MOFFETT FEDERAL AIRFIELD

RESPONSE TO COMMENTS
SITE 22 DRAFT FEASIBILITY STUDY REPORT

July 10, 1998

This report presents responses to regulatory agency comments on the Site 22 Draft Feasibility Study (FS) Report submitted January 9, 1998 for Moffett Federal Airfield (MFA), California. Messrs. Michael D. Gill, Clarence Callahan, and Steve Anderson of the U.S. Environmental Protection Agency (EPA) submitted comments electronically on February 23, 1998. Mr. Glenn Young of the California Environmental Protection Agency Integrated Waste Management Board (IWMB) submitted comments on this document in a letter dated February 3, 1998 addressed to Mr. Joseph Chou of the San Francisco Bay Regional Water Quality Control Board (RWQCB). Mr. Joseph Chou submitted these and additional comments in a letter dated March 9, 1998.

EPA COMMENTS

GENERAL COMMENTS

Comment 1. EPA agrees that there is limited potential for direct impacts to site receptors. The Navy is correct to expect that, as with any landfill, the material could possibly be a source of contaminants for nearby receptors. With this in mind, if the Navy protects the water quality at the level of Aquatic Water Quality Criteria [AWQC], the local aquatic receptors should be protected.

Response: **At this time, the proposed remedy does not address groundwater. Groundwater will be monitored and, as appropriate, the results compared to AWQC. AWQC are used as a means of comparison for protection of aquatic life. However, it must be emphasized that no direct pathway from the landfill leachate to surface water has been delineated.**

Comment 2. The viable alternatives presented in Section 4.0 are for two extremes of possible solutions to be considered for Site 22. Because 27 CCR [California Code of Regulations] Subchapter 5 allows for engineered alternatives, a single barrier cap comprising a geosynthetic clay liner [GCL] or a flexible membrane liner should be considered. The cost may be significantly lowered for a single barrier cap when compared with a multilayer cap if the foundation layer thickness is reduced and an integral biotic layer is part of the cap. If the question of inconsistency with local landfills precludes its selection, this can be evaluated later as one of the nine criteria.

Response: **A single barrier cap, with GCL membrane or other biotic barrier, has been considered and evaluated as part of Alternative 3 in the draft final Site 22 FS.**

Comment 3. Discussion should be presented regarding the existing site features and the disturbances that the various alternatives would have on these features. The short-term effectiveness section briefly mentions this, but the existing site features are not described.

Response: **An additional investigation was conducted in April 1998 to study disturbance to the area and to better delineate the boundary of the site. Field activities included a site survey, global positioning system (GPS) mapping, exploratory trenching and groundwater sampling. Using the data collected during the additional investigation, existing site features are described in Section 1.3.2 and disturbances to these features are further discussed in the short-term effectiveness evaluation in the draft final FS report.**

Comment 4: An alternative that should be considered is the relocation of refuse. This remedy may be more cost effective and environmentally protective than others proposed. This method was employed for Site 2 of OU [Operable unit] 1. Another example is a similar closed, abandoned, or inactive (CAI) landfill at March AFB [Air Force Base]. This was a relatively small landfill with refuse in groundwater and minimal groundwater contamination; the landfill was closed in the 1960's. The issue was leaving refuse in groundwater considering the long-term detrimental impacts (e.g., landfill settling, increased potential for off-site transport of contaminants, no leachate control). The State RWQCB required a minimum of a 5-foot separation between groundwater and refuse. This is consistent with the siting of new landfills under current regulations. The landfill was subsequently relocated within the old CAI footprint, allowing the site owners to apply the closure specifications they wanted, but not make all the siting regulations applicable.

Response: **The Navy has added a fourth alternative to the draft final FS report: excavation and off-site disposal of the refuse. The Navy is not considering re-location on-site because a suitable location does not exist. The relocation cost estimate is based on the new volume estimated during the additional investigation (92,000cubic yards).**

Comment 5: To best understand the infiltration minimization efficiency of the different cover scenarios, the results of the HELP [hydrogeologic evaluation of landfill performance] model should be presented. Given that there is perched leachate and an elevated leachate level within the landfill, there is significant infiltration. This higher water level elevation increases the potential for migration to groundwater and surface water bodies. The HELP model will allow a comparative analysis to be conducted between the different capping alternatives. This comparison will provide a better understanding of how the different alternatives will perform.

Response: **HELP modeling was conducted and is presented in Appendix G of the draft final FS report.**

Comment 6: Contingency actions should be proposed for instances when groundwater monitoring detects chemical concentrations higher than certain trigger points, e.g., AWQCs.

Response: **Based on both human health and ecological risk assessments as well as the evaluation of groundwater data, there is no evidence that groundwater poses a potential threat to human health or the environment. Groundwater monitoring is included as a component of each of the alternatives. If monitoring indicates that chemical concentrations have increased above AWQC, the Navy will consult with regulatory agencies and, if it is determined further action is needed, will evaluate alternatives consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).**

Comment 7: Significant infiltration appears to be generated by the landscaping practices conducted. To reduce infiltration, discussion should be presented on how irrigation practices can be implemented to minimize excess infiltration. This could include the use of lysimeters and timers for the irrigation system.

Response: **It is assumed that Site 22 will continue to be used as a golf course regardless of the remedial action taken. Certain irrigation practices will continue to ensure that the turf is properly maintained. Moreover, because the water table has risen into refuse and saturated portions of the waste, leachate will exist regardless of infiltration rates. Irrigation is not a significant contributor to this problem because the water table is in the waste layer; the water would exist in the waste regardless of irrigation practices.**

However, limiting infiltration would minimize the presence of a perched water table in the refuse and potentially reduce the amount of leachate produced. A discussion is presented in the draft final FS report on limiting infiltration through the use of a single or multi-barrier cap.

Comment 8. It appears that Site 22 is a municipal landfill, although no discussion is given. Please add language to substantiate this assumption that Site 22 is not a hazardous waste landfill, but a municipal landfill, as was done for Sites 1 and 2.

Response: **Based on historical records and interviews, Site 22 landfill was used for the same purpose as Site 2 (municipal waste). Trenching activities conducted during the additional investigation work uncovered only municipal waste. Information on the site history and why it is considered a municipal waste landfill is included in the draft final FS. (Please see response to comment 10 as well).**

SPECIFIC COMMENTS

Comment 9. Section 1.2.2, Page 5, Paragraph 1. Please clarify in this section how much the groundwater at Site 22 exceeds the 3,000 mg/L [milligrams per liter] TDS [total dissolved solids] level or reference Figure 4.

Response: **In the draft final FS report, TDS concentrations are provided in Figure 4 to clarify to what extent the Site 22 groundwater exceeds the 3,000 mg/L TDS level.**

Comment 10. Section 1.3.1, Pages 8 and 9. Please provide more detail on the contents of the landfill. This can be done by elaborating on the contents of Sites 1 and 2, if they contain the same materials. Please state whether Site 22 is a hazardous waste or municipal waste landfill, as was done for Sites 1 and 2 in OU1. Did the aerial photos show landfill coverage over the entire 7 acres or was the landfill only concentrated in certain areas?

Response: **Based on historical records and interviews with base personnel, Site 22 was used as a municipal landfill after Site 2. Therefore, it was assumed to contains waste similar to that found at Site 2. This was confirmed during exploratory trenching activities that uncovered only municipal waste such as old tires, newspapers, vacuum tubes, and shampoo bottles.**

Comments 11. Section 1.3.2, Page 9. Please provide the regulations that are in place to protect the burrowing owls (i.e., what prompted the burrowing owl protection zone described in Trulio 1997?).

Response: **The burrowing owl is listed under the Migratory Bird Treaty Act. Section 703 of the Act prohibits the taking, killing, or possessing of migratory birds. Although the Act in not applicable because it does not apply to the federal government, it is considered relevant and appropriate for inclusion in the FS report (See section 1.5.3 of the draft final FS report). According to Trulio, 11 areas within Moffett Federal Airfield that contain active owl burrows sites are considered burrowing owl protective zones. The presence of two active burrows (as of December 1997) within the area of the golf course prompted the protection zone there.**

Comment 12. Section 1.3.4, Page 14, Paragraph 1. Please clarify which of the referenced quarterly reports contain groundwater and/or soil data from Site 22.

Response: **The text has been clarified as suggested.**

Comment 13. Section 1.3.4, Page 15. Groundwater. Although meeting AWQC would protect aquatic life in surface water, it should be pointed out that AWQC are available for only a limited amount of the constituents detected at Site 22, including VOCs [volatile organic compounds] (3/14), SVOCs [semivolatile organic compounds] (3/13) and none for PCBs [polychlorinated biphenyls] (0/2). Other methods of protection from chemicals should be implemented when AWQCs are not available.

Response: **Groundwater monitoring pursuant to CCR Title 27 Subchapter 3 Article 1 is included as part of each of the capping alternatives. Under these requirements, the Navy will evaluate whether the landfill is impacting groundwater. The Navy believes the monitoring program that will be developed during the RD/RA phase, will adequately provide protective standards for groundwater.**

Comment 14. Section 1.3.4, Page 16. Landfill Gas. ". . . no significant subsurface methane gas is migrating beyond the perimeter of the landfill . . ." Please elaborate on what the phrase "no significant...gas" means and add it to the text.

Response: **No significant subsurface methane gas means no concentration of methane is above the lower explosive limit (LEL) of 5 percent by volume. This has been clarified in the draft final FS.**

Comment 15. Section 1.3.4, Page 16, Summary. Please clarify that few chemicals have AWQCs. We suggest changing the language of the second bullet to read: "For those organic constituents for which AWQCs are available, either in the landfill leachate or surrounding groundwater, none were detected at concentrations greater than AWQC".

Response: **The language has been changed in the draft final report to indicate that few chemicals have AWQCs.**

Comment 16. Section 1.4, Page 17. Please mention the use of the point risk approach and the associated results. Specify exactly what the calculated risks were for Site 22, as opposed to "within the acceptable risk range" for both the area risk and point risk methods.

Response: **Information has been provided on both approaches used in the risk assessment for Site 22, including the calculated risks.**

Comment 17. Section 1.4, Page 18, Paragraph 1. The last two sentences of this paragraph seem contradictory. The first states that "...no detectable quantities of nonmethane hydrocarbons are migrating..." and is followed by "Therefore, there are no risks associated with soil gas exposure or methane hazards". Please clarify the apparent confusion between nonmethane and methane gases. How can one be sure methane risks are nonexistent if nonmethane hydrocarbons are the gases not migrating?

Response: **The text has been revised to clarify that both nonmethane and methane gas were assessed as part of the air solid waste assessment test (SWAT) (as described in Section 1.3.4), and that neither nonmethane nor methane gas were determined to pose a human health risk.**

Comment 18. Section 1.4, Page 18, Paragraph 2. Please add a brief section about the risks to other ecological receptors, as discussed on page 9. Is the burrowing owl considered an indicator species?

Response: **The draft final FS has been revised to state that burrowing owls are an indicator species, and that only the ecological risk to burrowing owls was addressed in the site-wide ecological assessment conducted in the area of Site 22.**

Comment 19. Section 1.5.1, Page 21, Groundwater. Why are AWQCs not considered chemical-specific ARARs [applicable or relevant and appropriate requirements]? These and other ARARs need to be noted during the FS and ROD [record of decision], not only when the groundwater monitoring program is developed. In what situations would new chemical-specific ARARs be evaluated?

Response: **The alternatives being considered for Site 22 do not address remediation of groundwater. Based on both human health and ecological risk assessments, as well as evaluation of the groundwater data collected for Site 22, there is no evidence that groundwater poses a potential threat to human health and the environment. Therefore, given the scope of the remedy, it is inappropriate to identify groundwater ARARs at this time. Consistent with the approach taken in the OU1 ROD, groundwater monitoring will be conducted at the landfill. If monitoring indicates that there may be potential risks from groundwater, the Navy would evaluate the potential risks and need for remedial action under CERCLA. As part of that process, groundwater chemical-specific ARARs may be identified.**

Comment 20. Section 1.5.1, Page 21, Chemical-Specific ARARs.

(a). If AWQCs are not chemical-specific ARARs, EPA recommends rewording the section on groundwater (page 21) as follows: "Leachate has not significantly affected groundwater at Site 22. Because the proposed action does not include active groundwater remediation, no chemical-specific groundwater ARARs will

be identified. Chemical-specific ARARs may be reevaluated when the groundwater monitoring program is developed."

(b) For thoroughness, consider listing the ARARs for methane (page 21), even if it appears they will not be used because no methane was detected at the boundaries of the landfill.

(c) While the Site 22 landfill is stated on pages 21-22 to be exempt from Bay Area Air Quality Management District's [BAAQMD] Regulation 8, Rule 34 based on the estimated tonnage of waste at the site, the text should discuss whether the BAAQMD rule, although not "applicable", may nevertheless be "relevant and appropriate".

Response: (a) **Language similar to that proposed has been added. (Please see response to comment 19 as well).**

(b) **Because there is no remedial action objective (RAO) for methane and no remediation measures are being considered for landfill gas, it does not seem necessary to identify ARARs for methane.**

(c) **The Navy does not believe Rule 34 of BAAQMD Regulation 8 to be relevant and appropriate to the proposed actions at Site 22. The purpose of that rule is to limit emissions of organic compounds and methane from solid waste disposal sites. The rule establishes landfill gas collection and control system requirements in Section 8-34-301. These requirements are not relevant and appropriate at Site 22 because of the low concentrations of methane gas that have been detected.**

Comment 21. Section 1.5.2, Page 22, Location-Specific ARARs.

(a) The text should list the National Historic Preservation Act and the Archaeological and Historic Preservation Act and discuss why they are not potential ARARs. See, for example, the notes in Table A-3 of the Draft Final Stationwide FS dated November 8, 1996.

(b) The text should explain why the Endangered Species Act is not a potential ARAR, both generally and with specific reference to the western burrowing owl. Section 1.3.2 on page 9 states that there is a "western burrowing owl protection zone" within the perimeter of the golf course. Section 5.2.3 on page 44 states that the western burrowing owl is "a California species of special concern." These terms should be explained within the context of the relevant California statute or regulation, and potential state ARARs should be discussed in the text and listed at the appropriate place in the ARARs tables.

Response: (a) **It does not seem necessary to list federal acts that are not ARARs. However, as EPA has requested this information, the Navy has added a short discussion in Table 6 as to why the National Historic Preservation Act and the Archeological and Historic Preservation Act are not ARARs.**

(b) **As explained in the response to comment 11, the burrowing owl is not a threatened or endangered species and therefore the Endangered Species Act is not an ARAR. The Navy is not aware of any California laws and regulations that specifically pertain to the burrowing owl. The "species of special concern" designation was created by the California Department of Fish and Game. According to staff at the Department of Fish and Game, the "species of special concern" designation derives from Title 14, Division 6, Chapter 3, Section 15380 of the Guidelines for Implementation of the California Environmental Quality Act (CEQA). Section 15380, in the definition section of the Guidelines, states that a species shall be considered endangered, rare, or threatened, even if not so listed, if it meets the criteria in that section; the term "species of special concern" apparently covers such species. The guidelines are to be followed by state and local agencies in evaluating potential, significant environmental effects of a proposed action. The guidelines, including the definitions, are not considered ARARs for purposes of CERCLA actions.**

Comment 22. Section 1.5.3, Page 22. Please identify which provisions of the federal and California state solid waste regulations are more stringent.

Response: **The Navy intends to follow the approach used in the OU1 ROD. Rather than conduct a detailed analysis of each section of the regulations, both sets of regulations are listed and whichever is more stringent will be followed.**

Comment 23. Section 1.5.3, Page 22. Please provide some explanation of the change in California's solid waste regulations. In OU1's ROD, 14 CCR and other regulations were ARARs, but for this site, the ARARs are 27 CCR. A short description of the change in state regulations would be appreciated.

Response: **The Navy has added language to the text in Section 1.5.3 explaining the relationship between Title 14 and Title 27.**

Comment 24. Section 1.5.3, Page 22, Action-Specific ARARs.

(a) The first reference in the text to Title 27 (on page 22) should include a full citation to the regulation.

(b) The quotation in the last paragraph on page 22 should be followed by a citation to the specific regulation that is being quoted. If the quotation is from Section 21100(b)(1) of Subchapter 5, it should be revised to read: These regulations are applicable to solid waste "disposal sites that did not complete closure prior to November 18, 1990, in accordance with all applicable requirements."

(c) Is it correct that Title 27 is "applicable" to a landfill that has not been in operation since the mid-1960s, i.e., that the closure of a landfill dating from that time must be carried out in accordance with the requirements of Title 27, including the requirements in Subchapter 5 for a cap? If part or all of Title 27 is not "applicable", the text should discuss whether it may nevertheless be "relevant and appropriate". If Title 27 is either "applicable" or "relevant and appropriate", Alternative 2 does not appear to meet ARARs and may not be

protective of human health and the environment. See comment below on Section 5.2.1.

(d) The last two sentences on page 22 are confusing because they attempt to explain both the relationship between Title 27 and other state and federal regulations and the concept that, as between similar state and federal requirements, the more stringent requirement will be an ARAR. The sentences should be reworded for clarity and should include a specific citation to the other "federal and California solid waste regulations" that are being referred to, e.g., 40 C.F.R. Part 257 or 258. As necessary, these regulations should be added to Table 3.

(e) A statement should be added to the text explaining why state and federal hazardous waste regulations are not ARARs for this action. See, for example, the statement in Section 2.11.2.3 (pages 71-72) of the Final OU1 ROD dated August 1, 1997.

Response:

(a) A full citation of the regulation has been added to the text.
(b) The text now references the specific regulation quoted.
(c) Discussion concerning this issue has been added to the text in Section 1.5.3.
(d) The last two sentences have been revised and clarified.
(e) Language similar to that which appears in the OU1 ROD has been added to the text.

Comment 25. Section 2.1.2, Page 4. The Navy' definition of the RAO for groundwater surrounding this site is "...to protect surface water and associated environmental receptors from exposure resulting from leachate migration into groundwater and subsequently into surface water". This is vague and does not clearly state the goal. EPA suggests that the goal be "To maintain a level of protection of the surface water that meets or exceeds the Aquatic Water Quality Criteria (AWQC)." For those contaminants in the landfill that do not have identified AWQC, surrogate standards should be defined e.g., "no significant impact as determined in an appropriate bioassay."

Response: **Because the data do not suggest that the landfill has impacted groundwater quality, an RAO for groundwater is unnecessary. This statement has been removed from the text of the draft final FS. Because communication between the landfill and groundwater is limited, no direct pathway from the landfill leachate to the surface water has been delineated. As explained in response to comment 19, groundwater monitoring will be conducted at and beyond the perimeter of the landfill. If, based on the monitoring, it appears that groundwater is impacted, RAOs will be developed and alternatives evaluated consistent with CERCLA.**

Comment 26. Section 3.1.1, page 31, Capping. The FS should consider at least one additional capping alternative for comparison, possibly a single layer cap. If this alternative turns out to be insufficient to meet ARARs, it can be screened out at a later time.

Response: **A single barrier cap (clay, Alternative 3A) in addition to the multilayer cap (Geosynthetic Clay Liner with a drainage layer, Alternative 3B) are inclusive considered in the draft final FS. A native soil cap was not considered in this FS. Alternative 2, armoring the sides of the landfill, also has been retained for consideration in the draft final FS.**

Comment 27. Sections 3 and 4. Text in various places states that groundwater will be monitored in perimeter monitoring wells. (See page 32, paragraph 2; page 32, paragraph 6; page 33, last paragraph; page 35, paragraph 2) Why are no groundwater wells within the landfill to be monitored?

Response: **During monitoring, samples will be taken from all accessible wells, both in perimeter and leachate wells. The text has been changed to clarify this on page 32. Text on page 33 states that "no additional groundwater monitoring wells would be needed." This is because five perimeter and two leachate wells already exist. Through the actions of Alternatives 3 and 4, the wells located within the landfill may be abandoned; however, perimeter wells would still be monitored.**

Comment 28. Section 4.2.4, page 36, para 1. Please provide some examples of what type of corrective actions would be proposed to control any methane gas releases.

Response: **The text now provides information on possible corrective action methods. The air SWAT results indicated that no significant amount of methane gases (less than the LEL of 5 percent) are migrating beyond the perimeters of the landfill. However, if methane is also detected in the proposed gas monitoring units, a corrective action may be necessary.**

Comment 29. Section 5.2.1, Page 42. Is Alternative 2, which proposes only access restrictions, the placement of a "biotic barrier" around the landfill, and gas and groundwater monitoring, in fact adequately protective of human health and the environment, when it does not provide for a cap? This should be discussed in light of the apparent requirement in Title 27 that closed solid waste landfills have a multilayered cap of a specified standard of construction and the statement in Section 1.3 (page 8) that the refuse in Site 22 has not been fully characterized.

Response: **Based on the results of both the human health and ecological risk assessments, neither groundwater nor gas in the area of Site 22 pose a threat to human health or the environment. During the monitoring program, if it is determined that the groundwater and gas may pose a threat to human health and the environment, then remedial actions will be assessed.**

The human health exposure pathways for landfill refuse at Site 22 are direct contact with the waste through dermal contact and ingestion and inhalation of compounds in surface and subsurface soils. As it is assumed that the use of Site 22 will remain as a golf course, dermal contact and ingestion and inhalation of compounds within the soil will be minimized by maintained landscape on the landfill surface. In addition, access restrictions, including restrictions on excavating in the area of Site 22, will minimize exposure to both soil and refuse.

The ecological exposure pathways for landfill refuse at Site 22 are direct contact with the waste through dermal contact and inhalation of compounds in surface and subsurface soils. By reducing the burrowing activities of the ground squirrels and burrowing owls, the placement of the biotic barrier reduces exposure to both soil and refuse. The barrier would be placed on the slopes of Site 22 as this is the primary area of burrowing activities.

For these reasons, the Navy believes that Alternative 2 is adequately protective of human health and the environment.

Comment 30. Section 5.2.2, Page 42. Compliance with ARARs.

(a) The reference under Location-Specific ARARs to Section 1.5.3 should apparently be to Section 1.5.2.

(b) Action-Specific ARARs. Assuming that only the groundwater monitoring requirements of Title 27 are "applicable" to Alternative 2, the text should discuss whether other major requirements of Title 27 (such as the requirement for a cap) are nevertheless "relevant and appropriate". If they are "relevant and appropriate", Alternative 2 does not appear to meet ARARs, because it does not provide for a cap. (Title 27 specifies a multilayered cap of a specified standard of construction for closing solid waste landfills.)

Response

(a) The reference has been changed.

(b) Title 27 requirements are identified as "applicable" or "relevant and appropriate" in Table 6. Regardless of whether Title 27 is applicable or relevant and appropriate, Section 20080(b) allows for engineered alternatives to the capping requirements in Section 21090.

Comment 31. Section 5.2.3, Page 43, Paragraph 2. We disagree with the proposal that the biotic barrier will be protective if only placed in or on the sloped areas of the landfill. The alternative should be modified to cover the entire landfill with a biotic barrier. The analysis, including costs, should be modified to reflect this coverage. This is because there is presently nothing, such as fencing, to prevent the squirrels from digging into the portions of the landfill within the perimeter.

Response **As noted in response to comment 29, the primary burrowing activity of ground squirrels is on the slopes of the landfill. The top of the landfill is the golf fairway. Because it is heavily traveled and is relatively flat, no burrowing activity occurs at the top of the landfill. Therefore, the alternative has not been modified to cover the entire landfill.**

Comment 32. Section 5.3.2, page 46. The existing text discusses potential action-specific ARARs for Alternative 3 only in terms of applicability. However, certain provisions of Title 27 that are not "applicable" to Alternative 3, may be "relevant and appropriate". The text should discuss any such provisions and should be revised to be consistent with any added discussion in Section 5.2.2.

Response: **The Navy has identified those requirements in Title 27 that are applicable or relevant and appropriate in the draft final FS.**

Comment 33. Section.2.1, Page 50, Paragraph 2. It is stated that a cap specifically designed to reduce infiltration is of little value, since waste is already below the water table. This is contradictory and does not explain the presence of perched leachate within the landfill up to 7 feet above the surrounding groundwater table. Please clarify. It is also appropriate to consider a single barrier cap for this landfill. This section should be

objectively reevaluated to assess whether Alternative 3 can provide increased long-term effectiveness and permanence over Alternative 2.

Response: **At Site 22, some of the refuse is below the water table. Because the water table has risen into refuse and saturated portions of the waste, leachate will exist regardless of infiltration rates. In addition, according to CERCLA guidelines for municipal landfills, "caps may be of limited benefit in areas of high groundwater". However, caps that limit infiltration would minimize the presence of a perched water table in the refuse and therefore reduce the quantity of leachate produced. In the draft final FS report both a single and multi-barrier cap are considered as part of the capping alternative (Alternatives 3A and 3B, respectively).**

Comment 34. Section 6.2.1, Page 50, Paragraph 2. Please elaborate on what corrective actions would be taken if leachate migration is discovered through the groundwater monitoring program.

Response: **If groundwater monitoring indicates there may be a potential risk to human health and the environment, the Navy will evaluate remedial alternatives according to CERCLA requirements. It is premature at this time to speculate on the type of corrective actions that may be taken.**

Comment 35. Section 6.3, Page 50. If a single- or multi-barrier cap can reduce infiltration, and thus mobility, of the leachate, does not Alternative 3 provide a greater reduction of the contaminant mobility? Please clarify.

Response: **As stated in comment 33, some of the refuse in the landfill is below the water table. Because the water table has risen into refuse and saturated portions of the waste, leachate will exist regardless of infiltration rates. In addition, according to CERCLA guidelines for municipal landfills, "caps may be of limited benefit in areas of high groundwater". However, caps that limit infiltration would minimize the presence of a perched water table in the refuse and therefore reduce the quantity of leachate produced. In the draft final FS report both a single and multi-barrier cap are considered as part of the capping alternative (Alternatives 3A and 3B, respectively).**

Comment 36. Section 6.6, page 52 and Appendix F. The costs associated with a multilayer cap could be reduced if a single-barrier cap is used. The associated costs of a single barrier should be provided for comparison.

Response: **Because a single barrier cap has been evaluated for the draft final FS, costs are included for comparison.**

Comment 37. Tables 2 and 3. It would be desirable throughout to state whether a particular statute or regulation is "applicable", "relevant and appropriate", or "to be considered".

Response: **This information has been added to Tables 5 and 6.**

Comment 38. Table 2.

(a) Is 40 CFR [Code of Federal Regulations] Part 258 "applicable"? Compare it to 40 CFR Part 257.

(b) Add the Endangered Species Act and/or the equivalent State statute as necessary based on the additional discussion in the text at Section 1.5.2 relating to the western burrowing owl.

(c) Add the National Historic Preservation Act and Archeological and Historic Preservation Act, etc., as necessary based on the additional discussion in the text at Section 1.5.2.

Response:

(a) 40 CFR, Part 258 is not applicable; those regulations do not apply to landfills that did not receive waste after October 9, 1991. Nevertheless, portions of the regulations are considered relevant and appropriate as noted on Table 5. 40 CFR, Part 257 is not an ARAR; that section contains criteria to determine whether a facility poses a reasonable probability of adverse effects on health or the environment. As it does not contain substantive standards, it is not an ARAR.

(b) As explained above in response to comment 21, the Endangered Species Act is not an ARAR for Site 22. Text concerning this conclusion has been added to Table 5.

(c) The National Historic Preservation Act and Archaeological and Historic Preservation Act have been added and discussed in Table 5.

Comment 39. Table 3.

(a) Consider adding Section 21090 to the list of state ARARs in Title 27.

(b) Consider adding Section 21160 (landfill gas control and leachate contact) to the list of state ARARs in Title 27.

Response:

(a) Section 21090 has been added to the list of ARARs.

(b) Landfill gas control is already identified as an ARAR; however, 21160(b) has been added to the list of ARARs.

Comment 40. Figures. To better understand the site conditions and drainage patterns, it is suggested that a topographic map be provided.

Response: As part of the additional investigation field work, a topographic map with the landfill boundary and trench locations was made. This map is provided in the draft final FS report as Figure 15.

Comment 41. Figure 4. Please indicate Site 22 on this figure.

Response: This has been changed in the draft final FS.

Comment 42. Table 6. In this comparison of remedial alternatives table, the ratings scale seems to imply that one must use the entire spread of 1 to 5 in the ratings of the three alternatives. We don't believe that was the intention. Possibly redefining the scale as 1=meets most criteria and 5=meets least criteria would provide more clarity. When we made this change and re-evaluated, the overall ratings changed somewhat and Alternative 3 was the most preferable. We understand that the inherent problem with these kinds of ratings is that they are subjective, but changing these definitions may help to clarify the comparison.

Response: **The new definitions suggested above have been used to redefine Table 9 in the draft final FS.**

Comment 43. Figure 15 and Table B1. Sample designations presented in Table B1 are not found on Figure 15. On which figure are samples SBGC-1 through -5 located?

Response: **These identifications have been added to Figure 16 in the draft final FS.**

Comment 44. Figure 17. "Diagram" is misspelled in the legend.

Response: **This has been changed in the draft final FS report.**

Comment 45. Appendix B. Sample descriptions should be provided indicating if samples were taken inside or outside of the landfill.

Response: **This has been done in draft final FS report.**

Comment 46. Appendix B. Are these soil concentrations maximum concentrations detected? How many rounds of sampling are represented here? Please indicate data collection dates on the tables in this appendix.

Response: **Because a soil boring is only sampled once, there is not a range for maximum concentrations detected. Therefore, all detections from all soil boring samples are presented in Appendix B. Sample collection dates has been added to Tables C1 through C7 in the draft final FS report.**

Comment 47. Appendix C. Table C4 needs a definition for the *.

Response: *** indicates that the AWQC is for critical, not chronic exposure. No chronic exposure number is currently available. This information has been added to Table D4 in the draft final FS report.**

Comment 48. Appendix D. Table D1 is mislabeled. The title for this table should read Landfill wells, not Perimeter wells. Also, please describe the purpose of the Cochran t-test and what it is showing in this appendix.

Response: **The title of table has been changed in the draft final FS report. The purpose of the test is provided at the beginning of Appendix E.**

IWMB COMMENTS

GENERAL AND SPECIFIC COMMENTS

Comment 1. Based upon the amount of waste estimated in place (150,000 cubic yards based on a seven acre 13 foot thick waste prism), it appears that off-site clean-closure would be cost prohibitive. However this estimate should be based on waste quantities estimated from intrusive investigative field data (logs from trenching and potholing), which was not obtained during the feasibility study.

Response: **During additional investigations at Site 22, trenching was conducted to evaluate the vertical and horizontal extent of the waste. Based on these measurements, the volume of the waste was recalculated to be 92,000 cubic yards , and the cost of off-site, clean-closure has been estimated.**

Comment 2. IWMB recommends that an intrusive investigation be performed to collect field data which will clearly define the horizontal and vertical extent of the landfill prior to selection of a remedy including capping and monitoring. Once field data is obtained, and waste quantities are estimated, better-defined work scopes for remedial decisions can be made regarding capping, monitoring, consolidating, clean-closure, etc.

Response: **As part of field work conducted in April 1998, intrusive work was conducted that consisted of trenching and groundwater sampling. This new information has been incorporated in the FS and considered in the evaluation of alternatives.**

Comment 3. An intrusive field investigation may be beneficial to determine if shallow waste areas may be consolidated on site (within the current footprint), to minimize the landfill cap area and minimize the removal of mature trees.

Response: **See response to IWMB comment 2.**

Comment 4. Are soils and waste above the water table under saturated conditions, i.e. at optimal moisture content? Is infiltration through the current cover from golf course irrigation, moving under saturated flow conditions?

Response: **We do not know whether irrigation infiltration is moving under saturated flow conditions. The Navy has not identified any seeps around the landfill (Don Chuck verbal communication) and no seeps were identified during additional investigation field work. From soil borings and trench logs, the waste is saturated in a clay matrix, which would limit infiltration and flow through the landfill (and results in the perched water table). Since seeps have not been seen in the area of the landfill, the water could be moving down to the local water table (outside of the landfill) and/or is lost through evapotranspiration.**

Comment 5. Based on statistical data presented in Appendix D, Tables D1 and D2, the landfill has statistically impacted groundwater quality (primarily with inorganic constituents) even though groundwater quality is considered non-beneficial use due to high TDS.

Response: **There was a misprint in Appendix D. The title of Table D1 should have read Leachate not Perimeter wells. With this clarification, it can be seen that those metals found to be statistically significant in the leachate but not the perimeter wells include cobalt, lead, nickel, and zinc. These are metals that would be expected in a landfill. The fact that they are significant in the leachate, but not in the groundwater, indicates that the landfill leachate has not affected the groundwater in the perimeter wells. From the statistically-higher concentrations in the perimeter wells of magnesium, potassium, and sodium, it appears that the higher concentrations of the dissolved metals in the perimeter wells are due to salt water intrusion from the nearby evaporation ponds.**

Comment 6. It appears that a mounding of groundwater (leachate mounding) is present within the landfill based on static water levels shown in Figure 6 and 7 (p. 70). If this mounding is due to hydraulic head caused by golf course irrigation, a multi-layer cap may be the only feasible alternative since infiltration at this site is "not being minimized to the greatest degree possible" and the current site use is adversely impacting the landfill conditions.

Response: **In Figures 6 and 7, the groundwater is presented as mounded because the extent of the perched groundwater within the landfill is not known. However, chemical comparisons of the landfill leachate to the perimeter wells indicate that the water is not mounded, but perched and the waters are not in chemical equilibrium (see Section 1.3.3). Exploratory trenching, conducted as part of the additional investigation field work confirms the observations that the water table is not mounded but perched. Within the trenches, perched lenses of water were found within the refuse and at the base of the waste, on top of the native clay.**

As stated in the response to EPA specific comment 33, caps that limit infiltration would minimize the presence of a perched water table in the refuse and would therefore reduce the amount of leachate produced. In the draft final FS report both a single and multi-barrier cap are considered as part of the capping alternative.

Comment 7. Air SWAT data and levels of methane in the fill reported during the drilling of wells within the waste mass (reference boring SBGC-1 and SBGC-4), indicated methane gas concentrations of 51 percent and 30 percent of the Lower Explosive Limit (LEL) or 1.55 percent (15,500 ppm [parts per million]) and 2.5 percent (25,000 ppm) methane concentration by volume in air, which may indicate that landfill gas generation may be curtailing. IWMB staff, however, recommend that the four gas monitoring probes proposed in the FS, be installed and constructed in accordance with 27 CCR Section 20925, i.e. multi-depth, gravel packed, bentonite sealed, etc., and that quarterly monitoring be performed for 12 quarters to obtain data which could be used to obtain a waiver to further gas monitoring in the 30-year postclosure maintenance period.

Response: **According to 27 CCR Section 20925 all probes should be installed above the permanent low seasonal water table and that exclusion or modification can be requested ...when conditions limit the practicability or do not warrant installation depth criteria. At Site 22, the depth to groundwater is approximately 4 feet below ground surface (bgs) therefore does not seem prudent to install multi-depth probes. In the draft final FS, 12 quarters of sampling have been included in the cost estimate.**

Comment 8. IWMB staff recommend that an RAO should be to reduce infiltration into the landfill whether through ceasing irrigation activities or installation of a prescriptive cover system capable of controlling the impact of irrigation activities.

Response: **As stated in the response to EPA comment 25, the data do not suggest that the landfill has impacted water quality. In addition, some of the refuse at Site 22 is below the water table. Leachate will continue to be produced whether infiltration is limited or not. Therefore, no RAO to reduce the infiltration into the landfill has been included in the draft final FS report.**

Comment 9. Based upon the data presented in the feasibility study, the current land use, and remedial actions performed at the Site 2 Landfill (with similar site conditions), IWMB recommends that the appropriate action for this site is to perform a capping and monitoring action. To minimize infiltration, the cap should meet prescriptive standards, i.e. multilayer cap using a low-permeability barrier layer or geosynthetic alternative and an irrigation control system to minimize the impact of this activity on landfill conditions. It may be possible, if a suitable borrow source can be found, to install a 2 foot cover (1 foot barrier and 1 foot vegetative) over a reconditioned foundation, i.e. the present soil cap, which is 1.5 to 3 feet thick (moisture-conditioned and recompacted). This may help to minimize import soil costs, yet still achieve a multilayer cap. If barrier layer soil, of similar quality to the "Yacht-Harbor" soil used to cap Site 1, can be found, the cost of a multilayer cap may be further minimized.

Response: **Please see responses to EPA general comments 5, 6, and 8. Implementation of a cap has been evaluated pursuant to the discussion in these comments. However, if a soil cap is implemented, a local borrow source will be used. At the present time, no other potential source of soil similar to Site 1 is available. (The Palo ALto Yacht Harbor soil has been depleted).**

RWQCB COMMENTS

GENERAL AND SPECIFIC COMMENTS

Comment 1. The boundary of Site 22 need to be accurately identified. The RWQCB recommends to conduct intrusive investigation to delineate the horizontal and vertical extent of the site. The purpose of trenching or potholing is not to further characterize the landfill contents but to provide valuable information in selecting a preferred remedial action alternative. This method has been proved useful at Site 2 landfill consolidation process.

Response: **Intrusive investigations were performed as part of field work conducted within the area of Site 22. As part of this field work, trenching and potholing was conducted to evaluate both the vertical and horizontal extent of the landfill.**

Comment 2. Based on the State Water Resources Control Board (SWRCB) Resolution Number 88-63, the groundwater within the Site 22 area does not qualify as a potential drinking water aquifer because of its high salinity (total dissolved solids >3,000 ppm). However, the San Francisco Bay RWQCB Basin Plan (1995) should be considered as applicable or relevant and appropriate requirements (ARARs) in order to protect other beneficial uses of the groundwater. Groundwater monitoring should be in accordance with provisions of Title 27, California Code of Regulations (CCR), Subchapter 3. EPA Ambient Water

Quality Criteria (AWQC) and RWQCB Basin Plan Water Quality Objectives (WQOs) should be considered in deriving groundwater monitoring concentration limits.

Response: **As explained in response to EPA specific comment 25, the data do not indicate that there have been impacts to groundwater, and therefore, no action is necessary for groundwater. For this reason, ARARs for groundwater have not been identified. Monitoring will be conducted in accordance with the pertinent provisions of Title 27 and, as part of that process, constituent concentrations will be identified. As appropriate, the Navy will consider AWQC and Basin Plan WQOs in developing the monitoring program.**

Comment 3. The RWQCB agrees with the Navy that it is easier to implement and maintain a biotic barrier (Alternative 2) that a multilayer cap (Alternative 3). However, more importantly, the multilayer cap will effectively minimize infiltration and will further reduce offsite leachate migration.

Response: **In the draft final FS report, both a single and multi-layer barrier cap are evaluated as part of Alternative 3. In addition, please see discussion in responses to EPA specific comment 25 and IWMB comment 8.**