Appendix A). Soil remediation criteria based on wet weight concentrations are impractical, as the area of remediation would be dependent on the season and soil moisture when sampled. If, however, the soil concentrations presented in tabular form (Tables 3a through 3l) are dry weight soil concentrations,

there appears to be some arithmetic error. The soil concentrations listed in tables (Tables 3a through 3l) are less than the wet-weight concentrations stated in the text. If the tabular concentrations are dry-weight, they should be higher than the wet weight concentrations stated in the text, because the water would be driven off prior to analysis. For example, the wet weight soil nickel concentration is stated as 1,152.44 mg/kg (Section 11.3.1.1, page 11-6) for station IR14B009. Table 3a presents the soil nickel concentration as 1093.67 mg/kg. The biological tissue concentrations listed (Table 3a) for IR14B009 agree with the text statements with minor rounding errors (e.g., the text seed concentration of nickel is 8.2 mg/kg while Table 3a lists a seed nickel concentration of 8.1 mg/kg). This would seem to indicate that the soil concentration in the tabular presentation is mg/kg wet weight. If so there are significant typographic errors. Please clarify which of the tabular concentrations are wet weight and which are dry weight concentrations. In addition, please explain what appear to be higher wet weight soil concentrations than those listed in the tables.

17. Please provide an additional column in the tabular presentation of soil and tissue concentrations (Tables 3a through 3l) which indicates the percent moisture of the samples.

18. The higher soil concentrations at Site IR01SW2 (Section 11.3.1.11, page 11-16 and Section 11.3.2.11 page 11-34) indicate that the area of IR01SW2 is not adequately characterized. The area of the berm should be investigated to determine whether it is a localized area of higher concentration (i.e., a 'hot spot') and should be subject to remediation. Certainly remedial alternatives based on the generalized soil concentration of IR01SW2 away from this berm are not applicable to the area of the berm.

19. Tissue zinc concentrations at site IR-2B376 (Section 11.3.2.8, page 11-31) are 9.6 mg/kg in flying invertebrates, 657 mg/kg in mouse and 22.9 mg/kg in reptile tissue. These concentrations indicate that this site should be further investigated to determine whether it is a localized area of higher concentration (i.e., a 'hot spot') and should be subject to remediation.

20. The discussion of mercury at Site IR01SW1 (Section 11.3.2.10, page 11-34) refers to the absence of lead in soil and invertebrate tissue as a source of uncertainty. This is most likely a typographic error which should refer to mercury rather than lead. Please correct this typographic error.

21. Please do not characterize a hazard quotient (HQ) close to 1.0 as indicative of marginal absolute risk (Section 11.3.2.11, page 11-35). The toxic end points evaluated for ecological hazard are threshold effects which could occur at intakes marginally above those associated with intake from 'ambient' concentrations. Whether the ecological hazard is marginal is dependent on the concentration term, the uncertainty associated with the intake parameters and the confidence in the TRV.

22. We were unable to complete our review, as pages 11-43 through 11-57 were not included in the copy furnished for HERD review. Please provide these pages for HERD review prior to submittal of the draft final report.

23. The bioavailability assumption in using the BTAG/EFAWEST TRVs is not that the form of the toxic compound is 100 percent available (Section 13.3, page 13-4).

Rather, the assumption is that the form at Parcel E is as available as the form used in the toxicity dosing which is the basis for the TRV. The penultimate paragraph of the summary section (Section 13.4, page 13-6) more correctly states this uncertainty. Please correct the text in Section 13.3.

24. The xerographic copies of the field color photographs (Figure 4 through 6 and Figures 11a through 14d) were most helpful in reviewing this VS. No response is required for this comment.

Appendix A – Proposed Ecologically-Based Soil Remediation

26. Proposed soil remediation levels (Appendix A) cannot be based on the vertebrate receptors included in the VS to the exclusion of other biological receptors. The simplified terrestrial food web of assessment and measurement endpoints (Figure 7) includes a heterotrophic soil component, soil invertebrates and plants in addition to the vertebrate receptors included in the VS. The assessment and measurement endpoints other than vertebrate receptors must be included in development of the proposed soil remediation levels. Please specify the Oak Ridge National Laboratory (ORNL) soil Preliminary Remediation Goals (PRGs) used more fully (Section 2.0, page A-2). The Hunters Point Ambient Levels (HPAL), the proposed Parcel E Ecological Preliminary Remediation Goal (EPRG) and the ORNL values for plants, earthworms and soil microorganisms which should be considered when setting the proposed ecological remediation goals are:

	HPAL	Parcel E EPRG	ORNL Plants [a]	ORNL Earthworm [b]	ORNL Soil Microorganisms [c]
cadmium	3.14	4.19	4	20	20
copper	124.31	626.86	100	50	100
lead	8.9	1050	50	500	900
nickel	334	1485.61	30	200	90
selenium	1.95	1.95	1	70	100
zinc	109.86	713.06	50	200	100

a ES/ER/TM-85/R3. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision.
b Table 1. ES/ER/TM-126/R2. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision.
c Table 2. ES/ER/TM-126/R2. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision.

Conclusions

We have only minor disagreements with the methodology used in the validation study. The proposed ecological remediation goals must include consideration all components of the conceptual site model.

References

Sample, B.E., D. M. Opresko and G. W. Suter II. 1996. Toxicological Benchmarks for Wildlife:1996 Revision. ES/ER/TM-86/R3.

Schroeder, H. A., M. Mitchener, J. J. Balassa, M. Kanisawa, and A. P. Nason. 1968. Zirconium, niobium, antimony, and fluorine in mice: effects on growth, survival and tissue levels. *J. Nutr.* 95: 95-101.

Schroeder, H. A and M. Mitchener. 1971. Toxic effects of trace elements on the reproduction of mice and rats. *Arch. Environ. Health.* 23: 102-106.

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