



**MEMORANDUM**

M60050\_004173  
MCAS EL TORO  
SSIC NO. 5090.3.A

**DTSC**

*Department of  
Toxic Substances  
Control*

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**TO:** Tayseer Mahmoud  
Office of Military Facilities (OMF)  
Region 4, Long Beach

**FROM:** John P. Christopher, Ph.D., D.A.B.T. *John P. Christopher*  
Staff Toxicologist  
Human and Ecological Risk Division (HERD)

**DATE:** 20 March 1997

**SUBJECT:** MCAS El Toro: Draft RI/FS for Site 25  
PCA: 14740 Site: 400055-47

*Pete Wilson  
Governor*

*James M. Strock  
Secretary for  
Environmental  
Protection*

**Background**

Marine Corps Air Station (MCAS) El Toro is located in Orange County. The base, which is scheduled for closure in 1999, is also designated a Federal Superfund site, primarily because of contamination of groundwater with chlorinated solvents. Remedial activities at this base are being directed by Naval Facilities Engineering Command, Southwest Division (SWDIV). Region 4 OMF has asked HERD for continuing support on issues regarding toxicology and risk assessment at this base.

Site 25 consists of the four washes which traverse the base and the two creeks into which they empty. The current document contains human and ecological risk assessments for Site 25.

**Document Reviewed**

We reviewed "Draft Phase II Remedial Investigation/Feasibility Study Addendum, Site 25 - Major drainages, Marine Corps Air Station El Toro, California, CTO 0073/0308". This document, dated January 1997, was prepared by Bechtel National, Inc., contractors to SWDIV. HERD received a request to review this document on 24 January 1997.

**Scope of Review**

The document was reviewed for scientific content. Minor grammatical or typographical errors that do not affect interpretation have not

been noted; however, these should be corrected in future versions of the document. We assume that analytical chemistry data have been examined by regional personnel. If inadequacies in these regards were encountered in this review, they are noted below. Future changes or additions to the document should be clearly identified.

### General Comments

1. **Overall:** The human health risk assessment is well done. The ecological risk assessment shows very large hazard quotients at several locations, due mainly to the presence of metals, but these are dismissed. We cannot accept the ecological risk assessment as written.
2. **Ambient Concentrations of Metals:** Because background for metals in soils or sediments are derived from a single upstream sample in each of the drainages, it was not possible to eliminate many metals as constituents of potential (ecological) concern (COPC, COPEC). Data previously presented on basewide ambient concentrations of metals should have been used for this purpose.

### Specific Comments

1. **Metals As COPC and COPEC, Sec. 6.1.1, p. 6-2, Sec. 7.2.2.2, p. 7-17:** The Navy eliminated naturally occurring metals as COPC and COPEC based on comparison of single samples in each drainage to an upstream sample in the same drainage. This left 2-15 metals as COPC or COPEC in each drainage and these metals drove nearly all the estimates of risk and hazard.

We previously approved the Navy's document entitled "Final Technical Memorandum, Background and Reference Levels, Remedial Investigations, Marine Corps Air Station El Toro, California, CTO-0076/0272" (October, 1996). In this document the Navy concluded that concentrations of metals differed little among the various geological formations which comprise the base. Because sediments in the drainage channels may be expected to reflect regional soil conditions, we find it far preferable to use this body of 43 samples for selecting COPC and COPEC.

We reproduce here as Attachment 1 portions of Table 4 from the Technical Memorandum to show the range of detected values for metals in the background samples, together with an estimate of the 95th quantile of the ambient distribution of each metal. In Attachment 2, these ranges and 95th quantiles are compared to detected values for metals in the drainages (Tables E1-1 - E1-5) to select COPC and COPEC. The essential nutrients calcium, iron, magnesium, potassium, and sodium, are not included. It is noteworthy that many concentrations

of metals in sediments in these drainages were lower than the range of detected values in the background data set.

The analyses in Attachment 2 show that metals fall within or below the range of the regional background concentrations in every case but one. Mercury in Marshburn Channel is the only metal which should be selected as COPC or COPEC in any drainage. The single hit of mercury in Agua Chion Wash fell above the 95th quantile of the background data set, but this value was well within the range of the detected values in the background data set. Therefore, a Wilcoxon Rank Sum test would find no significant difference between mercury in background and mercury in sediment at Agua Chion Wash. Of all metals detected in the drain ages, we recommend that the Navy select as COPC and COPEC only mercury in Marshburn Channel. The final draft of the risk assessments should be adjusted accordingly.

#### Human Health Risk Assessment

2. **Tables 6-3, 6-6, and 6-7, pp. 6-15 ff.:** Footnote e in table 6-3 is not consistent with the body of the table nor with Tables 6-6 and 6-7. Please make these cross references agree.
3. **Toxicity Values, Table EIII-1, p. EIII-2-3:** The surrogate value used for 1,3-dichlorobenzene is the one agreed upon. However, the National Center for Exposure Assessment has published a provisional reference dose of 3E-02 mg/kg-day for this compound. Please use the new value in future assessments. Also, the Navy may use 4.7E-02 mg/kg-day as the oral reference dose for manganese, if they choose.
4. **Risk Characterization, Sec. 6.4, pp. 6-14 ff.:** With metals removed as COPC, cancer risks and non-cancer hazards associated with recreational use of Site 25 will be insignificant.

#### Ecological Risk Assessment

5. **Uptake Factors, Tables 7-4, 7-5, F-3, and F-4:** Please specify whether these factors are expressed on a wet weight or dry weight basis. Regarding uptake of organic chemicals from sediment by invertebrates (Table 7-4), it does not seem possible that a hydrophilic substance such as *bis*(2-ethylhexyl)phthalate could have the same value as strongly hydrophobic substances such as the congeners of DDT. Please explain this.

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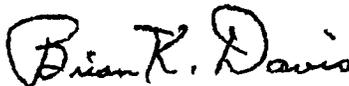
6. **Biological Effects, Sec. 7.4, p. 7-32 and Table 7-10:** Please make a clear reference to Table F-8, where the derivation of these toxicity values can be found.
7. **Risk Characterization, Sec. 7.5.2, pp. 7-45 ff.:** After comparing metals in sediment to regional background values in soil, the number of COPEC at each site decreases. Using the remainder of the information in Table 7-11, cumulative hazard quotients ( $\Sigma$ HQ) can be estimated for each species. However, these values should be confirmed by the Navy's risk assessor.

No COPEC remain for Borrego Canyon and Agua Chinon Washes. At Bee Canyon Wash, *bis*(2-ethylhexyl)-phthalate, the only remaining COPEC, yields hazard quotients (HQ) less than 1.0 for all species. In Marshburn Channel, levels DDT and congeners and of the herbicide dichloroprop yield a cumulative HQ of approximately 2.5 for the red-tailed hawk;  $\Sigma$ HQ was less than 1.0 for the other species. In San Diego Creek,  $\Sigma$ HQ is about 2.0 for the mallard duck due to phthalates in surface water;  $\Sigma$ HQ was less than 1.0 for the other species.

#### Conclusions and Recommendations

After comparison to regional background levels in soil, all metals detected in sediments from drainages should be removed as COPC and COPEC, except for mercury at Marshburn Channel. This method is preferable to comparing to a single upstream sample. Eliminating these metals removes nearly all risks and hazards. The risk assessments, especially the ecological assessment, should be corrected to reflect the proper suite of COPC and COPEC.

Reviewer: Brian K. Davis, Ph.D.  
Staff Toxicologist, HERD



cc: Dr. M. Wade, HERD  
Dr. C. Callahan, USEPA Region IX  
Dr. J. Paull, USEPA Region IX

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**Attachment 1: Regional Background Concentrations of Metals  
at MCAS El Toro**

<b>Metal</b>	<b>Frequency of Detection</b>	<b>Range of Detected Values (mg/kg)</b>	<b>95th Quantile (mg/kg)</b>
Aluminum	43/43	2,640 - 17,300	14,800
Antimony	2/36	2.8 - 4.5	3.06
Arsenic	39/43	0.29 - 8.5	6.86
Barium	43/43	22.8 - 172	173
Beryllium	24/43	0.11 - 0.79	0.67
Cadmium	30/43	0.38 - 2.6	2.35
Chromium (total)	36/43	2.1 - 5.5	26.9
Cobalt	36/43	1.7 - 9.7	6.98
Copper	43/43	0.36 - 11.1	10.5
Lead	43/43	0.67 - 22.4	15.1
Manganese	43/43	13.9 - 574	291
Mercury	11/39	0.03 - 0.41	0.22
Nickel	35/43	1.8 - 14.5	15.3
Selenium	13/41	0.10 - 0.37	0.32
Silver	3/42	0.53 - 0.65	0.539
Thallium	19/43	0.14 - 0.53	0.42
Vanadium	43/43	5.1 - 134	71.8
Zinc	43/43	6.2 - 99.5	77.9

**Attachment 2: Comparison of Metals in Sediment in Drainages at MCAS El Toro to Regional Background Concentrations**

<b>Metal</b>	<b>Frequency of Detection</b>	<b>Concentration (mg/kg)</b>	<b>Background Range (mg/kg)</b>	<b>Background 95th Quantile (mg/kg)</b>	<b>COPC/COPEC yes/no</b>
<b>Agua Chinon Wash</b>					
Aluminum	1/1	1,510	2,640 - 17,300	14,800	No
Arsenic	1/1	0.84	0.29 - 8.5	6.86	No
Barium	1/1	21.6	22.8 - 172	173	No
Cadmium	1/1	0.32	0.38 - 2.6	2.35	No
Chromium (total)	1/1	2.5	2.1 - 5.5	26.9	No
Cobalt	1/1	1.6	1.7 - 9.7	6.98	No
Copper	1/1	1.9	0.36 - 11.1	10.5	No
Lead	1/1	1.4	0.67 - 22.4	15.1	No
Manganese	1/1	51.3	13.9 - 574	291	No
Mercury	1/1	0.23	0.03 - 0.41	0.22	No
Vanadium	1/1	6	5.1 - 134	71.8	No
Zinc	1/1	13.1	6.2 - 99.5	77.9	No
<b>Bee Canyon Wash</b>					
Aluminum	1/1	1,920	2,640 - 17,300	14,800	No
Arsenic	1/1	2.6	0.29 - 8.5	6.86	No
Barium	1/1	30.6	22.8 - 172	173	No
Cadmium	1/1	0.64	0.38 - 2.6	2.35	No
Chromium (total)	1/1	2.8	2.1 - 5.5	26.9	No
Cobalt	1/1	1.9	1.7 - 9.7	6.98	No
Copper	1/1	6.8	0.36 - 11.1	10.5	No
Lead	1/1	5	0.67 - 22.4	15.1	No
Manganese	1/1	52.7	13.9 - 574	291	No
Mercury	1/1	0.22	0.03 - 0.41	0.22	No
Nickel	1/1	2.2	1.8 - 14.5	15.3	No
Vanadium	1/1	8.6	5.1 - 134	71.8	No
Zinc	1/1	26.1	6.2 - 99.5	77.9	No

**Attachment 2 (cont'd): Comparison of Metals in Sediment in Drainages at MCAS El Toro to Regional Background Concentrations**

Metal	Frequency of Detection	Concentration (mg/kg)	Background Range (mg/kg)	Background 95th Quantile (mg/kg)	COPC/COPEC yes/no
<b>Borrego Canyon Wash</b>					
Aluminum	1/1	1,020	2,640 - 17,300	14,800	No
Barium	1/1	13.8	22.8 - 172	173	No
Chromium (total)	1/1	1.6	2.1 - 5.5	26.9	No
Lead	1/1	1.1	0.67 - 22.4	15.1	No
Manganese	1/1	62.8	13.9 - 574	291	No
Mercury	1/1	0.18	0.03 - 0.41	0.22	No
Vanadium	1/1	4.7	5.1 - 134	71.8	No
Zinc	1/1	10.9	6.2 - 99.5	77.9	No
<b>Marshburn Channel</b>					
Aluminum	2/2	3,170 - 6,720	2,640 - 17,300	14,800	No
Arsenic	1/2	3.7	0.29 - 8.5	6.86	No
Barium	2/2	28.9 - 65.9	22.8 - 172	173	No
Beryllium	1/2	0.11	0.11 - 0.79	0.67	No
Cadmium	1/2	0.78	0.38 - 2.6	2.35	No
Chromium (total)	2/2	6.3 - 8.5	2.1 - 5.5	26.9	No
Cobalt	2/2	1.6 - 4.7	1.7 - 9.7	6.98	No
Copper	2/2	11.6 - 12.4	0.36 - 11.1	10.5	No
Lead	2/2	3.7 - 6.1	0.67 - 22.4	15.1	No
Manganese	2/2	221 - 241	13.9 - 574	291	No
Mercury	1/2	0.45	0.03 - 0.41	0.22	YES
Nickel	2/2	2.6 - 5.1	1.8 - 14.5	15.3	No
Selenium	1/2	0.22	0.10 - 0.37	0.32	No
Vanadium	2/2	12.3 - 22.6	5.1 - 134	71.8	No
Zinc	2/2	24.4 - 41.1	6.2 - 99.5	77.9	No

**Attachment 2 (cont'd): Comparison of Metals in Sediment in Drainages at MCAS El Toro to Regional Background Concentrations**

<b>Metal</b>	<b>Frequency of Detection</b>	<b>Concentration (mg/kg)</b>	<b>Background Range (mg/kg)</b>	<b>Background 95th Quantile (mg/kg)</b>	<b>COPC/COPEC yes/no</b>
<b>San Diego Creek</b>					
Aluminum	3/3	1,390 - 7,260	2,640 - 17,300	14,800	No
Antimony	1/3	3	2.8 - 4.5	3.06	No
Arsenic	3/3	1.1 - 1.5	0.29 - 8.5	6.86	No
Barium	3/3	19.3 - 68.4	22.8 - 172	173	No
Cadmium	1/3	1	0.38 - 2.6	2.35	No
Chromium (total)	3/3	1.7 - 8.2	2.1 - 5.5	26.9	No
Cobalt	3/3	1.8 - 4.1	1.7 - 9.7	6.98	No
Copper	3/3	1.4 - 6.5	0.36 - 11.1	10.5	No
Lead	3/3	0.98 - 3.1	0.67 - 22.4	15.1	No
Manganese	3/3	149 - 180	13.9 - 574	291	No
Mercury	2/3	0.25 - 0.35	0.03 - 0.41	0.22	No
Nickel	2/3	3.3 - 4.9	1.8 - 14.5	15.3	No
Vanadium	3/3	5.6 - 21.8	5.1 - 134	71.8	No
Zinc	3/3	14.3 - 30.7	6.2 - 99.5	77.9	No

# TELEFAX TRANSMITTAL MEMORANDUM

STATE OF CALIFORNIA  
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DEPARTMENT OF TOXIC SUBSTANCES CONTROL  
**\*\* OFFICE OF MILITARY FACILITIES \*\***

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DATE: 03/20/97 NO. OF PAGES (INCLUDING COVER): 9

SUBJECT: Final Risk Assessment Comments on Site 25 RIFS. MCAS El Toro

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TELEFAX NUMBER: (714) 726-6586

FROM: Tayseer Mahmoud

CONTACT NUMBER: (310) 590- 4891 CALNET 8-635-4891

MESSAGE /  
COMMENTS:

On March 6, 1997, I faxed you a draft copy of DTSC's Toxicologist on RIFS report for Site 25. This FAX is to transmit the final comments on the document. Please note that a slight change from the draft to the final. The memo recommends that all metals detected in sediments from drainages should be removed as COPC and COPEC, except for mercury at Marshburn Channel.

Please share this information with Bechtel. Thank you

Tayseer Mahmoud

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 Confidential  
 Information

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 Please Comment  
 Original Will /  
Will Not Follow