State of California

M60050_004086
MCAS EL TORO
SSIC NO. 5090.3.A

Memorandum

To: Mr. Tayseer Mahmoud
Department of Toxic Substances Control
245 West Broadway, Suite 350
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Date: May 15, 1996

From: CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - SANTA ANA REGION
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Telephone: CALNET 632-4130 Public (909) 782-4130

Subject: DRAFT REMEDIAL INVESTIGATION REPORTS, LANDFILL SITES 2 AND 17, EL TORO MARINE CORPS AIR STATION

We have reviewed the subject reports dated March 13, 1996 and recieved by us on March 21, 1996. Based on the data in the reports, we have the following comments:

A. For Site 2

1. Provide a Chapter 15 closure cap for the landfill (Section 2581, Division 3, Title 23, CCRs) to minimize water infiltration and to eliminate the discharge of waste to waters of the state. In accordance with Section 2581, a two-foot foundation layer, a one-foot 10-7 cm/s low permeability layer, and a two-foot vegetative layer are required for the cap. Closure and postclosure maintenance plans are required and need to be submitted for our approval. For closure requirements, please see Section 2580. A copy is attached for your information.

2. Install a gas extraction and collection system to eliminate gas migration to the groundwater and gas emission to the atmosphere. Install gas monitoring probes to detect any gas migration to the atmosphere. For landfill gas related issues, the California Integrated Waste Board and the SCAQMD should be contacted. Findings: Hot spots of soil gas are sporadic across the central portion of the landfill and consist primarily of Freon 12; volatilization of landfill gases will occur.

3. Submit a Report of Waste Discharge (ROWD) for an Evaluation Monitoring Program (EMP) for the site. The ROWD shall consist of Form 200 and shall include the information required under Section 2550.8(k)(5) for the proposed EMP. The purpose of the EMP is to assess the nature and extent of the release from the landfill in the groundwater. After the EMP is completed, the MCAS El Toro shall submit an engineering feasibility study, proposing groundwater remediation alternatives, and a workplan for Corrective Action Program (CAP).

Findings: The presence of TCE, PCE, other VOCs, metals, and general water quality parameters indicate that the landfill has leached to groundwater and these contaminants have been transported by groundwater to off-site locations. The extent of the landfill boundary was defined; however, the extent of contamination off the site has not been defined.

4. Institute a surface water monitoring program. Monitor the surface water (Borrengo Canyon Wash) for metals, VOCs, and general minerals. Quarterly or semi-annual monitoring is recommended. Findings: At Site 2, VOCs and high levels of metals were found in the surface water. At Site 17, large pieces of landfill debris were found in the drainage; no surface water sampling was conducted.

B. For Site 17

Recommendations for Site 17 are essentially the same as those for Site 2 except that a gas monitoring program should be instituted. A gas extraction and collection may not be needed because only soil gas with low concentrations of VOCs and methane below the regulatory thresholds were found. VOCs were found in the groundwater but below USEPA's MCLs.

If you have any questions, please call me at (909) 782-4998.

Sincerely,

Lawrence Vitale

Lawrence Vitale
DoD Section

Article 8. Closure and Post-Closure Maintenance

§ 2580. General Closure Requirements.

(a) Partial or final closure of new and existing classified waste management units shall be in compliance with the provisions of this article. If a unit has been partially closed in accordance with an approved closure plan by the effective date of these regulations, the cover over the closed portion does not need to be modified to conform to these regulations, unless monitoring data indicate impairment of beneficial uses of ground water. Classified waste management units shall be closed according to an approved closure and post-closure maintenance plan which provides for continued compliance with the applicable standards for waste containment and precipitation and drainage controls in Article 4 of this subchapter, and the monitoring program requirements in Article 5 of this subchapter, throughout the closure and post-closure maintenance period. The post-closure maintenance period shall extend as long as the wastes pose a threat to water quality. For land treatment facilities, the post-closure maintenance period shall extend until treatment is complete.

(b) Closure shall be under the direct supervision of a registered civil engineer or a certified engineering geologist.

(c) Class II waste management units and Class III landfills shall be closed in accordance with one of the following options:

(1) landfill: pursuant to Section 2581 of this article;

(2) surface impoundment: pursuant to Section 2582 of this article; (3) waste pile: pursuant to Section 2583 of this article; or

(4) land treatment: pursuant to Section 2584 of this article.

(d) Closed waste management units shall be provided with at least two permanent monuments installed by a licensed land surveyor or a registered civil engineer, from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the post-closure maintenance period.

(e) Vegetation for closed waste management units shall be selected to require minimum irrigation and maintenance, and shall not impair the integrity of containment structures including the final cover.

(f) The regional board shall require the discharger to establish an irrevocable closure fund or provide other means to ensure closure and post-closure maintenance of each classified waste management unit in accordance with an approved plan.

Note: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

§ 2581. Landfill Closure Requirements.

(a) Final Cover requirements:

(1) Closed landfills shall be provided with not less than two feet of appropriate materials as a foundation layer for the final cover. These materials may be soil, contaminated soil, incinerator ash, or other waste materials, provided that such materials have appropriate engineering properties to be used for a foundation layer. The foundation layer shall be compacted to the maximum density obtainable at optimum moisture content using methods that are in accordance with accepted civil engineering practice. A lesser thickness may be allowed for waste management units if the regional board finds that differential settlement of waste, and ultimate land use will not affect the structural integrity of the final cover.

(2) Closed landfills shall be provided with not less than one foot of soil containing no waste or leachate, placed on top of the foundation layer and compacted to attain a permeability of either 1×10^{-6} cm/sec or less, or equal to the permeability of any bottom liner system or underlying natural geologic materials, whichever is less. Permeability determinations for cover materials shall be as specified in Article 4 of this subchapter and shall be appended to the closure and maintenance report.

(3) Closed landfills shall be provided with not less than one foot of soil, containing no waste or leachate, placed on top of the material described in subsection (a)(2) of this section; the rooting depth of any vegetation planted on the cover shall not exceed the depth to the material described in subsection (a)(2) of this section.

(4) The cover shall be designed and constructed to function with the minimum maintenance possible.

(b) Grading requirements:

(1) Closed landfills shall be graded and maintained to prevent ponding and to provide slopes of at least three percent. Lesser slopes may be allowed if an effective system is provided for diverting surface drainage from covered wastes.

(2) Areas with slopes greater than ten percent, surface drainage courses, and areas subject to erosion by water and wind shall be protected or designed and constructed to prevent such erosion.

(c) Throughout the post-closure maintenance period, the discharger shall:

(1) maintain the structural integrity and effectiveness of all containment structures, and maintain the final cover as necessary to correct the effects of settlement or other adverse factors;

(2) continue to operate the leachate collection and removal system as long as leachate is generated and detected;

(3) maintain monitoring systems and monitor the ground water, surface water, and the unsaturated zone in accordance with applicable requirements of Article 5 of this subchapter;

(4) prevent erosion and related damage of the final cover due to drainage; and

(5) protect and maintain surveyed monuments.

Note: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

§ 2582. Surface Impoundment Closure Requirements.

(a) All free liquid remaining in a surface impoundment at the time of closure shall be removed and discharged at an approved waste management unit. All residual liquid shall be treated to eliminate free liquid.

(b) Following removal and treatment of liquid waste, impoundments shall be closed in one of two ways, as approved by the regional board:

(1) All residual wastes, including sludges, precipitates, settled solids, and liner materials contaminated by wastes, shall be completely removed from the impoundment and discharged to an approved waste management unit. Remaining containment features shall be inspected for contamination and, if not contaminated, may be dismantled. Any natural geologic materials beneath or adjacent to the closed impoundment that have been contaminated shall be removed for disposal at an appropriate waste management unit. If, after reasonable attempts to remove such con-

taminated materials, the discharger demonstrates that removal of all remaining contamination is infeasible, the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article.

(2) All residual wastes, including sludges, precipitates, settled solids, and liner materials, shall be compacted, and the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article, provided that the closed waste management unit meets applicable standards for landfill waste management units in Articles 3 and 4 of this subchapter, and further provided that the moisture content of residual wastes, including sludges, does not exceed the moisture-holding capacity of the waste either before or after closures. Surface impoundments which contain only decomposable wastes at closure may be closed as land treatment facilities under Subsections 2584(a)(2), (3), and (4) of this article.

NOTE: Authority cited: Section 1058, Water Code. Reference: Sections 13260 and 13263, Water Code.

HISTORY

1. Change without regulatory effect of NOTE filed 4-6-88; operative 4-6-88 (Register 88, No. 17).

§ 2583. Waste Pile Closure Requirements.

(a) Waste piles shall be closed in one of two ways, as approved by the regional board:

(1) All waste materials and any components of the containment system which are contaminated by wastes shall be removed from the waste pile and discharged to an appropriate waste management unit. Remaining containment features shall be inspected for contamination and, if not contaminated, may be dismantled. Any soil or other materials beneath the closed waste pile that have been contaminated shall be removed for disposal at an appropriate waste management unit. If, after reasonable attempts to remove such contaminated materials, the discharger demonstrates that removal of all remaining contamination is infeasible, the waste management unit shall be closed as a landfill pursuant to Section 2581 of this article.

(2) A waste pile may be compacted, covered, and closed as a landfill under Section 2581 of this article, provided that the closed waste management unit meets applicable standards for landfill waste management units in Articles 3 and 4 of this subchapter, or contains only dry waste and was not required to have a leachate collection and removal system under Section 2543(a) of this subchapter. Waste piles which contain only decomposable wastes may be closed as a land treatment facility under Subsections 2584(a)(2), (3), and (4) of this article.

NOTE: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

§ 2584. Land Treatment Facility Closure Requirements.

(a) During the closure and post-closure period, the discharger shall:

(1) continue all operations necessary to maximize degradation, transformation, or immobilization of waste constituents within the treatment zone,

(2) continue all ground water and unsaturated zone monitoring in compliance with Article 5 of this subchapter,

(3) continue all operations in the treatment zone to prevent runoff of waste constituents,

(4) maintain the precipitation and drainage control systems.

NOTE: Authority cited: Section 1058, Water Code. Reference: Section 13172, Water Code.

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, *Governor*

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MEMORANDUM

TO: Tayseer Mahmoud
Office of Military Facilities (OMF)
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: 14 May 1996

SUBJECT: MCAS El Toro: Site 2
PCA: 14740 Site: 400055-45

Background

Region 4 OMF 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 at this base are being directed by Naval Facilities Engineering Command, Southwest Division (SWDIV). Site 2 is a landfill in the northern portion of the base. It has significant ecological resources both on the sites and close by. Under the current reuse plan, future development for residential use could occur nearby.

Document Reviewed

We reviewed "Draft Remedial Investigation Report, Operable Unit 2B, Site 2, Marine Corps Air Station El Toro, California". This document, dated March 1996, was prepared by Bechtel National, Inc., contractors to SWDIV.

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 any future version of the document. We assume that

sampling of environmental media, analytical chemistry data, and quality assurance procedures have been examined by regional personnel. If inadequacies in this regard for the purposes of risk assessment were encountered, they are noted. Any future changes or additions to the document should be clearly identified.

General Comments

1. **Overall Impression:** The risk assessments of human and ecological health are quite thorough but not always clear. OSA disagrees with some of the methods used. Several clarifications are required. The document can be made acceptable with respect to risk assessment upon adequate responses to the comments below.

2. **Ambient Concentrations of Metals:** The Navy used the maximum value detected in the set of background values for metals in soil, which might have led to inappropriate elimination of cadmium as an inorganic constituents of concern. The Navy's analysis of their set of background values for soil is incomplete.

3. **Human Health Risk Assessment:** The assessment is quite thorough and well written, but we believe the Navy has overestimated risks for the site. Potential exposures to organic chemicals were estimated using the maximum value detected instead of the recommended 95% upper confidence on the mean. Dermal intakes might have been overestimated.

4. **Ecological Risk Assessment:** We cannot accept the Navy's conclusions regarding non-human receptors because of questions about the methods used. Exposure point concentrations did not match those used to assess human health. The derivation of the toxicity criteria was not clear.

Specific Comments

1. **Ambient Concentrations of Metals, Appendix G:** OSA does not approve of the use of upper tolerance limit (UTL) for estimating quantiles of distributions of ambient concentrations of metals, as described on page G-2. The UTL, which is an upper bound on a quantile, can yield an inflated estimate when the sample size is small. For this reason, we recommend using a simple estimate of the quantile, provided the raw or transformed data can reliably be fitted to a normal distribution. If metals are selected as chemicals of potential concern with this procedure but these metals are actually present within the range of background, subsequent levels of decision in the process, i.e. risk assessment and risk management, can be used to correct inequities.

In fact, the method used for selection of inorganic constituents of concern was to compare the highest value detected (C_{MAX}) at the site to the highest detected value among 43 samples judgmentally determined not to have been impacted by site-related activities. OSA does not agree the use C_{MAX} for this purpose for two reasons. First, chemical analysis samples might reveal anthropogenic impacts where none were thought to occur. Second, simple statistical methods, such as plotting cumulative probability, are readily available to determine whether C_{MAX} is a reasonable estimator. These simple methods have been employed successfully at several other Navy bases in California.

Table G-4 presents the summary statistics for ambient metal concentrations. The column labeled "Calculated UTL Value" contains the value for C_{MAX} for 11 of 23 metals, which would seem to make "UTL" a misnomer. With the exception of cadmium, the values shown in this column are similar to values we have seen to represent the upper range of ambient conditions for other military bases in Orange County. The value for cadmium is extremely high; C_{MAX} for cadmium was perhaps one order of magnitude higher than we would have expected. We are accustomed to seeing the 95th quantile for cadmium between 1 and 2 mg/kg. The use of 11.4 mg/kg could have led to inappropriate exclusion of cadmium as a chemical of concern. The Navy should present a detailed analysis of ambient cadmium concentrations.

2. **Chemicals of Potential Concern (COPC) in Water, Secs. 6.1.3-6.1.4, Tables SI-2 and SI-3:** Values for selenium and chromium in the upgradient well are surprisingly high. Please explain this. It seems possible that these metals might have been inappropriately eliminated as COPC.

3. **Exposure Point Concentration (EPC), Sec. 6.2.3, p. G-11, p. S-1, Table SI-1:** A potential problem arises when C_{MAX} is used as the EPC. The rules described on page S-1 for selecting EPC seem reasonable, especially if high detection limits or very low frequencies of detection are encountered, because these conditions make estimates of the mean uncertain or artificially inflated. However, in Table SI-1 for Site 2, C_{MAX} is selected as the EPC for all 41 detected organic chemicals, even though detection limits are acceptably low for nearly every chemical. Surely, something is wrong with such a method. The Navy and the agencies should meet to arrive at a consensus on this subject.

4. **Dermal Absorption Factor, Table SII-1:** Department guidance allows a default value of 10% (1E-01) for dermal absorption of organic chemicals. However, on the first two pages of this table, the exponent for the dermal absorption factor is shown as 1E-00. Does the Navy mean to imply that these organic chemicals are

absorbed to the extent of 100% through the skin? For endosulfan I and endrin aldehyde, the value shown is 5E-00. Surely, this is an error. Please check to see which value was used in the risk assessment. It seems possible that dermal intakes might have been overestimated. In view of the rather striking contribution of the total hazard at this site estimated for the herbicide MCPP via the dermal route, we strongly urge the Navy to verify that reasonable values were used for estimation of dermal intakes.

5. **Risk Characterization, Sec. 6.4, pp. 6-16 ff.:** Figures 6-2 through 6-7 are particularly well done; contributions to risk and hazard by pathway and chemical are clearly and dramatically shown for each receptor group. In section 6.4.2.1, please use scientific notation for numbers with many zeroes to the right of the decimal.

   The factors enumerated in comments 3 and 4 suggest that the Navy has overestimated risk and hazard at Site 2. Therefore, we do not disagree with the Navy's conclusions regarding human health risk.

6. **Uncertainty in the Exposure Assessment, Sec. 6.5.2, p. 6-29:** Somewhere in this section, the Navy should present a discussion of how the use of C_{MAX} as the exposure point concentration might have overestimated risk or hazard.

7. **Chemicals of Potential Ecological Concern (COPEC), Sec. 7.2.2.3, p. 7-6, Table 7-1, Sec. T1.1, p. T-2:** We note that the following metals were selected as COPEC (Table 7-1) but were deselected as COPC for human health after comparison with background (Table SI-1): aluminum, arsenic, barium, cadmium, cobalt, selenium, thallium, vanadium, and zinc. Departmental guidance on ecological risk assessment, cited in the Navy's report, does present a discussion on why COPC do not necessarily have to match COPEC. However, comparison with background should yield identical lists of metals. Treatment of background concentrations of metals continues to be a problem; the Navy, the Department, and USEPA must resolve this confusion and controversy.

8. **Intake Factors, Table 7-3:** This table would be easier to read if scientific notation were used.

9. **Assessment Endpoints, Table 7-4:** For carnivores and raptors, the principal exposure is via prey items. Therefore, the information in the right-hand column should describe food chain modeling, bioconcentration, etc. Toxicity to the predator via direct contact is not likely to be relevant and toxicity to food items via direct contact should be covered in assessments of those trophic levels.

10. **EPC, Sec. T.1.4, p. T-4, Table T-11:** The very useful discussion of the rules for determining EPC is much more detailed than that presented in Section 6.2.3 for human health. Please state that EPCs used for Site 2 are shown in Table T-11. Many EPCs for soil shown in Table T-11 differ from entries Table SI-1 for the same chemical. This is extremely confusing. Why are EPCs for metals in surface soil used for ecological risk uniformly lower than those used for human health? Why aren't entries for EPC the same in the two tables for DDE and Aroclor 1260? Why do heptachlor epoxide and methoxychlor appear as detected chemicals in Table T-11 but not in Table SI-1? Under the heading "Distribution" in Table T-11, does "neither" mean the same as "nonparametric" in Table SI-1?

11. **Toxicity Benchmark Values, Secs. T.1.4, T.4.4, Tables T-4 and T-17:** We are unable to decipher how the toxicity screening criteria and toxicity benchmark values were derived and how they are used. What is the column labeled "Dose" in Table T-4? Is this an administered dose from a laboratory study? If so, what is the literature reference for the study? Is a "Modifier" the same as an uncertainty factor? How does one link the values in Table T-4 to those in Table T-17? If an allometric extrapolation was performed, what values were used for body weights and where did they come from? The text in Section T.3.2, "Body Size Scaling", is not adequate to reproduce the derivation. Please present tables with complete derivations of these toxicity criteria. The same comment applies to Table T-9 and toxicity criteria for plants and invertebrates.

12. **Risk Characterization, 7.5, Table T-16:** The Navy claims that a comparison of hazard indices, chemical by chemical and species by species, for Site 2 versus the reference area yields no differences greater than an order of magnitude. The construction of Table T-16 made such comparisons very cumbersome. Please construct tables with data from the site and the reference area juxtaposed for each species, e.g. one table for each species or two species per table at most. Also, please present summed hazard indices for each indicator species.

    The Navy seems interested in basing its interpretation of the ecological assessment on the number and magnitude of hazard quotients which exceed those seen for the reference area. If this is the case, it would be useful to create a summary table with all the hazard indices, by chemical and species, which exceed the reference area. This table should contain some representation of the degree to which the value in the reference area was exceeded.

13. **Ecological Significance, Sec. 7.5.2, p. 7-21:** We cannot agree with the Navy's interpretation of the results of the ecological assessment, because we are unsure of the COPEC, the EPC, and the toxicity criteria.

Conclusions and Recommendations

1. The Navy should complete its analysis of the 43 samples designated as background, especially for cadmium. Such analysis should include plots of cumulative probability. If additional data are required to resolve ambiguities for one or more metals, the data base may be expanded to include samples from other locations on the base. Such an expansion need not be limited to Site 2; it could include data from all the sites investigated in Operable Units 2 and 3.

2. The Navy has probably overestimated risks to human health by choosing the maximum value detected to represent exposure. The Navy should propose a method more in keeping with the concept of the "reasonable maximum exposure". We are unsure whether dermal intakes have calculated correctly.

3. The ecological risk assessment can probably be made acceptable upon clarification of how exposure point concentrations were selected, how toxicity criteria for non-human receptors were derived, and by presenting the risk characterization in a more intelligible format.

Reviewer: Michael J. Wade, Ph.D., D.A.B.T.
Senior Toxicologist, HERS

cc: Mr. J. Paull, USEPA Region IX
Dr. C. Callahan, USEPA Region IX