STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

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MCAS EL TORO
SSIC # 5090.3

February 7, 1995

Mr. Wayne Lee
Assistant Chief of Staff
Environment and Safety
Marine Corps Air Station El Toro
P. O. Box 95001
Santa Ana, California 92709-5001

Dear Mr. Lee:

MARINE CORPS AIR STATION (MCAS) EL TORO, REVIEW OF RISK ASSESSMENT WORK PLAN MCAS EL TORO, EL TORO, CALIFORNIA, NOVEMBER, 1994

The Department of Toxic Substances Control (Department) has completed its review of the subject document. Enclosed are comments from the Department's Office of Scientific Affairs.

The Department has concerns regarding the ecological risk assessment. We look forward to our meeting February 21, 1995 to discuss risk assessment comments with the Navy and U.S. EPA representatives. If you should have any questions, please call me at (310) 590-4919.

Sincerely,

Alice Gimeno for

Juan M. Jimenez
Remedial Project Manager
Base Closure Unit-Region 4
Office of Military Facilities

Enclosure

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MEMORANDUM

TO: Juan Jimenez
Office of Military Facilities
Region 4, Long Beach

FROM: John P. Christopher, Ph.D., D.A.B.T.
Staff Toxicologist
Office of Scientific Affairs (OSA)
Human and Ecological Risk Section (HERS)

DATE: 1 February 1995

SUBJECT: MCAS El Toro: Risk Assessment Work Plan
Outcome: 02 PCA: 14740 Site: 400055-45

Background

Region 4 SMB has asked OSA for continuing support on issues regarding risk assessment at Marine Corps Air Station (MCAS) El Toro. This is a closing base in Orange County which is also designated a Federal Superfund site.

Remedial activities are being directed by Naval Facilities Engineering Command, Southwest Division (SWDIV). We previously reviewed ~~and~~ a baseline risk assessment for the Operable Unit (OU) 1, the regional groundwater. The current document presents plans to assess human and ecological risks in soils, surface waters, and sediments in OUs 2 and 3, which include nearly all the land area of the base.

Phase I activities in the remedial investigation (RI) of OU2 and OU3 included screening risk assessments for human health and for ecological endpoints. Habitats and species at the base have also been catalogued. The current document builds on this earlier work.

Document Reviewed

We reviewed "Risk Assessment Work Plan MCAS El Toro, El Toro, California". This document was prepared by Bechtel National, Inc., contractors to SWDIV. It is dated November 1994. We received a request to review this document on 28 November 1994.

Because HERS has not seen previous versions of this work plan, we are reviewing it as if it were a draft, even though it is not so entitled.

Scope of Review

The document was reviewed for scientific content. Minor grammatical or typographical errors that do not affect the interpretation have not been noted. However, these should be corrected in the final version of the document. Future changes in the document should be clearly identified.

General Comments

1. **Human Health Risk Assessment:** The work plan is acceptable with a few minor changes. We note, however, that the subject of basewide risk assessment is not addressed in this work plan. It will eventually be necessary to determine additive risk, if any, across OUs.

2. **Ecological Risk Assessment:** The work plan is not acceptable. The Department and USEPA Region IX have agreed to recommend that predictive risk ecological risk assessments at military facilities in California be based mainly on comparisons of doses or concentrations of chemicals of potential ecological concern (COPEC) to chemical-specific toxicity criteria, using surrogate species where appropriate. If this approach suggests that toxic effects may be occurring or if uncertainties are unacceptably high, the Department and USEPA Region IX have agreed to recommend moving to another, confirmatory tier of analysis, sometimes including field measurements, bioassays for toxicity, or analyses of residues of contaminants in tissues. This toxicity-based approach is not used in the current work plan. A previous screening ecological risk assessment for this base used the recommended toxicity-based approach, but results from that assessment do not appear to have used in designing this work plan.

   The current work plan states that characterization of ecological risks will be based on an interpretation of "the ecological significance of the observed or predicted ecological effects resulting from chemical releases", such interpretation to be based on chemical analyses, ecological surveys, and toxicity tests. We understand the role of chemical analyses, but the work plan gives no specific information on which surveys will be conducted or where or for what purpose, which toxicity tests will be conducted on which media or organisms, or how the ultimate interpretation will be performed. Furthermore, no rationale is given for how decisions will be made for the necessity of these data. No work plan can be complete without much greater detail on the data to be collected and how the interpretation will proceed.

We agree that bioassays are most useful to characterize toxicity to invertebrates and plants, given the difficulties of applying what few data are available in the scientific literature to the species of interest at MCAS El Toro. However, the Department and USEPA Region IX have concurred that potential toxicity to higher vertebrate species, *i.e.* birds and mammals, is best assessed in the predictive phase by estimating intakes for complete exposure pathways and comparing these to estimated no-observed-adverse-levels (NOAELs) derived from the scientific literature.

Specific Comments

1. **Sec. 3.2, p. 3-1:** The comparative adjectives "thicker", "thinner", and "lower" are used here. To what is this aquifer being compared?

2. **Habitats and Wildlife, Sec. 3.5, p. 3-3:** Western screech owls, great horned owls, and rufous-sided towhees are listed here as occurring at MCAS El Toro, but they are missing from the catalogue in Table 5-2. Please reconcile this.

3. **Exposure Setting, Sec. 4.2.3, p. 4-3:** Because MCAS El Toro is a closing base, it is not appropriate to limit assessment to the industrial or occupational setting anywhere on the base. Risks and hazards in the residential setting need not be used as the basis for risk management decisions, but they must be presented in all cases.

4. **Tentatively Identified Chemicals (TICs), Sec. 4.3.1, p. 4-4:** We recommend two criteria for deciding whether to include TICs as chemicals of potential concern (COPC). First, if the TIC is a chemical that may reasonably expected to occur at the site, it should be included. Second, if the total mass of detected TICs forms a large proportion of the total detected chemicals in a sample or at a site, then further analysis or further characterization is required to resolve the importance of the TICs with regard to risk.

5. **Blank Contamination, Sec. 4.3.1, p. 4-4:** The first bullet should refer to commonly encountered laboratory contaminants only, such as acetone, dichloromethane, toluene, and phthalates.

6. **Cancer Potency Factors (CPFs), Sec. 4.3.2, p. 4-5:** Please use the attached list of CPFs, recently updated by Cal/EPA. Regarding quantification of cancer risk (Sec. 4.3.4.1, p. 4-12), we encourage the Navy to use the higher of the CPFs published by Cal/EPA or USEPA in those cases where the agencies have published differing values. Presenting just one set of estimates based on the more

conservative values has been acceptable to the agencies at other bases in California and it will save time and resources.

7. **Basewide Risk Assessment, Sec. 4.3.3, p. 4-6, and Table 4-1:** We previously reviewed a baseline human health risk assessment for OU1 at MCAS El Toro, in which risks and hazards were estimated for exposure to regional groundwater. These risks and hazards could be additive with those from other OUs for some receptors. Please prepare and submit an addendum to this work plan detailing how basewide risk will be addressed for human receptors, including risks and hazards which overlap OUs.

8. **Table 4-2, p. 4-11:** We assume that "TBD" in the columns for the recreational scenario means "to be determined". Consultation with the Department and USEPA Region IX on this matter should be completed before the final draft of the work plan is prepared.

9. **Guidance Documents for Ecological Risk Assessment, Sec. 5.3, p. 5-2:** In addition to the 15 references to USEPA guidance for the conduct of ecological risk assessment, we recommend that the Navy use recently published guidance from this Department as well:

   - *Draft Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities, Part A: Overview*, August 1994

   - *Draft Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities, Part B: Scoping*, September 1994.

   Although these draft documents were produced for public comment, we encourage their use.

10. **Assessment Approach, Sec. 5.4, pp. 5-3 ff.:** This is not an approach. It is a list of techniques. An approach includes specific plans for where each technique will be applied. The work plan is the appropriate vehicle for presenting which such measurements will be made and how they will be used. Also, trapping of small animals is more properly a Tier III activity, not Tier II.

11. **Selection of COPEC, Sec. 5.5.1.2, p. 5-5 and Table 5-1:** In addition to listing all chemicals detected, as shown in Table 5-1, it is necessary to lay out criteria for deciding which COPEC will included or excluded for sites, habitats, or pathways. The guidance shown in Comment 9 above is useful in this regard, but the method must be laid out in the work plan.

12. **Ecological Receptors, Table 5-2, pp. 5-8 ff.:** We find it striking that burrowing owls are not included in Table 5-2. If this species is truly not present, then MCAS El Toro is the first instance known to us of a military aircraft facility where this species has not been observed.

13. **Bioavailability, Sec. 5.5.2, p. 5-13:** This topic is mentioned several times in the work plan, but no description is presented for how such measurements will be made or how they will be used. If any studies on bioavailability of metals from soils or sediment are undertaken, we strongly recommend that HERS be consulted with regard to test protocols and interpretation. We have found data on bioavailability very difficult to use at other sites, principally because of variations from sample to sample in the anionic species associated with the metal(s) of interest.

14. **Soil Gas, Sec. 5.5.2, p. 5-13:** We do not know what is meant by a "soil gas investigation". We agree that the air space of burrowing animals might contain volatile chemicals. We recommend direct sampling of that air space with probes as the best method for determining exposure point concentrations. Bagged samples could then be analyzed by conventional gas chromatography.

15. **Assessment and Measurement Endpoints, Sec. 5.5.3, pp. 5-13 ff.:** The lack of specificity in this section makes the work plan for the ecological risk assessment unacceptable. The specific measurement endpoints must be identified with a clear description of how each one is related to an assessment endpoint. Indicator or representative species should explicitly identified, together with a discussion of how these species relate to any special status species of interest. The Department believes strongly that effects on individuals of special status species must be assessed, while populations are of greater interest for other, less threatened species.

    Please supply detailed information for each area of the base (or generically, by type of habitat):

    - complete pathways,
    - COPEC for each complete pathway,
    - species exposed in those pathways,
    - toxicity predicted for that pathway and species in the screening assessment,
    - data gaps in the pathway, if any,
    - measurements needed to fill data gaps,
    - representative or surrogate species to be used for the measurement,
    - how the measurements will be made, and
    - how to interpret the measurements.

By way of example, it is stated in Section 5.6.3.3 that chemical concentrations in surface water will be "more adequately characterized" than was the case in the screening risk assessment. This statement is unacceptably vague. An appropriate statement would include the "why, where, when, and how often" that constitutes proper characterization of contaminants in surface water.

16. **Conceptual Site Model, Figure 5-2, p. 5-16:** Burrowing species can come into contact with subsurface soils. Therefore, direct contact with subsurface soils represents another exposure point and should be shown in the diagram.

17. **Chemical-Specific Toxicity, Sec. 5.6, p. 5-17:** It is stated that the results "of the exposure assessment will be combined with chemical-specific toxicity information", but we could not find where this combination is described in the work plan. Similarly, mention is made in Section 5.7.3.2 of NOAELs and lowest-observed-adverse-levels (LOAELs), but we could not find a description of how these would be used in the sections on risk characterization.

We recommend that the chemical-specific toxicity for vertebrate species be characterized under the rubric of the hazard quotient. Intakes from all pathways should be summed and the total dose compared to the most appropriate NOAEL derived from searching the scientific literature. We strongly recommend that the Navy consult with HERS on the appropriateness of the toxicity criteria before they are applied.

In Section 5.6.4 we find mention of modeling body burdens of contaminants through trophic levels ("food web analysis"). We strongly recommend against this technique for characterizing chemical-specific toxicity at this phase of the ecological assessment, because comparative data are extremely few. The toxicological literature contains few examples of chemicals for which data on body burdens are related to toxic effect. We know of only two, cadmium and DDT-like insecticides, with adequate data to describe a body-burden-to-toxic-effect curve, the counterpart to the dose-response curve.

19. **Indicator Organisms, Sec. 5.6.4.2, p. 5-20:** The work plan should name the representative or indicator species to be assessed. If special status species are present or potentially present in the pathway, the rationale for the selection of the indicator species should be clearly delineated.

20. **Exposure Equation, Sec. 5.6.4.3, p. 5-20:** The equation shown for estimating body burden is not acceptable. The construction shown is a calculation of rate of intake, with a single factor ("AE") to account for the combination of absorption and

depuration. We have never seen these latter two processes reduced to a single constant. We are extremely doubtful that such a construct is accurate or useful. In fact, we believe it to be an oversimplification which masks biological processes and introduces large uncertainties.

21. **Bioassays vs. Literature Values, Sec. 5.7.1, pp. 5-21 ff.:** The Department and USEPA Region IX reached agreement in January 1994 on how to approach this difficult subject. In general, the approved approach is to use chemical-specific toxicity derived from the literature as denominators in the hazard quotient. Bioassays and field measurements have their greatest value when toxicity is predicted and risk managers require verification or when uncertainties are so large that even the predicted absence of toxicity cannot readily be accepted. Note well that the purpose of field measurements is to resolve uncertainties remaining after the application of predictive techniques.

Three examples are illustrative.

- Literature values are available for most common contaminants to predict toxicity in mammals and birds, so hazard quotients predict adequately in most cases.

- Data are scanty on toxic effects of specific chemicals in invertebrates. Therefore, toxicity bioassays are indicated when invertebrate species are potentially exposed.

- Estimates of intake through trophic levels might suggest potential toxicity to predator species. Tissues of either prey items or the predators themselves could be analyzed in an attempt to verify the threat.

22. **Toxicity Bioassays, Sec. 5.7.2, p. 5-22:** While some of the assays listed in this section could indeed be ideal for illuminating assessment endpoints at MCAS El Toro, we are unable to comment on the appropriateness of any of them without more specific information, such as the relationship of a particular test to an identified assessment endpoint. The application of any bioassay can only be understood and evaluated in the context of the data gap one is trying to fill. Data gaps are nowhere identified in this plan. In general, we think it likely that bioassays are best applied to those areas where the literature is least informative, that is for predicting toxicity to plants and invertebrates.

This section seems to emphasize the food chain pathway to the exclusion of all others, which is not acceptable. Organisms in each exposed trophic level could experience direct toxicity and this must not be overlooked.

23. **Sources of Toxicity Information, p. 5-23:** We recommend a source of information in addition to those shown in this section. The Agency for Toxic Substances Disease Registry has produced a large number of monographs for individual chemicals, classes of chemicals, or mixtures. These monographs often contain information organized exactly according to what the risk assessor seeks for developing allowable exposure criteria.

24. **Ecological Surveys, Sec. 5.8.1, pp. 5-24 ff.** The authors state that three types of information will be used to identify "ecological threats": chemical analyses, ecological surveys, and toxicity tests. Ecological threats are causes, while ecotoxicities are effects. Chemical analyses identify the presence or absence of substances which might be causes of ecotoxicity. Ecological surveys attempt to identify effects. Toxicity tests can only establish the critical link between cause and effect if they use samples of environmental media representative for the putative causes (contaminants) and if they test appropriate endpoints (species) for the ecotoxicity of interest. With the exception of the need to analyze soils in the surficial 12 inches for volatile chemicals, this work plan presents no specific recommendations for chemical measurements. No methods or locations are described for ecological surveys. No instances are noted in which data from toxicity tests will answer critical questions. Thus, the work plan cannot achieve its stated goal of characterizing ecological risks using a weight-of-evidence approach as described in this section.

Conclusions and Recommendations

The work plan is adequate for assessing risks to human health, except that the issue of basewide risk remains unaddressed. The plan for the ecological risk assessment is vague to the point of inadequacy and conceptually flawed in any case. We recommend that risk assessors for the Navy, the Department, and USEPA Region IX meet to resolve differences in approach to assessing ecological risk at this base.

Reviewer: Laura M. Valoppi, M.S. LM Valoppi
Associate Toxicologist

cc: Dr. M. Wade, HERS
Dr. J. Parker, HERS
Dr. R. Barnett, USEPA Region IX