STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

REGION 2
700 HEINZ AVE., SUITE 200
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N00296.001407
MOFFETT FIELD
SSIC NO.5090.3

May 22, 1992

Elizabeth Adams
SFRWQCB
2101 Webster Street, Suite 500
Oakland, California 94612

Dear Ms. Adams:

MOFFETT FIELD OU-2 AND OU-4 RISK ASSESSMENT

The Technical Services Branch of the Department of Toxic Substances Control (DTSC) has reviewed the above reports. Because the toxicologists had limited time for review, they may have additional comments upon subsequent review of the above reports or their iterations. Their comments are enclosed for your consideration.

Should you have any questions, please call me at (510) 540-3821, Judy Parker at (916) 255-2058 or Laura Valoppi at (916) 255-2052.

Sincerely,

Cyrus Shabahari
Waste Management Engineer
Site Mitigation Branch

Enclosure

cc: Judy Parker
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Risk should be summed across all pathways, all media, and all chemicals. In the sections sent to TRAS, OU2, pages 19-1 through 21-22 and OU4, pages 6-1 through 7-6 only a single medium was addressed.

The DTSC hierarchy for use of toxicity values for risk assessment differs from that of the EPA. It is recommended that the following hierarchy be considered for use in this risk assessment:

1. Cancer potency slope (CPS) factors or reference doses (RfDs) promulgated into California regulations.

2. CPS factors or RfDs used to develop environmental criteria promulgated into California regulations (e.g., CPS used in deriving State Maximum Concentration Limits (MCLs), or "no significant risk levels" under Proposition 65). It is important to note that the entirely health based dose criteria should be used to estimate risk, and not the resulting risk management environmental criteria (e.g., use the CPS used to derive the MCL and not the MCL itself).

3. CPS factors or RfDs from the U. S. EPA's IRIS data base.

4. CPS factors or RfDs from the U. S. EPA's Health Effects Assessment Summary Tables (HEAST).

The risk assessment is extremely limited by the decision to include only ground water (OU4) and to exclude chemical fate and transport modeling of the leaching and migration of contaminants in ground water. In essence this decision results in the assumption that the ground water contamination has reached steady state, and yet no justification for this assumption is provided. If there is continued leaching of contaminants into ground water and migration of the ground water plume, then it is possible that the risk calculations do not reflect a reasonable upper bound estimate.

The OU4 risk assessment only addresses ground water contamination under sites 8, 9, 10, 12, 14-19 while the OU2 risk assessment only addresses soil contamination at sites 3-11, 14, 16-19. It is not clear how these OUs were defined. What is the rationale for this division? Where is the total risk presented? This seemingly arbitrary division of areas does not allow for evaluation of risk. This must be clarified.

GENERAL COMMENTS--OU2

OU2 has been subdivided by the contractor into a number of "sites". We were not provided maps of the facility nor have we had the opportunity to schedule a site visit. Therefore, we do not know if subdividing the unit in this manner is justified from a risk assessment perspective. Subdivision under some circumstances can make the calculated risks lower by putting into one subunit areas of contamination which may lead to exposure to a receptor located in an adjacent subunit. A similar phenomena could occur by dividing the facility into OUs.

GENERAL COMMENTS--OU4

The selection of chemicals of concern, page 6-12 and following, appears to follow EPA and DTSC guidance. However, EPA recommends that any detection frequency limit used should be approved by the project manager prior to its use. Chemical exclusion based on "low toxicity" is not appropriate until the calculations have been made that support this statement. See OU2 comments about essential nutrients .

Tables 6.2-1 through 6.2-5 contain the chemical concentration data for the ground water. There are several points that need to be clarified on these tables. What is CRQL? How can there be a range of detected concentrations if the chemical was only detected once? Please clarify these tables. Polychlorinated biphenyl (PCB) 1248 is listed on Table 6.2-1 but no values are given. Reconcile this with the statements on pages 6-46 and 6-52. Was PCB 1260 analyzed for?

Volume 4, Appendix E, Risk Assessment Models contains the equations for indoor air modeling and determination of concentration in vegetables. The calculations for vegetables are accepted. For indoor air modeling, the references are not supplied and are not the DTSC or U. S. EPA recommended methods (references attached). Justification must be supplied for the use of this model and evidence given that it is at least as conservative as the recommended models.

In general, the other equations and exposure assumptions for water contact seem appropriate.

Although it is a health-protective assumption to assume that a domestic well could be placed within the ground water plume in the upper aquifer, an additional consideration that is needed is to determine where within the plume such a

hypothetical well would be located. Such an assumption is needed to provide a reasonable estimate of exposure, since concentrations of contaminants would be expected to differ depending upon the spatial location and screening level of the well. The validity of the sample grouping technique used for estimating exposure point concentrations for domestic water drawn from the hypothetical well is questionable, since this technique averaged all monitoring well results together and thus did not follow EPA risk assessment guidance. EPA guidance (Risk Assessment for Superfund) recommends use of monitoring well data over the use of ground water models only when the sampling points correspond to exposure points, such as samples taken from a domestic well or domestic tap. This is not the case for this site. Therefore, in accordance with EPA guidance, the monitoring well data should be used to estimate exposure point concentrations for ground water contaminants by first determining if the aquifer is of sufficient quality and has sufficient production capacity to support drinking water or other uses. If so, EPA recommends (Risk Assessment Guidance for Superfund (page 6-27)) it "generally should be assumed that water could be drawn from anywhere within the aquifer, regardless of the location of the existing (monitoring) wells relative to the contaminant plume." EPA guidance implies that for estimating potential exposures to ground water contaminants, a hypothetical well should be evaluated directly within the most contaminated area of the ground water plume, except for cases such as a waste management unit, for which it should be assumed that water could be drawn from directly adjacent to the source.

SPECIFIC COMMENTS--OU2

Pages 19-3 through 19-7: The half lives for chemicals in soil cited for the chemicals in this section appear too short in our experience. We noted that all are based upon one study, Howard, 1991. We were not provided with a reference section so we can not comment on the methodology used in Howard, 1991, to estimate environmental degradation of chemicals.

Page 19-22: The report concludes that conditions at the site make the use of the vadose zone leaching model described on pages 19-19 through 19-22 highly uncertain. Therefore, we are of the opinion that little reliance be placed on this model in reaching conclusions about the site.

Page 20-6: We note that in previous investigation it was estimated that as much as 28,000 gallons of fuel could be

present on top of ground water at Site 5 (Fuel Farm, French Drains and Bulk Tanks).

Page 20-7: Were PCBs analyzed for on Site 8?

Page 20-11: We would like to obtain a copy of the 1984 U. S. Geological Survey of background soil constituents cited at the top of the page. We need a citation for this reference (or a copy).

Page 20-11: Although we agree in general with the list of compounds eliminated as chemicals of concern under the heading "Essential Nutrients" we do not consider sulfates and especially carbonates as "essential nutrients" in the general usage of that term. For example, they are not listed in the National Academy of Sciences listing of essential nutrients in Recommended Dietary Allowances (ninth edition). All essential nutrients can not be a priori eliminated from a risk assessment. Some, such as selenium, copper, manganese, and zinc can be important in assessing site-related risk.

Page 20-14, top of page: Four chemicals were dropped from further consideration because "The toxicities of these constituents were very low at their detected concentration". These chemicals should be retained until their contribution to the hazard index for the site can be determined.

Pages 20-19 through 20-21: The description of the sampling activities at Sites 16-19 leaves the impression that a comprehensive investigation of soil contamination was not performed. Does Region 2 have an opinion on sampling activities at these sites?

Page 20-28, bottom of page: This page indicates that 160 acres of facility land is leased for agricultural use. The crops grown should be identified. If crops used for food by animals or humans are grown on this land, an assessment of possible residues in food should be conducted.

Page 20-35: Children six years of age or under could be exposed to soils currently at depths of one foot or greater if, as likely, regrading occurs during future home construction. Further, excavation for utility lines, swimming pools, spas, etc., will also expose subsurface soils.

Page 20-36: The report indicates that dermal exposure to organics in water in the Marriage Road ditch could not occur because "organic compounds present in the soil are not readily

soluble in water." This statement is incorrect because at this site itself, ground water is contaminated with volatile organic chemicals (VOCs). Further, recent studies indicate inorganic compounds such as cadmium do cross the skin (Wester, et al., 1991).

Page 20-36 (bottom) and 20-37 (top): The percent of vegetative cover of the ditch and surrounding area should be ascertained. If cover is 95 percent or less then the fugitive dust pathway should be considered.

Page 20-37: The pathway of inhalation of VOCs needs to be considered. Also, inhalation of wind borne particulates can not be excluded. Typically yards have areas of bare soil such as surrounds trees, bushes, gardens, RV storage, etc. These comments apply to all sites considered for residential construction.

Page 20-38: Have surface soils been sampled at Site 5? In any case regrading and removal of underground tanks during residential constructions may bring currently buried contaminated soil to surface or near subsurface depth.

Page 20-37 (Hangers 2 and 2): Although the site is currently paved, it is our understanding that volatile chemicals, much like radon does, can permeate through pavement and into structures and dwellings.

Page 20-40 (Site 8, top of page): Please provide a description of the barriers which would preclude children from trespassing onto the site, especially since residential populations live nearby on base housing. If children are not precluded a trespasses scenario should be included.

Page 20-41, third paragraph: Is the nearest residence far enough from the runway to preclude particulate exposure especially since taxiing or landing planes may "kick up" considerable dust.

Page 20-41, fourth paragraph: Please explain why chemicals within the Chase Park area should remain isolated from residential receptors and why exposure could not occur via wind borne vapors or dust or runoff during rain storms. Is Chase Park itself a potential site for residential construction?

Page 20-42 (Site 11): Please provide data, such as well sample data, that indicate ground water under Site 11 is not potable.

Page 20-42: Please provide further data explaining why Site 13 is limited to occupational receptors only. Parked heavy equipment could be attractive to children.

Page 20-43: Sites 14, 16, 17, 18, and 19. As discussed previously, VOCs can permeate through foundations, at similar sites estimates of potential indoor contamination have been made.

Page 20-44, bottom line: We believe "Ci" for dermal absorption should be chemical specific soil concentration not air concentration as listed.

Page 20-46, first complete paragraph. A value of 480 mg/day should be used for soil ingestion by construction workers as specified in supplement B of the March 25, 1991 OSWER directive on Standard Default Exposure Parameters.

Page 20-46: Unless site-specific date are available, we specify that the value of 1.45 mg/cm^2 be used for a soil adherence factor as cited in Risk Assessment Guidance for Superfund (RAGS).

Our general approach to dermal absorption is to calculate mg of daily exposure and then apply a percent absorption factor of one percent for inorganics and ten percent for organics unless chemical specific data are available.

Daily exposure is estimated by multiplying exposed body surface area by soil adherence factor and percent absorption and then correcting for percent of daily soil exposure from the site. A value of 50 percent for adults and 100 percent for children is suggested for this value.

Page 20-47, second complete paragraph: A word was left out or a typographical error occurred in the sentence beginning "Concentrations in air".

The algorithm used to estimate dermal exposure should be revised according to our comments above for page 20-46.

For children, 100 percent of daily dermal exposure should be assumed to arise from residential exposure. This approach should be used instead of the factors of 0.00046 $hour^{-1}$ and 0.45 hours/day cited in the report. A separate exposure calculation should be developed for children. Please contact TRAS for further details.

Page 20-50: The method used to estimate lead toxicity does not fit TRAS or EPA guidelines. Either the U. S. EPA's Lead Biokinetic Uptake Model or the Department's Lead Spread Sheet can be used to do a toxicity assessment for lead. Dr. Jim Carlisle, ((916) 255-2049), of TRAS could be contacted for further details on securing and operating these models.

Page 20-55: Estimates of hazard from noncarcinogenic effects of carcinogens should be included with the hazard for noncarcinogens to arrive at a hazard index for the site.

Pages 20-56, 57. Cancer risks are described for individual chemicals, please note that cancer risks must be summed over all chemicals and exposure pathways. Why was ground water omitted as an exposure pathway? Please note that in general, a target cancer risk of 10^{-6} has been followed in regard to hazardous waste remediation by the State.

SPECIFIC COMMENTS--OU4

Page 6-15. It is stated that bromoform will not be considered (A2 aquifer). However, on page 6-46 a risk from exposure to bromoform in A1 aquifer is presented. Please clarify, DTSC prefers that bromoform remain in the group of chemicals to be considered.

Page 6-45. Although a range of incremental risks from 10^{-4} to 10^{-6} is recommended by both EPA and DTSC, 10^{-6} is considered the departure point.

Page 6-47. The first paragraph states what chemical carcinogen class a few of the chemicals fall into. This should be done for all the chemicals (and for all the aquifers).

Page 6-50. The last paragraph states that potential future risks could occur if aquifers A1, A2, and B2 were developed for use. Again, movement from these contaminated aquifers into the currently used aquifer C is not addressed. Perhaps this is addressed in other parts of the document, but it needs to be included in the summary also.

Table 6.3-1. Under the current land use scenario, Moffett residents are not exposed to contamination via irrigation of crops. In the future, if contamination migrates to aquifer C, this may not be the case. Please address.

Page 6-51 states that the aquifer A1 needs to be remediated and that B2 does not. The conclusion for the A2 aquifer is not stated.

Ecological Assessment

Moffett Field Preliminary Endangerment Assessment--
Environmental Receptors

A qualitative assessment of risk to environmental receptors should contain a site characterization, a biological characterization, and a pathway assessment. The biological characterization should identify the distinct habitats on the site, and species utilizing those habitats. In addition to rare, threatened, or endangered species, species of special concern (e.g., candidate species) and other species representative of the habitat should be described.

The pathway assessment should identify the potential for contact between environmental receptors and chemicals of concern. Pathways to be addressed should include the potential for the receptor to contact the contaminants, either directly (i.e., water exposure) or indirectly (food-web exposure). Additionally, transport of contaminants to habitat areas should be addressed in the pathway assessment.

The environmental receptor assessment for OU2 provides a fair biological characterization of the site. The report states burrowing owls and their burrows have been found in the northeastern section of Moffett Field, yet the California Natural Diversity Data Base (1991) indicates they have been observed in the northwestern corner of Moffett Field. The burrowing owl is a California species of special concern. The pathway assessment is not conducted. The statement on page 20-34, "Most [rare threatened or endangered species] are not present at specific OU2 sites", is not sufficient as a pathway assessment for environmental receptors. All environmental receptors should be considered, not only rare, threatened and endangered species. The potential for current or past surface transport of contaminants (e.g., via storm drains, or overflow from bermed areas) from OU2 areas to other areas on and off the based should be considered.

Similarly, the environmental receptor assessment for OU4 is deficient in conducting a pathway assessment. Although only on-site ground water is considered in OU4, the potential for discharge of contaminated water in the shallow aquifers to the

surface, in particular to the sensitive wetland habitats, should be qualitatively discussed.

CONCLUSIONS

The document needs further work before it is acceptable to fully characterize risk. As stated earlier, many of the problems noted may already be addressed in different parts of the document. The issue of how the site has been subdivided into OUs must be addressed. Currently, there is no way to evaluate total risk.

If we can be of further help, please contact us.

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References

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Wester, R. C., H. I. Maibach, L. Sevik, J. Melendres, S. DiZio, I. Jamall, M. Wade (1991). In Vitro Percutaneous Absorption of Cadmium from Water and Soil into Human Skin. The Toxicologist 11:1115.