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Bechtel

401 West A Street
Suite 1000
San Diego, CA 92101-7905

M60050.001375
MCAS EL TORO
SSIC # 5090.3

CLEAN II Program
Bechtel Job No. 22214
Contract N68711-92-D-4670
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IN REPLY/REFERENCE: CTO-0080/ 0036

May 22, 1995

California Regional Water Quality Control Board - Santa Ana Region
2010 Iowa Avenue, Suite 100
Riverside, CA 92507-2409

Attention: Larry Vitale, Remedial Project Manager

Subject: Technical Review Comments on (Draft) Work Plan and Field Sampling Plan for Phase II RI/FS, MCAS El Toro, CTO-0059.

Dear Mr. Vitale:

This letter is a follow up to the draft hard copy and electronic copy of my comments related to the subject documents which I forwarded to you on 18 March 1995.

Overall, the Work Plan and Field Sampling Plans are satisfactory but not yet ready for implementation. Following the submittal of all comments the agencies may consider summarizing major issues and meeting with the Navy and their contractor to expedite their resolution. Although there are many comments contained in this package the key issues probably could be resolved in a one or two day meeting in June, supplemented by a risk assessment focus meeting.

Because changes are necessary throughout these documents and in some cases are extensive, the documents should be reprinted and reissued in their entirety.

If I can be of any assistance, please call me in Bechtel's San Diego office at (619) 687-8780 or when I am in San Francisco at (415) 768-8561; the facsimile number in S.D. is (619) 687-8787 and in S.F. (415) 768-1373.

Sincerely,

BECHTEL NATIONAL, INC.

Dante J. Tedaldi, Ph.D., P.E.
Technical Quality Assurance MCAS El Toro

cc:

Juan Jimenez, RPM Base Closure Branch
State of California Environmental Protection Agency
Department of Toxic Substances Control
245 West Broadway
Suite 350
Long Beach, CA 90802-4444

Joseph Joyce BRAC Environmental Coordinator
Department of the Navy - Southwest Division
Naval Facilities Engineering Command
Environmental Division
1220 Pacific Highway, RM 18
San Diego, CA 92132-5181

Bonnie Arthur, RPM
U. S. Environmental Protection Agency Region IX
Hazardous Waste Management Division, H-9-2
75 Hawthorne Street
San Francisco, CA 94105-3901

Attachments

Summary

These review comments begin with the Work Plan and are followed by the Field Sampling Plan. Comments are provided for the main body of each report and for selected OU-2 and OU-3 sites. The focus of this review was on the OU-2 sites. Broadly applicable comments for all sites are also included and it is expected that the Navy will provide the necessary quality control to assure that these comments are incorporated throughout the document.

1. Technical Review Comments on Work Plan (Draft) Phase II Remedial Investigation/Feasibility Study MCAS El Toro CTO-0059.

1.1. Page 1-3, Section 1.2. The text should identify sites by the corresponding operable unit for clarity.

1.2. Page 1-4, Figure 1-2. The figure should include the Remedial Investigation Report and Feasibility Study Report for OU-1.

1.3. Page 2-44, Section 2.4.3.2. An EE/CA is only part of the process for the implementation of non-time critical removal actions. Also, consider additional statements which explain the reasons why sites proposed for EE/CAs are carried through this Work Plan.

1.4. Page 3-2, Table 3-1. The table should specify what the estimated risk represents, e.g., excess lifetime cancer risk or incremental ELCR.

1.5. Page 3-4, Table 3-1. The first note appears to be an error. Consider review and deletion from text.

1.6. Page 3-5, Table 3-2. TRPH and TPH are listed as COPCs; however, these are not chemicals. Rather, these are analyses which provide information on a broad spectrum of petroleum and fuel components. Were these analyses specified as COPCs because there were levels of concern at individual sites or simply because the analyses for TRPH and TPH happened to be conducted in Phase I and values above detection levels were reported? The reasons for the analysis of soil samples for both TRPH (418.1) and TPH (8015M) should be identified. It is not cost effective to specify both analyses without justification.

1.7. Page 3-14, Section 3.3. The text should note that Site 24 includes (subsumes) Sites 11, 9, 22, 17, 8, 10.

1.8. Page 4-4, Section 4.2.1.3. The text should specify if the risk for consideration was for cumulative, excess lifetime cancer risk alone or noncarcinogenic risk was also included (and apparently found not to be significant.)

1.9. Page 4-4, Section 4.2.1.3. The text should reinforce the fact that this section only contains some of the potential decisions. This is different than 4.2.5, in which all potential the decision rules are listed.

1.10. Page 4-4, Section 4.2.1.3. The use of the word "impacted" is inconsistently applied throughout the document. In some apparently equivalent applications the word "contaminated" is used. Suggest that "impacted" be deleted and "contaminated" be used throughout for clarity unless data indicate that the medium is not contaminated.

1.11. Page 4-4, Section 4.2.1.3. Decision number 3 requires editing. Soil sampling cannot be used alone to determine if groundwater beneath a site is contaminated. Groundwater sampling should be used for that purpose.

1.12. Page 4-4, Section 4.2.3. Recent discussions with SWDIV representatives have indicated that PRGs will be used for Phase II work rather than RBCs. The document should be modified throughout to reflect this change. In addition, the Quality Assurance Project Plan should be modified accordingly. The text may need to note that PRGs will be calculated when federal PRGs do not exist, e.g., TRPH and TPH.

1.13. Page 4-13. MCAS El Toro appears to be of sufficient size to identify on-station sampling locations for the assessment of ambient levels of polynuclear aromatic hydrocarbons. Consider inclusion of a section which identifies these locations and proposes an expedited sampling, analysis, and data interpretation schedule. This effort should be conducted before the main Phase II field work commences. This approach would substantially improve field screening and final decision making by providing ambient levels of PAHs, rather than PRGs which are likely to be much lower.

1.14. Page 4-13. The text should define if the coefficient of variation is based on the estimated mean or the arithmetic mean. The presentation in Table 4-2 does not appear to benefit from the inclusion of arithmetic mean values; they tend to diffuse focus on the values of interest and should be removed.

1.15. Page 4-17. For the Tier 1 and Tier 2 (and Tier 3 of OU-3) portions, the text should be modified to note that limited lists of analytes will be examined using field analytical screening techniques and these will be supported by offsite, fixed laboratory analyses. The difference is not simply a function of cost, as is stated in the text.

1.16. Page 4-18. Reorganize the bullet list on the top of the page to correspond with the sequence of presentation of the topics which follows.

1.17. Page 4-19. Sampling along an axis. Consider redefining the approach to include a provision for discontinuation of sampling under the following conditions. Along an axis, if the probable source is upstream/upgradient and two samples collected in succession downstream./downgradient have analytes concentrations below PRGs or background/ambient levels, then discontinue further sampling.

1.18. Page 4-21, field screening. The text should be revised to clarify the definitions and relationships between preliminary field sampling devices, preliminary field screening and the undefined field screening which follows but precedes off site analyses.

1.19. Page 4-21, field screening. Correct the text. Samples will be forwarded to laboratories under contract to Bechtel and the United States Navy, not to USEPA's CLP laboratories.

1.20. Page 4-21, field screening. The text does not mention metals analyses in the field; however, XRF analyses and/or ICP analyses are part of a field program are described elswhere (DQOs by inference and explicitly in the QAPP). Clarification of the use of these analytical techniques is needed.

1.21. Page 4-23, Table 4-4. The title should be "Project-Required Detection Limits by Method." This will reduce confusion which could result because HVOCs by 8010 and VOCs by 8240 possess overlapping lists of analytes; however, the respective detection limits are different. For these situations, consider a marker or super/subscript which would indicate, for individual analytes, the lowest detection limit available.

1.22. Page 4-23, Table 4-4. Correct the listing, benzene is not a halogenated volatile organic compound.

1.23. Page 4-23, Table 4-4. The analytes listed under HVOCs-Method 8010 and VOCs-Method 8240 are not complete. Clarify with a footnote the reason, or correct the table and include all analytes provided by the method. Please review the rest of the table to assure that this oversight did not affect other methods listed.

1.24. Page 4-23, Table 4-4. With respect to the previous comment, also note that TCE, PCE, carbon tetrachloride and benzene are absent from the listing under 8240.

1.25. Page 4-23, Table 4-4. The note footer should contain an explanation of the dash symbol which appears in the table. Does this represent something different from NL-not listed and NV-no value?

1.26. Page 4-31, confirmation methods. See previous comments regarding field screening terminology. Specifically, clarify "quantitative field screening" with

respect to "preliminary field screening." Remove the term CLP from the paragraph.

1.27. Page 4-32, confirmation methods. Remove the term CLP from the paragraph. Provide a statement which explains that statistical comparison techniques may not be used if the number of samples collected are insufficient to conduct the comparison tests. Under these conditions, qualitative comparisons would be necessary.

1.28. Page 4-32, Section 4.2.3.9. The discussion of groundwater models clearly states that MODFLOW, MT3D, and MODPATH will be used for some applications. However, the vadose zone modeling discussion does not specify which of the models presented will be used. The text should include a sentence which clarifies this.

1.29. Page 4-34, additional data requirements for groundwater modeling. The text states that "...confidence could be improved by obtaining..." empirical data listed in the bullets on the page. Although it seems likely that these data will be collected, please clarify that this indeed will occur.

1.30. Page 4-37, Decision Rules. A few significant points arise when considering the following text and the bullet items.

1.30.1. Item 1

> "If the purpose is to make a preliminary risk management decision...then action levels and RBCs would be used in the decision process."

Item 2

> "If the purpose is to determine whether additional sampling activities are needed...then only RBCs are used in the decision process."

First, the text of Item 2 should be modified to include the expression "background/ambient levels" since these are used later.

Second, cumulative risk is defined elsewhere in the document as equivalent to action levels. Action levels would apparently supersede RBCs/PRGs and background/ambient levels. Thus, the Navy is not proposing to consider cumulative risk (action levels) when defining areas for continued inclusion in the Feasibility Study process. Rather, RBCs or PRGs would be used for direct comparisons in the field to define the extent of contamination. Items 1 and 2 are therefore incorrect and should possibly read:

Item 1-revised

> "If the purpose is to make a preliminary risk management decision...then action levels would be used in the decision process."

Item 2-revised

> "If the purpose is to determine whether additional sampling activities are needed...then PRGs, MCLs and background/ambient levels are used in the decision process."

It should be possible to include provisions for the summation (where possible) of PRGs or RBCs ratios using the highest concentration detected.

This is a significant point which the BCT at MCAS El Toro has been considering. Because these FS areas would be addressed in detail as part of the remedial action implementation, it appears that the proposed approach is acceptable; however, the modified approach of summing the PRG ratios should be evaluated for applicability to this project.

1.30.2. Of equal if not greater significance is a fundamental error in many of the decision rules. The expression "action levels" appears to be indiscriminately used. Several Step 5 rules (e.g., Rule No. 6) apply to decisions to be made in the field to define the limits of contamination. Under these circumstances Item 2 would apply and therefore, only RBCs/PRGs and background/ambient levels would be used. Action levels (cumulative risk assessment) would not be performed. The current list of rules should be corrected to address this issue.

1.30.3. Several Step 5 rules are too vague when referring to comparisons with COPC. For example, Rule 7 states that if two consecutive samples are ND then the extent will be considered established. However, this approach ignores the fact that many COPCs such as inorganics and pesticides/herbicides (and as proposed in this review-SVOCs) have background/ambient levels above ND. Thus, the approach presented will not work.

1.30.4. Rule 14 indicates that cleanup levels will be defined if unacceptable risks are found. The implication is that unacceptable risks are result of exceedence of action levels which are different from cleanup levels. However, the Navy has recently proposed NFAC at several OU-3 Sites and Units based on "Preliminary Risk Values." No explanation was provided for these OU-3 risk values; however, they seem to be equivalent to action levels (as defined above). If that is true then Rule 14 was not followed for these OU-3 sites. This situation is confusing and should be reviewed and clarified.

1.31. Page 4-47, Section 4.2.6.3. The text should define the acronym MDRD.

1.32. Page 4-49, Section 4.2.6.3. The text should define the acronym MDD.

1.33. Page 4-51, Section 4.2.6.4. Table 4-6 was discussed at the BCT meeting in April and the RTM and BNI statistician concurred with deletion or modification of this table. The table should be modified or deleted to reflect the discussions.

1.34. Page 4-51, Section 4.2.6.4. The first three paragraphs are unsupported by references and appear to contain logic errors. At a minimum, the text should be recomposed and presented in a manner which clarifies the relationship between risk and the ratio of geometric means.

1.35. Page 4-56,57, Table 4-7. Note "e" is based on data presented in Table 4-6 and these data have been questioned in the previous comment. Confirm that the approach presented in Note "e" is applicable and correct.

1.36. Page 4-63, Table 4-9. Note "f" should be corrected. The number of confirmation samples presented here does not equal the numbers presented in the text and QAPP.

1.37. Page 4-66, Table 4-12. For Site 24, VOC analyses would be included in the TO-14 analyses; therefore, the VOC analyses indicated would be redundant.

1.38. Page 5-5, Section 5.3.1.5. First paragraph and second to last sentence. Change the text to "Generally, VOCs are slightly soluble in water..."

1.39. Page 5-25, Section 5.9.2.3. Consider adding a description of the ARAR waiver requirements included under CERCLA.

1.40. Page 6-1. The dates provided for OU-3 are based on a start date of 1996. This is not consistent with the presentations provided to the BCT and therefore, the dates should be checked against the current FFA.

1.41. Page 7-3, Figure 7-1. The Project flow chart does not include the Laboratory Coordinator. The coordinator is responsible for the execution and oversight of all laboratory work and therefore should be included in this section. It is unclear who will be responsible for technical decision-making in the field. This individual and the reporting chain of command should be identified.

1.42. Page A-i, Step 6. Here and throughout the document replace the expression "confidence (0.05) and power (0.20) limits" with "confidence level of 95 percent and power of 80 percent." The current presentation is incorrect. $\alpha \leq 0.05$ represents a maximum acceptable Type I error of 5 percent error and $\beta \leq 0.20$ represents a maximum acceptable Type II error of 20 percent. See page 4-47 of the text for clarification.

1.43. Page A-1. Within the title of this DQO and all others, identify which OU this site is associated with. For example:

Appendix A
SITE 1, OU-3 - EXPLOSIVE ORDNANCE DISPOSAL RANGE

1.44. Page A-7,8. The COPC summaries present concentrations that have letter "B" and letter "J" as qualifiers that are explained directly after the summaries. Here and throughout the Plan, the explanation should indicate if the letter is a laboratory or validation qualifier. Also, when giving a range of concentrations that state "from less than X to Y", the value for X should be less than Y. Here and throughout the plan, identify the boring, well, or location of the highest detected value for each contaminant. Also, picocuries should be abbreviated as pCi not pci.

1.45. Page A-7,8. Most DQOs in the Work Plan do not include explanations for the qualifiers. These should be explained prominently on the first page mentioned, as was done for Site 1.

1.46. Page A-14, Additional Inputs for Early Action; Additional Inputs for Long-term Action. The bullet lists should be developed further. The presentation incorrectly implies that the only difference between Early Action and the RI/FS/RA process is pilot testing.

1.47. Page A-15, Figure A-5. Here and elsewhere in the document, correct the statement "Is there a risk?" by replacing with "Is there an unacceptable risk?" Also, the legend should explain that the octagon represents points in the process which require BCT concurrence.

1.48. Page A-26, 27. Tier 2 and Tier 3 approaches are discussed at a level of detail which is inconsistent with other DQOs in this Plan. Explain why this is necessary since activities conducted under these Tiers is contingent on Tier 1 results.

1.49. Page A- 27. Provide an explanation why two upgradient wells are planned for Site 1. One upgradient well should be sufficient.

1.50. Page B-5, Figure B-2. There are several errors within this figure. Well 59 is mislabeled as 58, well 27 is presented in duplicate, and surface drainages do not appear to be consistent with current conditions at the site.

1.51. Page B-5, Figure B-2. The need for nine new wells at this site is not supported by the data and the presumptive remedy approach being considered. Provide a defensible rational for the Work Plan approach.

1.52. Page B-27, Table B-2. Note "a" should be corrected to be consistent with the main text of the Work Plan and the QAPP, i.e., 10 percent of detects and 5 percent of non detects.

1.53. Page B-31, Unit 1, last bullet. The basis for the 300 µg/L cutoff value should be identified. Consider the presentation of isoconcentration lines and reevaluation of this value after the data are assessed in their entirety.

1.54. Page B-37. There is no mention of HydroPunch sampling; however, this is apparently part of the program. Confirm the HydroPunch work and include adequate discussion in the text.

1.55. Page B-38. The referenced map, Map B-3 is missing from this report

1.56. Page B-38. The bullet introduction sentence states that the tasks listed are for Tier 3; however, the first bullet identifies Tier 2 tasks.

1.57. Appendix C in general. The presentation does not separate the Tier 1 activities from the Tier 2 and Tier 3 activities. This is confusing and the text should be corrected to be similar to other DQOs (e.g., Site 1) where the distinction is made.

1.58. Page C-21, Step 3. Here and elsewhere in the Work Plan the expression "...this approach is validated..." requires clarification. It is not clear what approach is being referred to nor the meaning of the term "validated."

1.59. Page C-21, Step 3. Within other DQOs, inputs for NFRAP, early action, and long-term action were listed and discussed separately. The approach presented here is not consistent with other DQOs.

1.60. Page C-21, Step 3. The basis for the statement

> "If a landfill is shown not to be producing gas, a vadose zone monitoring program may not be required by the California [RWQCB]."

should be provided. The statement fails to address emission rates, constituents, and concentrations within landfill gas. In addition, the production or absence of gas is not sufficient to make a determination that leachate is not being generated.

1.61. Page C-21, Step 3. On page C-42 the text states that vadose zone monitoring is dependent on the results of the groundwater monitoring. However, as noted in the previous comment, the text also states that decision is to be based on landfill gas production. The inconsistency with this decision requires review and revision.

1.62. Page C-21, Step 3 and page C-41, last paragraph. The text states that gas probes may be installed in the vadose zone; however, on page C-42 the text states that the probes will be used to collect leachate and/or gas. Clarify what will be measured using the probes.

1.63. Page C-30, Table C-1, and Page C-31, Table C-2. The Tier 1 description for the number of soil sample locations at the Landfill Area states that NFRAP applies. This appears to be an error since landfill is suspected of leakage and thus, NFRAP could not apply.

1.64. Page C-30, Table C-1, Page C-31, Table C-2, and page C-36, Table C-7. Here and elsewhere in similar Tables in the Work Plan consider removal of references to Tier 2 and 3 because these activities have yet to be defined. The presentation of limited portions of these lower tier approaches is confusing.

1.65. Page C-41, first paragraph. Correct the text, substitute "...maximum contaminant levels..." for "...maximum concentration level..." as per the Safe Drinking Water Act.

1.66. Page C-43. The data presented in the Plan indicate that adequate surface water sampling has been conducted. Unless there is a rational, which for some reason was not presented in this document, additional surface water samples should not be considered.

1.67. Page Q-1, Step 1. The second sentence

> "Because this is currently the only groundwater monitoring the landfills impacting water quality on water quality is unknown."

is garbled and should be rewritten.

1.68. Page Q-1, Step 1. Provide a reference and definition of what "...allowable levels..." of landfill gas are.

1.69. Page W-15, Abandoned Water Wells.

1.69.1. A separate map should be prepared which identifies the probable locations of these wells.

1.69.2. The relationship between the abandoned wells and groundwater plumes and soil gas plumes has not been evaluated and should be considered. These wells, especially Well 2, have the potential to act as contaminant sources and pathways for deep aquifer migration.

1.70. Page W-49. A minimum of three new well for vertical plume characterization and a minimum of 4 new wells fro horizontal plume characterization are proposed. From the Phase I data it appears that the plume has been sufficiently characterized and the focus should be on source definition. Installation of permanent wells to find a source does not seem cost effective. The text should provide an explanation of how these new wells would aid in the implementation of remedial action at the site. Phase I modeling in the IAFS has already produced well placement scenarios which could contain and mitigate the source.

2. Technical Review Comments on Field Sampling Plan (Draft) Phase II Remedial Investigation/Feasibility Study MCAS El Toro CTO-0059.

2.1. There are numerous typographical errors in this document. Some examples are: Table of Contents-Section 3-Maps, Site 2-Magazine Road Landfill is listed as both Map 3-4 and 3-5, throwing the following numbering off. Sites 21 and 24-the titles are different than those of the figures. In Section 3, the title of Map 3-17 appears to be wrong. In many of the Attachments, Section 4.2.1.1 (Land Surveying) second paragraph includes the wording "...delineated during by the surface geophysical survey...". As with the Work Plan, a thorough editorial review is necessary

2.2. In each of the Attachments, in the Section 2.2 the COPC summaries present concentrations that have letter "B" and letter "J" as which are not explained. Here and throughout the Plan, the explanation should follow directly and indicate if the letter is a laboratory or validation qualifier. Also, when giving a range of concentrations that state "from less than X to Y", the value for X should be less than Y. Here and throughout the plan, identify the boring, well, or location of the highest detected value for each contaminant. Also, picocuries should be abbreviated as pCi not pci.

2.3. In each of the Attachments, Sections 4.2.1.1 and 6.1 addressing Land Surveying, there is a typo in the last sentence and next to last sentence respectively. The sentence should read "...delineated (*delete "during"*) by the surface..."

2.4. Table of Contents

2.4.1. Page iv. Map 3-5 is Site 3-Original Landfill. Rest of Maps are misnumbered. There is no Map 3-26.

2.4.2. Map 3-22, Site 21-Materials Management Group, Building 320. Figure is for Building 20.

2.4.3. Map 3-24, Site 24-Potential VOC Source Area. Figure is titled "VOC Source Area".

2.5. Section 3 Maps

2.5.1. Page 3-35. Map 3-17, Site 15-Crash Crew Pit No. 2. Caption is supposed to be "Suspended Fuel Tanks". I assume figure is correct one for fuel tanks.

2.5.2. Page 3-45. Map 3-22, Site 21-Materials Management Group-Building 20. Should be Building 320 (according to Table of Contents).

2.6. Page B4-3. Section 4.2.1.2. The description of geophysical survey activities to be conducted does not explain how the edge of the landfill is to be determined.

2.6.1. The related figure (B3-2) shows that the survey is to be conducted over the entire landfill, instead of just around the boundary. This is curious because the stated reason for the survey was to define the limits of the landfill. Under these circumstances, efforts should focus on the perceived boundaries and beyond, not in the center of the know landfill.

2.6.2. How far beyond the boundary will the survey be conducted to be certain that the boundary is identified? There should be a buffer zone consisting of several data acquisition locations surrounding the landfill. Will the interior of the landfill be surveyed as shown on the figure?

2.7. Page B4-5. Section 4.2.2.3. Sampling is to be conducted after the "first rainfall." Suggest a specific description, i.e., "first rainfall after field work begins" or "first seasonal rainfall," or "first rainfall that produces runoff after sampling begins."

2.8. Section 4.2.3, first paragraph. The third sentence can be misconstrued and should read "...from Site 2 to a monitoring well upgradient from Site 5..."

2.9. Page B4-6. Section 4.2.3.1. Protocol for groundwater sampling from existing wells is not well defined. How many, how deep, and where are the screened intervals? What protocol will be used to collect samples? Full purge and sample? Micropurging? Bailers vs pumps? At a minimum, refer to the appropriate CLEAN II SOPs.

2.10. Section 4.3.1.2. First sentence should read "...during Tier 1 surface soil and soil gas sampling..."

2.11. Page B4-7. Section 4.3.2.2. The text should describe how locations of temporary well points will be determined. The locations are not shown in any of the figures.

2.12. Page B4-8. First paragraph, second sentence. Cannot find well 02_DGMW59 on any of the maps. It was apparently mislabeled as 02_DGMW58.

2.13. Paragraphs 3, 4, and 5. Suggest mentioning the probable existence of a confining layer (layer II) at this location and that Wells NEW4 and NEW5 are intended to confirm its existence and ability to prevent (further) downward migration of VOCs.

2.14. Page B4-9. Section 4.4.1.2. The last sentence should read " in FSP Section 6.7.3."

2.15. Pages B5-6 through B5-10. Here and throughout the Field Sampling Plan, several reviewers have noted that these types of tables are hard to understand. Specifically with respect to the number of samples relative to the numbers mentioned in the text. There are numerous blanks in the tables and numbers don't necessarily reconcile between left and right sides of the tables. Table B5-2 has 45 total samples, but only 44 mentioned on right side of table. It may be possible to understand under careful scrutiny but precise meaning of the numbers presented is not obvious and should be.

2.16. Page B6-1. Section 6.2, geophysical investigation strategy.

2.16.1. As noted earlier, the geophysical investigation strategy is not fully explained. Provide a discussion of the number of sampling points along survey lines, and how far beyond presumed boundary the investigation proceed until boundary is defined.

2.16.2. Specify if the entire are of landfill will be investigated or just the presumed boundary, and if the latter, the length of the survey lines be (i.e., the number of sampling points on either side of the presumed boundary).

2.16.3. Will it be possible to pick the boundary as the data is gathered or only after downloading the data at the end of the day? This entire approach should be reviewed by a senior geophysicist prior to implementation.

2.17. Last sentence should read "...Section 6.9.2 of the FSP."

2.18. Page B6-2. Section 6.4. Last sentence should read "...Section 6.6."

2.19. Section 6.5. Bullets identify wrong section numbers as follows: bullet 1 should read "Section 6.9..."; bullet 3 should read "Section 6.10 "; and bullet 8 should read "Section 6.12..."

2.20. Page B6-3. Section 6.6.1. Air temperature is not mentioned but may be a consideration here and in section 6.6.2. Discuss the effect if any of air temperature on gas migration.

2.21. Page B6-4. Section 6.7. Section numbers incorrect.

2.22. Page C2-1. Section 2.1.3, second paragraph. Regional flow direction vs flow from the foothills.

2.22.1. The regional groundwater flow direction from the center of the base to offsite is apparently to the northwest toward MCAS Tustin. However, along the foothills the flow direction is initially to the southwest (the same as surface drainages) and

then to the northwest along the axis of the syncline. Groundwater flow direction at Site 3 is almost certainly southwesterly to westerly rather than northwesterly.

2.22.2. If groundwater data has been gathered around the landfill and it is to the northwest, then this should be stated. Here and throughout the Field Sampling Plan, discussions of hydrogeology for specific sites should be clear on the source of information and whether or not it is applicable to the base in general or only a particular site.

2.22.3. These points are significant because the interpretation of flow direction affects the placement of groundwater monitoring wells. Confirm that well locations in the foothill sites are correctly situated based on local flow conditions.

2.22.4. Pages C3-5 and C3-9. Groundwater flow direction is shown as northwesterly. Please see previous comments.

2.23. Page C4-2. Section 4.1.4. There are no wells mentioned anywhere in Attachment C (see bullets under Section 4.2 Tier 1), except here and in Section 4.2.1.1 (Land Surveying). Furthermore, well locations are not shown on any of the maps of this site and suggest that this section is simply an artifact that should be deleted.

2.24. Page C4-3. Section 4.2.1.1. Section states that proposed locations for soil gas, soil borings, and wells will be surveyed during the initial survey. However, the tiered approach for the investigation states that locations of soil borings and wells will be established based on soil gas data. Thus, an additional survey team mobilization will be necessary.

2.25. Section 4.2.1.3. Provide an explanation for the 200 foot spacing here versus 100 foot spacing for Site 2.

2.26. Page C5-2. Section 5.2.4. Is it possible that an FID could be substituted for a PID? If so, the text should say "...PID or FID..."

2.27. Section 6.2. Last sentence should read "...Section 6.9 of the FSP."

2.28. Page C6-2. Section 6.5, paragraph 1. Provide a reference to the appropriate CLEAN II SOP for the VOC sampling protocol.

2.29. Paragraph 2, line 6. "...at minimum 10-foot intervals..." can be misconstrued to mean "...every 10 feet or greater..." Consider rewording the text as "...collected at least once every 10 feet and at changes in lithology..."

2.30. Page C6-4. Section 6.7. No new wells are shown in figures C3-2 and C3-3.

2.31. Page E4-6. Section 4.3.1.3. The proposed location of the downgradient well is not shown on Map E3-2.

2.32. Page E5-5. Section 5.3.10. Here and throughout the Plan where this sentence is repeated. The sentence suggests that additional investigation is to be performed but the activities are not mentioned. The paragraph needs additional explanation as to whether or not additional work is proposed.

2.33. Maps Q3-2 and Q3-3. Discuss the significance of "keyhole" area delineated around Phase I soil borings 17_SA1-3. Consider that the direction of groundwater flow at this location is more to the west southwest than northwest.

2.34. Page Q4-1. Section 4.1.2. Explain rationale for soil gas sampling locations and spacing.

2.35. Page Q4-5. Section 4.3.1.3. Because the apparent groundwater flow direction is more to the west southwest, the placement of well NEW2 is not optimal. However, it may be used to determine the flow direction together with NEW1 and 17_DGMW82.

2.36. Page W2-1. Section 2.1.1. This paragraph could be improved by deleting the third sentence and adding to the second sentence as follows:

> "...synclinal trough that has accumulated approximately 30,000 feet or more of detrital sediments since the Miocene epoch."

Also, in the last sentence, replace the word "...on..." with "...located within the boundaries of..."

2.37. Section 2.1.1.1. The first sentence could be improved by deleting "The majority of..." and replacing it with "Most of the surface and near-surface..."

2.38. Page W2-2. Section 2.1.2. Second paragraph. Replace the word "...on..." with the word "...beneath..." Delete the first five words of the third sentence and insert the rest of the sentence into the second sentence as follows:

> "The principal aquifer, approximately 120 feet beneath site 24, is the main water-producing zone..."

2.39. Fourth paragraph. First sentence. Replace the word "...on..." with the word "...beneath..."

2.40. Page W2-3. First line. Can not find well cluster 18_BGMW03 on Map W3-2 or W3-3. Confirm that the well cluster is supposed to be either 21_BGMW03 or 18_BGMW05.

2.41. Page W2-8. Section 2.2.3. Second sentence states wells TIC 47 and TIC 35 are located "downgradient" of the station. Please state the direction, distance from the station and depth of the screened intervals. Confirm that the groundwater flow direction clearly known?

2.42. General comment about figures. The color plots are very useful, but it would be helpful to only have items listed in the legends that are shown on each of the maps.

2.43. Pages W4-2, W4-3 and W4-4. Tables W4-1, W4-2, and W4-3 are followed by blank pages with the page numbers, on which the tables should be located. Tables have Xs entered into columns with no explanation, and it is hard to understand just where the numbers entered as "subtotals" come from. Table W4-3 is confusing because the numbers of samples to be analyzed at the off-site laboratory do not always correspond with the total number of samples to be collected. Also, sometime there are blanks and sometimes dashes. Review these and similar tables in other attachments and clarify when possible.

2.44. Page W4-5. Section 4.2.1.

2.44.1. First paragraph, second sentence should read "...will be checked for acceptable quality and ability to be correlated between borings."

2.44.2. Identify the depth of the mud-rotary holes. Mud rotary has the potential to produce large quantities of potentially contaminated investigation derived wastes. Discuss the alternatives to mud rotary that been considered and the reasons for their exclusion.

2.44.3. Consider using cased-hole logging techniques such as natural gamma and induced gamma. CPT logs can also be very helpful in correlating lithologic changes between borings, and are capable of penetrating over 200 feet depending on the nature of the soil. Large gravel and boulders, or concrete rubble can prevent its use. CPTs have lower total costs than borings and they produce much less IDW.

2.44.4. Section 4.2.2. CPT should be considered since soil and groundwater samples can be collected with minimum IDW produced.

2.45. Page W4-6. Section 4.2.2. Third paragraph. This is the first mention of abandoned water supply wells. Discuss how the investigation will proceed with a backhoe. What geophysical investigation is proposed and have agency file searches been conducted to establish the location of these wells.?

2.46. Page W4-7. Section 4.2.3. Third paragraph. Last word should read "W3-7" instead of "W3-8."

2.47. Fourth paragraph. First sentence. Delete commas on either side of " and possibly..." and replace the word "...on..." with the word "...beneath..."

2.48. Section 4.2.4. Line 7. Replace "...relatively low permeable soil layers..." with either "...relatively impermeable soil layers..." or "...soil layers with relatively low permeability..."

2.49. Page W4-8. Section 4.2.4. CPT sampling/logging locations are not shown in Figure W3-9.

2.50. Section 4.2.5. Last paragraph. Pumping tests will produce large quantities of IDW. The IDW plan should be referenced here and where mud rotary drilling is mentioned.

2.51. Page W5-1. Section 5.2. Second paragraph. Line 2. Using both FID and PID or either.

2.52. Page W6-2. Section 6.2. Second paragraph.

2.52.1. Include mention of brass sleeves if they are to be used.

2.52.2. Provide clarification as to:

> Will each 6-inch sampling sleeve will constitute a "sample" of which 25 percent are to be submitted to a mobile lab?
>
> Or is it from 25 percent of sample drives that one 6-inch sample will be collected for mobile lab analysis?

2.53. Page W6-4. Section 6.4.1. Last sentence. "Map W3-6" is a cross-section and does not show Tier 1 soil gas sampling locations. Can not find Tier 1 soil gas sampling locations on any of the maps presented. Review these items and correct the text and/or figures.

2.54. Section 6.4.2.1. Last sentence. CPT locations are not shown on Map W3-9.

2.55. Section 6.5. Third paragraph. Provide the details of the pumping tests to be conducted. For example, are three separate tests proposed, which wells will be used as observation wells, and what length tests are proposed?

2.56. Page W6-5. Section 6.5.1. Provide details about the vapor extraction tests. For example, what will be the duration of the tests, what consideration related to air emissions need to be considered, is there a need to obtain local AQMD permits?

2.57. Section 6.5.2. Second paragraph. Air Sparging.

2.57.1. Indicate the direction in which sparging wells will be drilled 20 feet from well 09_DBMW45.

2.57.2. Second sentence. Delete the words "...placement proximate to the well..."

2.58. Page W6-6. Section 6.5.2. With reference to FSP, sections 6.6.2.2 and 6.6.2.1 should read 6.7.2.2 and 6.7.2.1 respectively.

2.59. Section 6.5.3. Second and third paragraph. With reference to FSP, section 6.6.3 should read section 6.7.3.

2.60. Page X2-4. Section 2.2.4.1. Second bullet. Delete the word "...in..." and insert the word "...and..." Fifth bullet. After "...Bee Canyon..." delete the comma and insert the word "...and...", and after "...Borrego Canyon..." before the comma add the word "...washes..."

2.61. Page X4-1. Section 4.1.1. Second paragraph. first sentence should read "...first rainfall that produces runoff.."

2.62. Page X5-1. Section 5.2. Second paragraph. Lines 5 and 7 mention FID and PID. This should be FID or PID.