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MOFFETT FIELD
SSIC NO. 5090.3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 1, 1994

Mr. Stephen Chao
Naval Facilities Engineering Command
Western Division
900 Commodore Way, Bldg. 101
San Bruno, CA. 94066

Re: Draft Ecological Assessment Technical Memorandum for Operable Unit 1, dated June, 1994

Dear Mr. Chao,

The U.S. Environmental Protection Agency (EPA) has received the subject document and encloses the following comments. Call me at 415-744-2383 if you have any questions.

Sincerely,

Michael D. Gill

Michael D. Gill
Remedial Project Manager
Federal Facilities Cleanup Office

cc: C. Joseph Chou (DTSC)
Ken Eichstaedt (URS)
Susan Gladstone (RWQCB)
Sandy Olliges (NASA)
Peter Strauss (MHB)
Mike Young (PRC) (Fax)

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COMMENTS
Moffett Field Draft Ecological Assessment Technical Memorandum - Operable Unit 1

The objectives of the scope of work for the ecological assessment are presented on pages 6 and 7 of the document. The objectives are reorganized for discussion purposes in these comments as follows:

- Evaluate whether capping will jeopardize species currently residing on OU1.
- Evaluate whether capping will unacceptably alter the habitat and ecology at OU1.
- Evaluate the potential for habitat recovery following capping at OU1.
- If ecological impacts from capping are unacceptable, evaluate whether chemicals at OU1 pose potential adverse impacts to ecological receptors under current conditions.
- If chemicals do pose an adverse ecological impact under current conditions, compare the relative magnitude of these impacts to impacts from capping.
- If capping does not unacceptably alter the habitat, assess the potential for burrowing animals to be exposed to chemicals following capping.
- If animals can be exposed to chemicals by burrowing through the cap, assess the potential adverse impacts to these receptors.
- Evaluate the potential for uptake of chemicals by plants following capping.
- If there is a potential for plants to accumulate chemicals following capping, evaluate the potential impacts to animals foraging on those plants.

The approach used in the EATM to meet each objective is reviewed.

The review comments provided below are organized into <u>General Comments</u> that address issues of global concern and <u>Specific Comments</u> that address each of the objectives listed above.

GENERAL COMMENTS

1. A theoretical qualitative approach was used to evaluate virtually all the objectives of the EATM. Many of the objectives ask for a prediction of environmental response to some future action at OU1 (e.g., what the potential is for recovery following capping or to evaluate the potential for uptake of chemicals by plants following capping). It is important for the EATM to present available field data from the site in order to make a decision about the cap.

   The EATM used an exposure modeling approach to evaluate impacts. This is a screening level approach which is believed to be conservative (i.e., ecological impacts will not be underestimated) and is widely applied in ecological risk assessment work. Typically, a screening level evaluation is initially conducted and if impacts are estimated, then biological investigations (e.g., population studies, tissue chemical analysis, or toxicity testing) may be warranted to confirm results of the screening level assessment. Since the EATM concluded that there was no ecological impact from chemicals occurring in soil at OU1, further evaluation using biological approaches is unnecessary. However, as comment 9 suggests, the conclusions of the exposure modeling presented in the EATM may be flawed and require recalculation. Depending upon the results of the revised modeling, biological tests may be required.

2. Comments from all three regulators (pages 5 and 6 of the EATM) identified the assessment of potential ecological impacts to surface water bodies adjacent to the landfills from chemicals migrating from the landfills as a major data gap in the Draft Final FS Report. Ecological impact to the surface water bodies adjacent to the landfills needs to be addressed in the objectives of the ecological assessment.

3. Several sections of the EATM seem unnecessary and should be removed. Section 2.1 (Human Health Risk Assessment) explains that a human health risk assessment was performed at OU1 during the remedial investigation and concluded that there was no unacceptable risk to humans from drinking the groundwater. The relevance of this information to the EATM is unclear and no attempt is made to integrate it into the EATM. Section 3.1 (Evaluate Habitat Destruction from Proposed Remedial Action at OU1) begins with approximately 6 pages describing theoretical aspects of population biology. This information seems irrelevant and is not integrated into the other sections of the EATM.

4. Limited information is presented concerning the present status of the ecosystem at and adjacent to OU1 (e.g. salt water retension ponds). An introductory section should be included that summarizes the information provided in the Phase I Site-wide Qualitative Habitat and Receptor Characterization NAS Moffett Field (Wesco 1993) and elsewhere so the reader can understand the extent of the ecosystem on and adjacent to OU1.

5. The EATM suggests that the proposed remedial action (e.g., capping) and subsequent maintenance regime (e.g., periodic mowing) will create a habitat incapable of supporting the ecosystem currently occupying OU1. The EATM needs to take a proactive position in answering the question, "Why not enhance the habitat quality as part of the remedial action?" It would be a rather simple and cost-effective effort to incorporate elements into the remedial design that would enhance the habitat for animals if the presence of these organisms would not interfere with the future use at NAS Moffett Field.

SPECIFIC COMMENTS

6. **Evaluate whether capping will jeopardize species currently residing on OU1.**

This objective is addressed in Section 3.1.1 (pages 12-14) for species currently occurring on OU1 and in Section 3.1.2 for threatened and endangered species. Section 3.1.1 used a subjective qualitative approach for determining impacts of remedial action on animals occurring on OU1 and concluded that the proposed capping will result in habitat destruction that is unacceptable to current terrestrial populations residing at OU1. This conclusion is based on the rationale that capping will cause some animals to migrate into adjacent areas of increased competition or will eliminate organisms unable to avoid capping. While it is clear that the physical act of placing a 36 inch soil cap will cause the migration and elimination of organisms from OU1, the primary issue is whether capping will jeopardize populations of animals that occur in the area (e.g., black-tailed hare, California ground squirrel, Botta's pocket gopher, California vole, red fox, domestic cat as described on page 16 of the EATM). No evidence is presented that suggests that OU1 provides a unique habitat that following modification from capping would cause the elimination of a species from the area. On the contrary, animals listed in the EATM as occurring on OU1 are common to the region and undoubtedly occur on adjacent areas. These animals could readily reoccupy OU1 following capping if provided suitable habitat. Although the approach

to meeting this objective is appropriate, the conclusion that habitat destruction resulting from capping is unacceptable to current terrestrial animal populations residing at OU1 should be substantiated. The kind of data that is needed to show that the cap shouldn't be constructed is a measure of the size of the small mammal population and the raptors that feed on them. This will tell us if temporary loss of the area of OU1 would adversely affect the biotic community. Field data on body-burdens of the COCs is necessary. This might also include some bioassays, such as the P450 test of the soils, to determine if levels of planar organics (PCBs, PAHs) are sufficiently high to possibly affect reproduction in the animal populations.

Section 3.1.2 states that no threatened or endangered species were observed inhabiting OU1 but that if they did occur on OU1, capping would jeopardize these species. It should be defined whether OU1 provides habitat on which threatened or endangered species depend for part or all of the year, which would make it a sensitive area in need of protection. If no threatened or endangered species occur on OU1, it would be sufficient to say that they would not be impacted by capping.

7. **Evaluate whether capping will unacceptably alter the habitat and ecology at OU1.**

Sections 3.1 and 3.1.1 contain some qualitative and subjective verbiage about the effects that capping would have to the habitat on the site. The first sentence on pg. 12 states, "The placement of a 36-inch deep cap on OU-1 will destroy the existing terrestrial habitat". In addition, maintenance practices following capping (e.g., mowing) will limit recolonization of OU1. It is clear that the physical act of placing a 36-inch soil cap will cause the migration or elimination of organisms from OU1. However, the EATM should discuss whether OU1 will revert back to the same or improved quality of habitat as was present prior to capping. This topic is discussed further in comment 8. While the displaced animals may not be able to find suitable habitat nearby, is it likely that the nearby populations could recolonize the area once the remediation took place. Field data may be necessary to answer these questions. In Section 3.1.1 (p. 13), the text states that the vegetation structure is an important component in determining the size and species composition of bird communities. That is true. Is the existing vegetation structure at OU1 of sufficient complexity to support a very complex bird community? Would a native grass/shrub community support a more complex bird community? These questions should be investigated.

8. **Evaluate the potential for habitat recovery following capping at OU1.**

This objective was addressed in Sections 3.1 and 3.1.1 in a very terse, subjective manner. Since maintenance practices following capping (e.g., mowing) will limit recolonization of OU1 by natural plant and animal populations, it is concluded that it is unlikely that a diverse terrestrial ecosystem will reestablish itself at OU1. Substantiated evidence should be presented to support this position. If we agree that "habitat destruction at OU1 is unacceptable to the current terrestrial populations residing at OU1", it seems that field data would be necessary to provide the information about what species actually lives there, rather than relying on modeling. It seems unlikely that temporary destruction of the ruderal grassland will result in a devastating effect on the shrew/small mammal population. Field data is needed to prove or disprove these theories. Performing P450 bioassays on the soil or capturing the shrews living on site and looking at their P450 levels may determine if bare ground has an adverse effect and the cap is needed. There are also many other ways to approach this through actual field sampling. As stated in comment 5, it would be a simple

matter to incorporate elements into the remedial design that would enhance the habitat at OU1 (e.g., eliminate mowing, establish a diverse assemblage of indigenous plant species with native grasses and bushes such as Coyote bush to add vertical dimension to the cap, increase topographic diversity, create artificial surface water bodies). In fact, if mowing was eliminated from the maintenance, most assuredly the endemic plant community and native fauna would reestablish itself on OU1 given time. If a water-proof, biotic barrier were installed under the native soil cap, the watering requirements to revegetate the cap might be less of an issue, and the necessity for mowing the cap might be reduced if the proper mix of annual and perennial grasses and shrubs were planted. In addition, with proper stormwater and infiltration controls, the problems associated with increased leaching due to watering the cap could be avoided. OU1 is itself a highly disturbed area that has evolved into a diverse terrestrial habitat with established animal populations in residence. Therefore, the conclusion presented in the EATM for this objective is too simplistic and largely inappropriate.

9. **If ecological impacts from capping are unacceptable, evaluate whether chemicals at OU1 pose potential adverse impacts to ecological receptors under current conditions.**

This objective was addressed in Section 3.3 using an exposure modeling approach. Exposure modeling is a standard screening level approach for estimating potential impacts of chemical releases on plants and animals. In ecological risk assessment, it is wise to conduct a screening level evaluation, such as exposure modeling, prior to conducting biological investigations (e.g., population studies, tissue chemical analyses, or toxicity testing). However, the exposure modeling that was presented in the EATM appears flawed. The conclusion of the assessment is that a shrew weighing 7 grams and consuming 2.5 grams of food per day would not be impacted by ingesting 0.2 grams of mercury, 23.07 grams of lead, 4.69 grams of PCB, and 1.87 grams of PAHs per day. This conclusion is unreasonable.

Additional issues that need to be revised include:

a) Although a shrew is an appropriate target species for exposure modeling, no evidence is presented that shows that soil chemical concentrations that are protective of the shrew are protective to other animals.

b) The selection of COPCs is presented on pages 22-24. What were the criteria for selecting COPCs? Although the COPCs selected in the EATM appear reasonable, a complete summary of chemicals detected in soil at OU1 (i.e., a summary table containing number of observations, frequency of detection, mean concentration, maximum and minimum detected concentration, and maximum and minimum non-detected concentration) is required for the reader to determine if the proper chemicals were selected as COPCs. Why were only mercury and lead considered as COCs? What about the concept of additive effects from exposures to multiple COCs?

c) Assumption 4 on page 25 states that J-coded data were not used in determining average concentrations of PAHs and PCBs. This is contrary to EPA guidance.

d) The average concentration of COPCs in soil was used to estimate exposure and potential impacts to the shrew. Standardized risk assessments include an evaluation of the

reasonable maximum exposure (RME) concentration. The average does not represent the RME which is more appropriately calculated as the upper 95 percent confidence limit.

e) The only route of exposure used for the shrew is the ingestion of prey. Evidence must be presented for elimination of the ingestion of soil, dermal, or inhalation routes of exposure. Incidental ingestion of soil particles could occur if the shrews were preening or licking moisture (fog) off grass blades for water. There aren't any references presented that would support the idea that "they don't drink the water". There wasn't any mention of leachate potentially leaving the landfill. This could be a pathway of concern since the landfill is adjacent to the salt ponds. No direct toxicity was considered, only food chain pathway. Inhalation occurs when they burrow or stay in burrows where volatiles occur. Shouldn't VOCs be part of the COC list?

f) The calculation of exposure presented in section 3.3.1.1 on pages 24-26 does not explain how chemical concentrations were determined in prey items for the shrew. Apparently, a factor of 1 is used to estimate concentrations of chemicals in prey from concentrations of chemical in soil. Although this may be conservative for some chemicals, it may not be conservative for chemicals that bioaccumulate, such as PCBs, which have been estimated empirically at 20. The method for determination of bioaccumulation factors in prey items of the shrew should be clearly stated and substantiated.

g) Section 3.3.1.3 presents toxicity values that are supposed to be representative of "no effects levels". These toxicity values are based upon acute lethal dietary concentrations and do not take into account chronic exposure and sublethal effects that can impact the health of a population by reducing reproductive potential. Toxicity values representing chronic "no effects levels" should be obtained from the literature. Also, the calculation of the "environmental no effect level in the diet" is flawed and should be recalculated.

h) There is no comparison between the exposure presented in section 3.3.1.1 and the no effect levels presented in section 3.3.1.3. A summary table should be presented summarizing the numbers and presenting the calculated ratios.

10. **If chemicals do pose an adverse ecological impact under current conditions, compare the relative magnitude of these impacts to impacts from capping.**

Since Section 3.3 concluded that there is no adverse effect to animals from chemicals detected in soil at OU1, then according to Figure 2-3 a comparison of effects was not necessary. This objective was correctly omitted from the EATM. However, since the conclusions in Section 3.3 are in doubt, this objective may need to be evaluated in the future if unacceptable risks are associated with chemical exposure to animals on OU1.

11. **If capping does not unacceptably alter the habitat, assess the potential for burrowing animals to be exposed to chemicals following capping.**

According to Figure 2-3, this objective should not be addressed in the EATM if capping resulted in an unacceptable alteration in the habitat. Section 3.1 concluded that capping would result in an unacceptable alteration in the habitat at OU1. Therefore, Section 3.2.1,

which assesses whether a 36-inch native soil cap is protective of burrowing animals, is unnecessary.

12. **If animals can be exposed to chemicals by burrowing through the cap, assess the potential adverse impacts to these receptors.**

According to Figure 2-3, this objective should not be evaluated in the EATM if capping resulted in an unacceptable alteration in the habitat or if animals are not exposed to chemicals following capping. Section 3.1 concluded that capping would result in an unacceptable alteration in the habitat at OU1. This objective was correctly omitted from the EATM.

13. **Evaluate the potential for uptake of chemicals by plants following capping.**

This objective was addressed in Section 3.2.2 subjectively evaluating the potential for roots to penetrate the 36 inch cap. The EATM concluded that the grass vegetative cover established following capping would not contact the underlying landfill material. However, the basis for this conclusion is unclear. The first paragraph in Section 3.2.2 states that WESCO (1993) estimated root depths of grasses and forbs native to the area to be less than 5 feet. Section 3.2.2 later states that an unknown grass species will be established on the site following capping and provides a reference that states that several grass species typically have a root depth of less than 1 foot. This information is contradictory and requires further substantiation before a conclusion can be made. Information on the rooting depth of the grass species to be used for revegetation should be obtained for the particular soil and climatic conditions found at the site. Furthermore, it is highly likely that plant species indigenous to the area will invade OU1 in time no matter what maintenance regime is used. Plant species endemic to the area (e.g., hare barley, ripgut brome, wild oat, sweet clover, yellow star thistle, Russian thistle, black mustard, and fireweed) have an annual life habit and are primarily species of recent exotic introductions that can be considered weeds. As such, they are aggressive colonizers that would most certainly invade OU1 following establishment of the grass cover. Therefore, rooting depth of these plants should be considered in the evaluation.

14. **If there is a potential for plants to accumulate chemicals following capping, evaluate the potential impacts to animals foraging on those plants.**

Since Section 3.2.2 concluded that plant roots will not come into contact with the landfill contents following capping, this objective should not have been addressed and was not addressed in the EATM. However, if as suggested in comment 13 the root depth issue is re-evaluated and it is determined that rooting depth may exceed 36 inches, then this objective will have to be addressed. An exposure model approach that estimates the amount of chemical moving from the soil into the plant and subsequent exposure to an herbivorous animal (i.e., Black-tailed hare, California ground squirrel, Botta's pocket gopher, California vole) would be appropriate.

EDITORIAL COMMENT

15. p. 6: Revise text to read, "jeopardize any species..."