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MCAS EL TORO
SSIC # 5090.3

COMMENTS FROM THE U.S. ENVIRONMENTAL PROTECTION AGENCY ON THE WORK PLAN AND DATA QUALITY OBJECTIVES APPENDICES PHASE II REMEDIAL INVESTIGATION MCAS EL TORO

COLLABORATIVE REVIEW

SCO10016AFB.WP5

Introduction

The following document presents a response to comments received by the U.S. Navy (the Navy) from the U.S. Environmental Protection Agency (EPA) on the Phase II Remedial Investigation (RI) Work Plan, and on the Data Quality Objectives (DQO) document attached to the Work Plan as a series of subappendices. The response is divided into two portions. The first is a response to the cover letter accompanying the comments that were sent to the Navy by the EPA. The second portion provides specific responses to individual EPA comments on the Work Plan. The Navy's responses follow each of EPA's comments (reproduced in bold for ease of review).

Correspondence From The U.S. Environmental Protection Agency To Andy Piszkin/U.S. Navy

December 17, 1993

Mr. Andy Piszkin
BRAC Environmental Coordinator
Code 1811
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92132-5181

Subject: ***Review of Marine Corps Air Station El Toro Installation Restoration Program Phase II Remedial Investigation/Feasibility Study Draft Work Plan***

Dear Mr. Piszkin:

The United States Environmental Protection Agency (EPA) has completed the review of the subject draft Project Plans, Volumes I through III, including the Draft Sampling and Analysis Plan, the Draft Quality Assurance Project Plan, and the Draft Health and Safety Plan, dated November 9, 1993. General and specific comments are attached. Overall, EPA identified the following major deficiencies in the subject draft Project Plans:

1. A three month extension was granted to the Navy for the submittal of the Phase II draft project plans. The purpose of this extension was to allow for the incorporation of the Data Quality Objectives process (DQO). The intended use of the DQOs process is to streamline the scope for the Phase II RI and to minimize the volume of comments on the draft Project Plans. As demonstrated by the volume of the enclosed comments, the DQO process did not attain its objective. A major flaw for the El Toro DQO process is that it failed to develop and to optimize the sampling and analysis design for the Phase II RI (DQO Step 7). Coupled with the Phase I RI, the El Toro DQO

process did not generate a sampling and analysis plan that can be used to adequately characterize the nature and extent of contamination. During the course of the development of the El Toro DQO process, meetings between Remedial Project Managers were held to provide guidance for the use of the DQO process. Numerous verbal and written comments have been generated regarding the Phase I RI results and the use of the DQO process. The Phase II Project Plans do not completely address our comments.

2. EPA does not believe the draft Project Plans will produce an investigation that will adequately characterize the nature and extent of contamination or provide adequate support for the subsequent remedial decisions. Because MCAS El Toro is scheduled for closure, the failure of the Phase II Project Plans will result in a failure to expedite reuse. With the use of the proposed approach presented in the draft Project Plans, EPA believes that an additional phase of characterization after Phase II RI will be required.

3. The statistically based sampling strategy is based on a critical assumption of equal probability of finding contaminants at any point within each stratum. The Navy has been requested by EPA to evaluate the validity of this assumption. However, to date, documentation to support this assumption has not been adequately provided. All of the evidence available to EPA to date suggests that this assumption may not be valid. This implies that the Phase II Project Plans may fail to adequately characterize the facility.

Therefore, EPA would not approve the Draft Project Plans for the Phase II RI for MCAS El Toro as currently written. EPA believes that the current workplan does not address the three major deficiencies identified above. Because MCAS El Toro is a Base Closure Base, we need to expedite and optimize the investigation. As a result of the limited time frames we are facing, EPA believes that a workplan that integrates and optimizes rapid site characterization through innovative field screening techniques would address the concerns we have raised. EPA believes that the results of the rapid site characterization, properly supported, would provide the additional documentation for a defensible field sampling plan that would adequately characterize the contamination without the need of a third lengthy phase of investigation.

If you have any questions concerning this matter, please do not hesitate to contact me.

Sincerely,
John Hamill
Remedial Project Manager

Response

EPA has stated in their cover letter that the Project Plans contain three major deficiencies: (1) the DQO process did not achieve its objectives, as demonstrated by the volume of the EPA comments and the fact that EPA concerns expressed during the DQO process were not addressed; (2) the Phase II design will not adequately characterize the nature and extent of contamination or provide adequate support for subsequent remedial decisions; and (3) the assumptions that underlie the use of statistical strata, which form a foundation for the RI at MCAS El Toro, have not been demonstrated to be valid to the satisfaction of EPA. This response will address these major concerns.

1. EPA Concern: The DQO Process Did Not Achieve its Objectives

The DQO process achieved a great deal during the 6 months that led up to the submission of the draft Phase II planning documents. In addition to the Phase II RI design and the preparation of the documents themselves, during the DQO process, the Phase I RI data were evaluated and a series of 19 "position papers" were prepared. These position papers stated consensus that was reached between the Navy and the regulatory agencies on a wide variety of issues that affected the Phase II design. Consensus was built in a series of 2-day meetings held on a monthly basis with the members of the MCAS El Toro Phase II RI planning team. Attendees at the meetings included the Navy, the EPA, the California Department of Toxic Substance Control (DTSC), the California Regional Water Quality Control Board (RWQCB), and consultants to the Navy and EPA.

The 19 position papers specified how the Phase I data would be evaluated and established the framework for the design of the Phase II RI. Among the agreements set forth in the position papers were the following:

- The establishment of Risk-Based Concentrations (RBCs), human health-based standards used to evaluate Phase I and II analytical data
- The designation of media boundaries (e.g., shallow soil and subsurface soil)
- The approach for evaluation of petroleum hydrocarbons in soil
- The selection of Chemicals of Potential Concern (COPC) based on Phase I RI results for each medium
- The selection of chemicals for further investigation during the Phase II RI in each medium

- The calculation and establishment of background concentrations for inorganics in shallow soil

- The designation of Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) sites that are to be investigated under the RI

- The redefinition of the Operable Units (OUs) and designation of additional RI sites

- The elimination of a Phase II RI for OU-1 and agreement to move directly to a Feasibility Study (FS) for OU-1

- The establishment of ecological criteria and approach

- The use of RBCs and risk calculations for cutpoints to evaluate Phase I and II data

- The statistical approach used to evaluate Phase I and Phase II data, including the concepts of statistical strata, power, confidence, Minimum Detectable Relative Difference (MDRD), and Coefficient of Variance (CV)

The monthly meetings and position papers represented an excellent effort by the Navy to include all the regulatory agency decisionmakers in the planning process. Every effort was made to incorporate agency concerns in the position papers, both concerns expressed in the meetings and concerns expressed in writing. ***Based on the rules set ahead of time by all the decisionmakers, unless contrary comments from the regulatory agencies were received by the Navy, the technical positions stated in the position papers would be the basis for the preparation of the Phase II Work Plan.*** This "concurrence" process, as well as the technical positions listed above, were documented in meeting minutes and in correspondence from the regulatory agencies, including EPA.

EPA first raised the use of soil gas sampling and field gas chromatography/mass spectroscopy (GC/MS) analysis of soil samples at the July 1993 meeting, 3 months (about halfway) into the DQO process. The Navy responded by initiating an independent evaluation of the field screening methodology and its validity for use at MCAS El Toro. Significant problems were found with the methodology with regard to cost (more expensive than EPA believed), detection limits (higher than RBCs in many cases), and actual analytical methods available for use. Some of the COPCs could not be analyzed by the field methods. Nevertheless, field screening sampling was incorporated into the Phase II design at eight sites, while soil gas sampling was incorporated into the design at five sites. One of the sites where field screening and soil gas sampling will occur is Site 24, the newly created Volatile Organic Compound (VOC) Source site that encompasses six existing sites.

EPA first indicated that strata may be a problem in August 1993, 4 months (about two thirds) of the way through the DQO process. However, the expressed concern was not with the concept of statistical strata, but rather with the documentation of how strata were established at MCAS El Toro. The Navy responded by adding a subsection to the subappendix for each site that summarized how and why each stratum was established.

The Navy continued to solicit feedback from the regulatory agencies by releasing a preliminary draft of the DQOs for Sites 2 and 12 in August 1993 and a preliminary working draft of the overall Work Plan and DQOs to the agencies in September 1993. Although comments were received from the state agencies (DTSC and RWQCB), ***no comments were received from EPA.***

The Navy then set up one last working session in October 1993 to give the agencies a chance to provide input into the document. ***EPA and its consultant chose not to attend this meeting.*** Therefore, given the facts described here, it is very surprising that EPA has chosen to register its "nonconcurrence" at this late stage.

2. EPA Concern: The Phase II Design Will not Adequately Characterize the Nature and Extent of Contamination or Provide Adequate Support for Subsequent Remedial Decisions

The Navy disagrees with EPA's belief. An additional phase of the RI will not be required if the proposed Phase II design is followed. From 6 to 12 Level III quality shallow soil samples will have been collected in each stratum that is not being investigated further during Phase II, while from 12 to 33 Level III quality shallow soil samples will have been collected in each stratum that is being investigated further in Phase II. These samples will be more than adequate to evaluate the nature of contamination and perform a Baseline Risk Assessment. Furthermore, as many as 87 field screening samples per stratum and 72 soil gas sample locations per stratum are proposed in the existing Work Plan during Phase II. Various sites contain from one to five strata. As part of the preliminary investigation at new Site 24, 1,000 soil gas samples were proposed at 500 locations, together with 200 field screening soil samples and 40 Level III soil samples. During the Phase II RI following the preliminary investigation, additional shallow and subsurface soil samples and groundwater samples will be collected from Site 24. The combined soil gas, field screening, and Level III laboratory samples will be more than adequate to evaluate extent and remedial alternatives in most cases. Additional samples may be collected if needed during the remedial design/remedial action (RD/RA) phase.

EPA proposes in the text of their comments that rather than follow the design in the planning documents that an "alternative" approach be followed. In this approach, "massive" *(EPA's wording)* numbers of soil samples may be collected and analyzed for "full suites" of classes of priority pollutants in a complex three-tier analytical approach. This suggestion seems to imply that it is necessary to begin the RI process all over again as if Phase I had never occurred. The RI strategy outlined in the Phase I Sampling and Analysis Plan (SAP) and approved by EPA required that the Navy

collect large numbers of soil samples during Phase I and analyze these samples for a wide range of constituents, as a way of evaluating what contaminants may be present (the nature of contamination) at each site. The Navy agreed to this approach and has invested $22 million in the RI to this point. Results from the Phase I RI were to be used to select contaminants that pose human health or ecological risk for additional focus during the Phase II RI. During the DQO process, the MCAS El Toro planning team, including EPA, agreed on an approach to select strata and contaminants for further investigation during the Phase II RI. EPA's proposed approach contradicts the approach previously agreed to by the MCAS El Toro planning team.

In addition, there are technical problems associated with the EPA proposed "alternative" approach. Aside from the logistical difficulties of managing such an investigation (involving utility clearances, subcontractor contracting, scheduling of subcontractors, and field personnel, making "real-time" decisions without regulatory agency oversight, etc.), there are at least three major difficulties with this approach. The first is the ***great expense***--Navy estimates have concluded that a field screening sample program as proposed by EPA may cost as much as $30 million. Note that EPA's *Interim Final Guidance on Implementing the Data Quality Objectives Process for Superfund* (September 1993) clearly states in Step 1 of the DQO process (State the Problem) that available resources, e.g., the costs of investigations, are key considerations at the outset of any planning exercise.

The second problem is ***detection limits***--conversations with Dr. Robbat of SiteWorks, Inc. (one of the likely field laboratory subcontractors) have revealed that in some cases, the detection limits are substantially higher than RBCs agreed upon during the DQO process. For example, while the RBC for polychlorinated biphenyls (PCBs) is 40 parts per billion (ppb), the detection limit using GC/MS field screening is 300 ppb. Since the Phase I results revealed that the greatest calculated human health risk in surface soil at MCAS El Toro lies in strata containing PCB contaminants, the very real concern in the EPA approach lies in what to do about field screening sample results that show "nondetect." Does EPA propose that stratum boundaries may be revised or strata eliminated from further consideration when detection limits are orders of magnitude greater than concentrations that may pose risk to human health? To date, the EPA has not given the Navy any indication it would be willing to accept decisions based on data where detection limits are higher than RBCs.

The third problem is the fact that ***many compounds may not be analyzed using field screening methods***. For example, among the semivolatile organic compounds, only six polynuclear aromatic compounds may be analyzed. Among the pesticides, only dieldrin and DDT may be analyzed. EPA's stated goal of analyzing for "full suites of classes of priority pollutants" is not possible using the proposed field-screening methodology.

The design for the Phase II RI at MCAS El Toro was essentially specified in the position papers developed during the DQO process, and EPA participated in the development of these papers. In addition, the broad outline of the design was established in planning documents prepared prior to the Phase I RI and approved by

EPA. This includes the concept of statistical strata, and an approach that specified sampling for a wide variety of constituents in Phase I, and sampling for a restricted and focused group of constituents in Phase II. The EPA "alternative" would essentially require that the RI start over and would obviate all previous agreements and understandings reached during the RI at MCAS El Toro.

3. EPA Concern: The Assumptions that Underlie the Use of Statistical Strata, Which Form a Foundation for the RI at MCAS El Toro, Have Not Been Demonstrated to be Valid

It is not clear whether EPA is troubled by the concept of statistical strata, or the manner in which the concept has been applied at MCAS El Toro. If the concept of strata concerns EPA, it should be pointed out that originally the Navy proposed, in the Draft Phase I SAP, placing samples judgmentally at each site. The decision to divide the sites into strata and allocate samples randomly was made at EPA's request and the new stratum concept was then incorporated into the Draft Final Phase I SAP. Strata have also been utilized at other Superfund sites with EPA approval (e.g., MCLB Barstow and MCAS Yuma).

Strata at RI sites at MCAS El Toro were later refined based on evidence from historical aerial photographs. These changes were documented in the SAP Amendment. Both the Draft Final Phase I SAP and the Phase I SAP Amendment were approved by EPA, DTSC, and the RWQCB. Finally, many of the position papers developed during the DQO process and approved by EPA relied on the concept of strata. For example, "Chemicals to be Investigated During Phase II" (26 July 1993) and "Statistical Design for Phase II Sampling" (11 August 1993) relied on the concept of statistical strata. Thus, strata have been a part of the RI at MCAS El Toro nearly from the beginning, and the existing stratum boundaries were largely established during the Phase I RI and approved by EPA.

According to EPA's *Interim Final Guidance on Implementing the Data Quality Objectives Process for Superfund* (September 1993), "...[s]trata should be defined so that physical samples within a stratum are **more similar** [emphasis added] to each other than samples from other strata. Sampling depth, concentration level, previous cleanup attempts, and confounding contaminants can be used as the basis for creating strata." The Navy believes it has, through historical data, aerial photographs, Phase I results, and employee interviews, adequately met the intent of Step 4 of the DQO process (Define the Study Boundaries). EPA's guidance never intended to place the impossible burden of finding perfectly "homogeneous" strata in an inherently heterogenous environment. Strata definition is meant to be accomplished with available data; the uncertainties are handled when the decisionmakers arrive at acceptable decision errors (Step 6 of the DQO process).

Additionally, since EPA has already given concurrence to stratum boundaries established in the Phase I SAP and Phase I SAP Amendment, it should only be necessary to document <u>changes</u> in stratum boundaries between Phase I and Phase II.

Documentation has already been presented in previous planning documents (e.g., the SAP Amendment) and discussed at great length in Remedial Project Managers (RPM) meetings. A summary of evidence and rationale for the establishment of strata is provided in Section 1 of each subappendix. Section 5 of each subappendix provides rationale for any changes in stratum boundaries necessitated by the Phase I RI data or the most recent review of historical aerial photographs. Only a few changes in strata boundaries have been proposed for the Phase II investigation.

Rather than make a sweeping condemnation of the validity of strata at MCAS El Toro, EPA should provide specific examples of strata where they feel the boundaries should be re-evaluated. The Navy will amend the Work Plan where the suggested changes are shown to be necessary. However, it is inappropriate for EPA to challenge the use of statistical strata globally at this stage of the RI, given the previous EPA concurrence, and the time and expense that would be required to reproduce extensive documentation or make substantive changes in the sampling strategy.

The sampling strategy at MCAS El Toro is sound. A large number of samples that will have been collected at each site by the conclusion of the Phase II RI. The Navy believes that sufficient data will exist to perform a risk assessment and evaluate remedial alternatives. Additional sampling to refine the extent of contamination, if necessary, may occur during the RD/RA stage.

Final Review Comments
MCAS El Toro
Installation Restoration Program
Phase II Remedial Investigation/Feasibility Study
Draft Phase II Work Plan

Introduction

EPA has reviewed the report entitled *MCAS El Toro Installation Restoration Program Phase II Remedial Investigation/Feasibility Study Draft Phase II Work Plan*, dated November 9, 1993. The proposed work plan presents the scope of work for the Phase II Remedial Investigation (RI) at MCAS El Toro. The Phase II RI work plan was prepared on the basis of the results of the Phase I RI using the Data Quality Objectives (DQO) process. The comments are presented in three sections. The first section, "Major General Comments," presents the major, reportwide fatal flaws. The second section, "Other General Comments," presents other reportwide comments. The third and final section, "Specific Comments," presents specific comments on the report.

Major General Comments

1. **Deficiency: Very little evidence is presented to establish the validity of the established stratum boundaries.**

   The strata are purportedly set up so that at any point within one, there is an equal chance of finding contamination. However, very little support is provided for this assumption. The report presents a limited discussion of the two aerial photographic surveys that have been performed, but that is the extent of the discussion. Very little mention is made about any discussions that might have occurred with current or past employees, and of the fate and transport mechanisms that might distribute contaminants unevenly within a stratum even if they were initially randomly placed. Also, what effect would differences in the time of placement have on current distributions?

   In addition, areas of concern (AOCs) from the RCRA Facility Assessment (RFA) are rolled into existing strata at several CAOCs (see specific comments). The text provides no discussion to justify this. Logic suggests that these areas were identified as AOCs because something unique has occurred there. This is contrary to the concept that it is equally likely to find contamination at any point within the stratum.

   It is imperative that the validity of the strata definitions be presented thoroughly and completely, since everything else in the work plan depends on this assumption. If it is not valid, the entire sampling strategy fails.

Remedy: The report should provide a complete presentation of all the information that went into the strata border definition. This should include the aerial photos, employee interviews and the results of the Phase I sampling effort. A non-exhaustive list of criteria for the lateral stratification of the CAOCs could be:

- **Similarity of past activities**
- **Patterns of contamination**
- **Physical characteristics of the CAOC**
- **Weathering and runoff processes**
- **Expected variability of concentration levels**
- **Characteristics of the chemicals of potential concern (COPCs)**
- **Expected hot spots**
- **Geology, etc.**
- **The fate and transport of the COPCs**

Again, it needs to be stated that without this documentation, the entire RI/FS process is in danger of falling apart.

Response

A summary of existing evidence and a rationale for the establishment of strata are provided in Section 1 of the DQO subappendix for each site. It should not be necessary to repeat the documentation for the criteria listed in the EPA comment above, because this documentation is quite lengthy and has been provided in several previous reports.

According to EPA's *Guidance on Implementing the Data Quality Objectives Process for Superfund* (August 20, 1993), "...[s]trata should be defined so that physical samples within a stratum are **more similar** [emphasis added] to each other than samples from other strata. Sampling depth, concentration level, previous cleanup attempts, and confounding contaminants can be used as the basis for creating strata." The Navy believes it has, through historical data, aerial photographs, Phase I results, and employee interviews, adequately met the intent of Step 4 of the DQO process (Define the Study Boundaries). EPA's guidance never intended to place the impossible burden of finding perfectly "homogeneous" strata in an inherently heterogeneous environment. Strata definition is meant to be accomplished with available data; the uncertainties are handled when the decisionmakers arrive at acceptable decision errors (Step 6 of the DQO process).

In fact, because stratum boundaries established in the Phase I SAP and Phase I SAP Amendment have already been approved by EPA, it should only be necessary to document changes in stratum boundaries between Phase I and Phase II. Documentation has already been presented in previous planning documents (e.g., the SAP Amendment) and discussed at great length in RPM

meetings. A summary of evidence and rationale for the establishment of strata is provided in Section 1 of each subappendix. Section 5 of each subappendix provides rationale for any changes in stratum boundaries necessitated by the Phase I RI data or the most recent review of historical aerial photographs. Only a few changes in strata boundaries have been proposed for the Phase II investigation.

Rather than make a sweeping condemnation of the validity of strata at MCAS El Toro, EPA should provide specific examples of strata where they feel the boundaries should be re-evaluated. The Navy will amend the Work Plan where the suggested changes are shown to be necessary. However, it is inappropriate for EPA to challenge the use of statistical strata globally at this stage of the RI, given the previous EPA concurrence, and the time and expense that would be required to reproduce extensive documentation or make substantive changes in the sampling strategy.

There is only one site where an AOC from the RFA has been incorporated into an existing stratum--Site 3/4. Here, SWMU/AOC 300 was incorporated into the landfill stratum because aerial photographs and excavations both revealed that the landfill underlies the AOC. This AOC is currently paved, so risk of contacting contamination is not an issue. The real issue concerns the manner in which the stratum will be remediated, and the landfill will drive the remediation (e.g., landfill closure will automatically remediate the SWMU/AOC). This was discussed during the DQO process and EPA made no objection at that time.

It is true that a large portion of the DQOs rely on the stratum concept. In fact, the Phase I RI, in which the Navy invested over $20 million, was based on the stratum concept. It must be kept in mind that the original Phase I RI Work Plan called for use of a judgmental approach to sampling, and the Navy adopted a stratum approach at the EPA's insistence. The proposed Phase II design builds on the Phase I investigation, and EPA participated in most of the stratum-based decisions during the DQO process.

For example, EPA has concurred on many position papers as a part of the DQO process. Most of these positions were predicated on an approach that relied on the establishment of strata and the use of statistical evaluation methods. Such concurrence by EPA implied concurrence with the strata/statistical approach to design as well. Fundamental disagreement with the concept of strata should have been expressed earlier in the process.

2. **Deficiency: The proposed work plan for the Phase II RI is insufficient to characterize the nature and extent of contamination. The Phase I RI sampling strategy was based on an assumption of equal probability of finding contaminants at any point within each stratum. Since the validity of this assumption has never been substantiated, the use of the same sampling strategy for the Phase II RI will not provide sufficient characterization of the nature and extent**

of contamination. With the use of the proposed approach in the draft work plan, an additional phase of characterization after Phase II RI will be required.

Remedy: An alternative to the proposed approach in this work plan is the use of the field screening techniques to quickly delineate the nature and extent of contamination. This approach can be used in the early phases of the RI/FS when the primary objective is to investigate if contamination occurs at each potentially problematic site or CAOC. Field screening techniques can provide information which streamlines data collection efforts by optimizing the use of soil sampling techniques and the number of samples sent to the laboratory for confirmation chemical analysis. The following is an example for the use of field screening techniques to delineate the nature and extent of contamination.

A suspect stratum is sampled using a grid system, and a three-tier analytical approach is designed for the field screening system. The first tier, field screening analysis, involves the use of onsite chemical analyses at a field mobile laboratory. Massive quantities of soil samples are collected from the grid system; three samples are collected from three different depths at each sampling point. The samples are analyzed onsite at a field mobile laboratory for full suites of classes of priority pollutants, including VOCs, semivolatile and nonvolatile organism, and metals. Real-time results of the analysis can be available for onsite decisionmaking and to guide concurrent field investigations. If no contaminants are detected in the samples from the suspect stratum in the first-tier analysis, the DQO process is used to optimize a sampling and analysis design and a specific number of sampling locations needed to satisfy the statistical requirements (i.e., specified rates for Type I and II errors) is calculated.

A moderate number of samples is then collected randomly from the calculated number of sampling locations from three depths (i.e., three samples will be collected at each location). These samples are analyzed for full suites of chemicals using a second tier analysis, field quantitation analysis, equivalent to CLP quality at the field laboratory.

The third tier, laboratory confirmation analysis, involves sending samples to an offsite laboratory for CLP level 4 analyses. If no contaminants are detected in the samples from the second tier analysis, a minimal number of sampling locations is selected randomly from the suspect stratum. Samples from three depths are collected for confirmation analyses of full suites of chemicals at an offsite laboratory with data quality equivalent to CLP level 4. If the confirmation results from the third tier analysis indicates no contaminants present, the suspect stratum is then classified as "no further investigation" for subsequent phases. The advantage of this three-tier approach is the reduction of massive quantities of "non-detects" typically found in the laboratory results for strata that are classified for no further investigation.

On the contrary, if contaminants are detected during the first tier, field screening analysis, the data are used to locate the "hot spots" and the areal extent of contamination within the stratum, and perhaps beyond the stratum boundary. Once contaminants are detected during field screening and chemical concentrations indicate that remediation may be required, the subsequent analyses are thus designed to characterize the nature of contamination and to delineate the volume of the contaminated media. The RI sampling and analysis program is also designed to collect the necessary data for the subsequent feasibility study and remedial decisions. Samples are collected from within the contaminated area for the second tier analysis to confirm the results of field screening. Real-time analytical results are used to provide guidance for the field investigation to define the contaminated volume. A minimal number of samples is then collected for the CLP level 4 confirmation analyses at an offsite laboratory to confirm the results obtained from field screening and field quantitation analyses. The information from the three-tier analysis is also used to guide groundwater investigations and to optimize the locations of groundwater monitoring wells. The approach will also reduce the number of "non-detects" and the contaminated area can be delineated within one phase.

The use of the approach, most importantly, can result in site characterization in a single phase and significant overall savings in time. The use of field screening and quantitation analyses with a field mobile laboratory can expedite field investigations and enable field teams to conduct sampling and obtain real-time data to guide field investigations. The approach can result in savings from reducing the unnecessarily high number of samples for CLP level 4 analyses, which typically most of them are "non-detects." Also, precious time will not be lost waiting for offsite laboratory analytical results. With this approach, the RI can be cost-effectively streamlined to collect only those data necessary to assess what remedial actions, if any, are needed at a particular stratum. For those strata that are classified for no further investigations, less questions will be raised because the entire stratum has been thoroughly investigated and the results are confirmed.

Response

The validity of the stratum concept and the assumption of equal probability of detecting contaminants within a stratum, as well as the establishment of specific strata at each RI site at MCAS El Toro, was agreed to and approved by EPA prior to the Phase I RI. In fact, the stratum concept was originally suggested to the MCAS El Toro planning team by EPA.

An additional phase of the RI will not be required if the proposed Phase II design is followed. From 6 to 12 Level III quality shallow soil samples will have been collected in each stratum that is not being investigated further during Phase II, while from 12 to 33 Level III quality shallow soil samples will have been collected in each stratum that is being investigated further in Phase II.

These samples will be more than adequate to evaluate the nature of contamination and perform a Baseline Risk Assessment. Furthermore, as many as 87 field screening samples and 72 soil gas sample locations are proposed at individual strata during Phase II. Various sites contain from one to five strata. As part of the preliminary investigation at new Site 24, 1,000 soil gas samples were proposed at 500 locations, together with 200 field screening soil samples and 40 Level III soil samples. During the Phase II RI following the preliminary investigation, additional shallow, subsurface and groundwater samples will be collected from Site 24. The combined soil gas, field screening, and Level III laboratory samples will be adequate to evaluate extent and remedial alternatives in most cases. Additional samples may be collected if needed during the RD/RA phase.

EPA proposes that "massive" numbers of soil samples may be collected and analyzed for "full suites" of classes of priority pollutants in a complex three-tier analytical approach. This suggestion seems to imply that it is necessary to begin the RI process all over again and that Phase I never occurred. The RI strategy outlined in the Phase I SAP and approved by EPA required that the Navy collect large numbers of soil samples during Phase I and analyze these samples for a wide range of constituents, as a way of evaluating what contaminants may be present at each site. The Navy agreed to this approach and invested $20 million in the Phase I RI. Results from the Phase I RI were to be used to select contaminants that pose human health or ecological risk for additional focus during the Phase II RI. During the DQO process the MCAS El Toro planning team, including EPA, agreed on an approach to select strata and contaminants for further investigation during the Phase II RI. It should not be necessary to analyze for full suites of potential contaminants at each site again in Phase II. EPA's proposed approach seems contradictory to the one previously proposed by EPA and approved by the Navy.

The field screening sampling approach outlined in this comment has a great deal of technical merit, and may be a way to perform a "one-phase" RI at a site where the RI is just beginning. However, MCAS El Toro already has performed extensive investigation. In addition, there are technical problems associated with the EPA proposed "alternative" approach. Aside from the logistical difficulties of managing such an investigation (involving utility clearances, subcontractor contracting, scheduling of subcontractors and field personnel, making "real-time" decisions without regulatory agency oversight, locating a sufficient number of mobile GC/MS field laboratories to complete the RI in a reasonable amount of time, etc.), there at several difficulties with this approach. One difficulty is the expense--Navy estimates have concluded that the approach outlined by EPA may cost as much as $30 million, and provide less useable data for the Baseline Risk Assessment. The optimization of data quality against costs is a priority for the Navy.

Another difficulty is that in some cases, the detection limits are substantially higher than RBCs agreed upon during the DQO process. For example, the RBC for PCBs is an order of magnitude less than the detection limit using GC/MS field screening. Since the Phase I results revealed that the greatest calculated human health risk in surface soil at MCAS El Toro lies in strata containing PCB contaminants, the very real concern in the EPA approach lies in what to do about field screening sample results that show "nondetect." Does EPA propose that stratum boundaries may be revised or strata eliminated from further consideration when detection limits are as much as 10 times greater than concentrations that may pose risk to human health?

Yet another difficulty is the fact that many compounds may not be analyzed using field screening methods. For example, among the semivolatile organic compounds, only six polynuclear aromatic compounds may be analyzed. Among the pesticides, only dieldrin and DDT may be analyzed. EPA's stated goal of analyzing for "full suites of classes of priority pollutants" is simply not possible using their proposed field-screening methodology.

3. **Deficiency: The DQO process is a series of planning steps and its structure provides a convenient way to organize the information available for planning activities for the Phase II data collection. The intended use of the DQO process at this point is to streamline the scope for the Phase II RI. The DQO process consists of seven steps. In most cases, each successive step derives information from previous steps; thus, each step should be completed in the order that it appears in the DQO guidance. The El Toro DQO process presented in the document submitted by the Navy does not follow the structural DQO process. Instead, the Navy provides a cross-reference table to show where the information of each step is presented throughout the document. Between steps, there is no apparent connection. However, the major flaw from the El Toro DQO process is that it failed to develop and to optimize the sampling and analysis design for the Phase II RI. The final step of the El Toro DQO process did not generate a sampling and analysis plan that can be used to adequately characterize the nature and extent of contamination at the facility.**

Also, the DQO process allows for iteration to refine the outputs from previous steps. With the loose format presented in this document, it would not be very efficient to refine the DQO outputs by iteration.

It is also very difficult for a reviewer to follow the process through to insure that it has been performed properly. For example, it is difficult to find adequate information about what cutpoints were used for which chemicals, or a discussion of the uncertainty inherent in this process.

Remedy: The document should be revised to more closely follow the DQO process. The final outputs from the DQO process should generate an optimized sampling and analysis plan for the Phase II RI.

Response

Logic of DQO Presentation. The DQO presentation in the Work Plan was presented to EPA in a series of meetings. Sample DQO write-ups were provided to EPA 3 months before the entire Work Plan was submitted, and EPA had no comment. There is a logic to the DQO presentation in the Work Plan, and it does include each of the seven DQO steps. The Navy does more than merely provide a table. Section A.7 of the Introduction describes the approach followed in the Work Plan.

The seven-step DQO process was followed during the planning of the Phase II RI at MCAS El Toro. However, their presentation in the text sections of the site DQO write-ups has been reorganized in a logical order that will be easier for the reader to follow and avoid too much duplication of text. For example, some tasks listed under the seven DQO steps have universal applicability (e.g., decision rules). Rather than repeat (throughout the write-ups) those discussions of tasks that are common to all the sites, these tasks and their outcomes are described in detail in the Work Plan (Section 4--Rationale), and summarized in the DQO Introduction (Section A.6).

In addition, certain earlier DQO tasks seem to fit more logically when presented later in the each subappendix's site discussion. For example, one Step 1 task--State the Problem--is to draw conclusions and define the problems and issues that need to be addressed. Since this step logically follows other DQO steps, such as identifying inputs affecting the decision, conclusions for a site are placed near the end of each subappendix, just before the discussion of the design for Phase II.

In summary, the logic of the presentation for each site is to first present what is known about a site, evaluate this information according to procedures developed during the DQO process, draw conclusions from the information, identify data needs for Phase II, and finally, prepare an investigative design according to decision rules developed during the DQO process.

Cutpoints. A separate position paper on cutpoints was submitted to EPA and approved by EPA. Cutpoints for all chemicals were based on their RBCs and the calculated human health risk posed by each detected concentration of a chemical. There are tables in each site subappendix that summarize the risk and there is text in each subappendix that discusses the cutpoints, both in terms of chemicals to be investigated further, and the sampling design itself. The position paper on cutpoints is provided in its entirety in the Work Plan, and summarized in the Introduction to the DQO appendices.

Optimization of the Design. EPA states that the major flaw for the El Toro DQO process is that it failed to develop and to optimize the sampling and analysis design for the Phase II RI. In place of the design offered in the Work

Plan, EPA proposes a massive field-screening sampling effort. Yet EPA's *Interim Final Guidance on Implementing the Data Quality Objectives Process for Superfund* (September 1993) states that the outputs of the DQO process are used in developing a statistical design. It states further:

> "For most field investigations, a probabilistic sampling approach is necessary for extrapolating results from a set of samples to the entire site. By combining an efficient probabilistic sampling design with a statistical hypothesis test, the decisionmaker will be able to optimize resources such as funding, personnel, and temporal constraints while still meeting the DQOs."

4. **Deficiency: The document does not provide a response summary to indicate the comments on the Phase I RI from the regulatory agencies have been addressed. It is very difficult to determine if the regulators' comments on MCAS El Toro submittals have been addressed in this document.**

   Remedy: The Navy is requested to provide a response summary to indicate where in the document the comments from the regulatory agencies have been addressed.

   Response

   As specified in the Federal Facility Agreement that was signed by EPA, the Phase I RI report was a technical memorandum that summarized the data gathered during the Phase I RI. There was no provision for draft and final versions of this document, nor for responses to EPA comments. Data interpretation and design decisions were to be made during the DQO process and in the RI Report. All the regulatory agencies had ample opportunity to voice their concerns during the DQO process. The Navy hosted extensive meetings, prepared a series of position papers for agency review, and released sample DQO write-ups prior to releasing the DQO document itself.

5. **Deficiency: VLEACH modeling**

   On page 4-64, it is stated that the accuracy of vadose zone transport simulations are directly dependent on an accurate estimation of the initial vertical distribution of contaminant mass in the vadose zone. VOC concentrations detected in the soil matrix during the Phase I RI were used in the VLEACH modeling. On page 26, Section A.6.7, it is stated that the analysis of vadose zone transport of VOCs typically address three phases: Contaminant dissolved in the liquid phase, contaminant existing as a vapor phase, and contaminant adsorbed to the organic carbon fraction of the vadose zone soil. Significant losses of VOCs from soil matrix samples are believed to be unavoidable because of the disturbance of the soil matrix during field sampling and laboratory

handling. Therefore, the soil matrix VOC concentrations used as inputs to the VLEACH modeling may be much lower than the actual field conditions.

In addition, the VLEACH modeling ignored the VOC mass in the vapor phase that may be significant for an arid CAOC like MCAS El Toro. The modeling does not account for the VOC mass in the vapor phase. EPA disagrees that the VLEACH modeling overestimates the contaminant mass in the subsurface leaching to groundwater (see pages 4-64 and 4-92, and page 29, Section A.6.7).

Remedy: In light of the problems with VOC concentrations in the soil matrix samples, the Navy should try to conduct sampling and analysis of soil gas VOC concentrations and calculate the equilibrium total VOC mass in the vadose zone of the modeling inputs. The results thus obtained should then be compared to those obtained using the soil matrix VOC data.

Response

The VLEACH model assumed that the concentration of each compound being modeled was the same throughout the vadose zone as in the most contaminated sample in which it was detected. For example, if toluene was found in one sample at a depth of 25 feet at a concentration of 50 ug/kg, and the depth to groundwater is 120 feet, then it is assumed that toluene was present throughout the entire vadose zone at a concentration of 50 ug/kg. In addition, generally conservative values of soil properties, hydrogeologic parameters, and surface recharge rates were used in VLEACH and groundwater mixing calculations. A sensitivity analysis of major input parameters was performed to place limits on the modeled results. The use of generally conservative assumptions should counterbalance not factoring in soil vapor concentrations in the model. Note that soil vapor concentrations were not available for use.

No vadose zone model is perfect, including VLEACH. A great deal of discussion was held during the DQO process regarding vadose zone modeling, and VLEACH was selected by the entire team, including EPA. The proof of whether contaminants have migrated to the groundwater lies in whether the groundwater monitoring system is adequate, and whether contaminants are detected in groundwater samples collected in this system. Performing soil gas surveys throughout the Station would be very expensive, and only marginally improve the predictive ability of the model.

6. **Deficiency: On what basis were the metals in the subsurface soils screened for potential migration to groundwater?**

In the discussion of chemicals to be investigated during Phase II, it is routinely stated that no COPCs were judged to have the potential to reach the groundwater. On pages 4-52 and 4-55 of the report, it is stated that inorganics were not evaluated with the VLEACH model. Since metals are always listed as

COPCs in the subsurface soils, this raises the question as to how this judgment was made.

Remedy: Please provide information for each subappendix to explain how the metals in the subsurface soils were screened for potential migration to groundwater. The potential for metals to migrate through the vadose zone can be modeled using the SESOIL model. Please provide an evaluation on the potential for metal species to migrate through the vadose zone.

Response

The issue of metals in subsurface soil was addressed in position papers approved by EPA and included in the Work Plan in Section 4, and summarized in the Introduction. The DQO planners, including EPA, were unable to agree on what constituted background for metals in subsurface soil and in groundwater. Therefore, it was not possible to agree on which concentrations of metals would be modeled. It was then decided to postpone decisions on background in subsurface soil and groundwater, and develop an alternative approach to the selection of inorganic chemicals for further investigation.

The purpose of VLEACH modeling of the potential of chemicals to migrate to groundwater was to help select chemicals for further investigation, not chemicals of concern. In this regard, it is worth mentioning that the groundwater sampling strategy stated in the DQO document requires that all groundwater samples collected during the Phase II RI will be analyzed for general chemistry parameters and metals.

The method of selecting inorganic chemicals in subsurface soil for further investigation is clearly stated in the position paper (Work Plan Section 4.11) and in Section A.6.8.2 of the DQO Introduction:

> *Inorganic Chemicals in Subsurface Soil:* Selection is on the basis of an evaluation of whether the chemical is migrating through the soil column. If the inorganic chemical in question exceeds background and RBCs in surface soil at that location, and if it also exceeds Maximum Contaminant Levels (MCLs) or Action Levels in groundwater at the site, then it will be investigated during Phase II.

7. **Deficiency: Risks are not discussed for groundwater.**

Chemical results are presented in each subappendix for groundwater, and many subappendixes have a table showing which chemicals in groundwater exceed the RBC. This implies that risks due to groundwater can be calculated for each CAOC. However, no presentation is made of risk summaries for the groundwater, or of the significance of these risks.

Remedy: A discussion should be provided to each subappendix on the risk due to groundwater.

Response

For each RI/FS site, chemicals detected in groundwater monitoring wells at that site during Phase I are summarized in the text in Section A_-3, Chemicals of Potential Concern, and listed in Table A_-2c, Chemicals of Potential Concern--Groundwater. All Chemicals detected in groundwater that exceed human health RBCs are summarized in the text in Section A_-7, Chemicals to be Investigated During Phase II, and listed in Table A_-3b, Chemicals Detected in the Phase I RI That Exceed Human Health Risk-Screening Criteria--Groundwater.

Strata at each site are defined by potential surface soil contamination and represent a potential exposure area for human or ecological receptor contact. Therefore, risks due to potential soil contact are summarized by strata. The potential exposure area for contact with groundwater is not limited by stratum boundaries. Therefore, risks due to potential groundwater contact are not summarized by strata. Instead, all chemicals detected in groundwater that exceed screening criteria are recommended for further investigation in Phase II.

Decisions to analyze for organic COPCs in groundwater in Phase II are based on exceedances of RBCs or MCLs in Phase I, chemicals predicted to leach to groundwater, and chemicals that did not fit in either of these categories but were evaluated to be related to past site activities. All monitoring wells sampled in Phase II will be analyzed for general chemistry parameters and metals to evaluate background concentrations and geochemical facies.

8. **Deficiency: The discussion of the use of findings of Phase I in support of the Phase II approach, is not adequate.**

Remedy: Specifically, uncertainties in the Phase I data should be presented and well understood before the data are used to draw any conclusions about their theoretical distributions, real means and standard deviations (and consequently CVs). Summary statistics for the Phase I data should be presented and discussed by stratum. The presentation should include the number of samples, mean, error estimates, and variability estimates for the COPCs. Power and confidence level tests should be performed on the Phase I data, and the results should be presented with a discussion of how these results affect the Phase II approach.

Response

It is agreed that a table of summary statistics of the Phase I data for each strata would be desirable. Such a table would be a useful addition to the document.

The second part of the comment requests that "Power and Confidence level tests should be performed...". Power and confidence are decision errors specified by consensus among the decisionmakers; to the Navy's knowledge, there are no "tests" of power and confidence. In addition, the design of the Phase I RI was based on the use of a nonparametric upper tolerance limit to screen strata for potential contamination. The Phase I data allowed for an estimate of the actual CV. Section 4 of the Phase II Work Plan discusses the choice of human excess cancer risk as the measure of choice and presents an estimate of the CV of this measure. This value was within the range of earlier power calculations. Section 4 of the Work Plan also describes how the Phase I sample results (i.e., the variability of risk observed from Phase I data) affected the Phase II approach.

9. **Deficiency: Metals and other naturally occurring constituents are included as COPCs for groundwater at most of the CAOCs, and groundwater samples are proposed for sampling and analysis for total metals. EPA understands that total metal concentration data are required when conducting risk assessments. The proposed sampling and analysis plan,however, should also consider other potential uses for the data collected during the RI. Metals can occur in many chemical forms in a soil-water environment, and knowing these forms or species is important to predicting the behavior of metals. The mobility, reactivity, biological availability, and toxicity of metals and other inorganics depend upon the speciation; knowing only the total concentration of a metal or inorganic compound is frequently of little use.**

The Phase II RI needs to sample and analyze for dissolved metals in groundwater samples. Often, within a contaminant plumes, concentrations of dissolved metals are often elevated because of changes in pH and redox potential (Eh) conditions. Microbial degradation of organic compounds often is accompanied by the decrease in Eh levels. Certain metals retained by iron and manganese oxides may be remobilized when iron and manganese oxides in the aquifer are reduced due to the lowering of Eh levels in the contaminant plumes (Francis and Dodge, 1990; Hounslow, 1981). An increase in dissolved metals would facilitate the transport of metal species in groundwater.

In addition, the proposed monitoring parameters at the landfill CAOCs were not designed to monitor the leachate-impacted groundwater. Ammonia is identified as a constituent that needs to be analyzed for at most of the CAOCs. Nitrogen occurs primarily as organic nitrogen and ammonia in landfill leachate. An important parameter, TKN, which measures the reduced forms of nitrogen including ammonia and organic nitrogen, may provide more information than ammonia alone. However, none of the CAOCs where ammonia was identified are proposed for TKN analysis.

Remedy: Groundwater should be sampled and analyzed for total and dissolved metals, including iron and manganese, and parameters that are important for the fate and transport of metal species (i.e., dissolved oxygen (DO), Eh, pH, temperature, and electrical conductivity). This comment applies to all the CAOCs with groundwater monitoring wells within the contaminated groundwater plumes (i.e., the benzene plume, and the regional TCE plume), and all the landfill CAOCs (i.e., CAOCs 2, 3, 5, and 17). To provide more information on the contaminant plume, dissolved metals and other parameters useful in identifying contaminant plumes from the landfills should also be analyzed for. These parameters include TKN, COD, BOD, TOC, and TOX.

Response

All of the parameters mentioned in this comment are already proposed for analysis in the Phase II Work Plan, with the exception of TKN; it can be added. Previously, the debate among the planning team (EPA was present) covered the issue of whether groundwater samples should be left unfiltered for total metals analysis, for risk assessment purposes. All groundwater samples are currently specified for field filtration, in order to analyze for dissolved metals. The team should discuss which samples, if any, should be collected and analyzed for total metals.

13. **Deficiency: Strata in CAOCs 1, 2, 3/4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 19, 20, 21, 22, and 25 were selected for no further investigation during the Phase II RI.**

The conclusions were made based on stratum risk ratios calculated from comparisons of maximum contaminant concentrations in soil matrix samples to the risk-based concentrations (RBC). Besides the issue of inadequate number of sampling points within each stratum, these conclusions seem questionable in that the VOC concentrations used to calculate the risk ratios are from soil matrix samples, and the validity of the soil matrix samples are highly questionable (see discussion in references below).

The soil matrix VOC concentration data generally are increasingly being called into questions because (1) the potential for some VOCs to be lost during field sampling and laboratory testing, (2) the tendency for highly volatile VOCs to reside primarily in the vapor phase, especially in relatively dry soils and soils containing little natural organic matter, and (3) the spatial heterogeneity of soil textures (Forbes and others, 1993). Sampling of soil for laboratory VOC analysis is subject to numerous sources of random and systematic errors. Of the errors, negative bias (i.e., measured value less than true value) is perhaps the most significant and most difficult to eliminate and control. This error is principally caused by volatilization losses during soil sampling collection, storage, and handling (Siegrist and Jenssen, 1990). Also, in a study presented at an EPA-sponsored symposium, it was shown that laboratory soil VOC data obtained from the EPA sample collection and handling protocol (SW-846) were

one or more orders of magnitude lower than those obtained by a less disruptive, limited-exposure handling method (Hewitt, 1993). The spatial heterogeneity of VOCs within the soil matrix, makes it very difficult to obtain a representative sample for laboratory analysis (Forbes and others, 1993).

Remedy: The Navy may have to conduct more investigations in some of these strata during the Phase II RI or use field screening techniques.

Response

In the first place, the following CERCLA Area of Concern (CAOC) strata were not selected for no further investigation based on stratum risk ratios:

- **Site 1:** Investigation deferred because of safety concerns.
- **Site 2:** Both strata selected for further investigation.
- **Site 3/4:** One stratum incorporated into the landfill stratum because it was found that the landfill includes it. No other stratum dropped from further investigation.
- **Site 5:** The single stratum selected for additional further investigation.
- **Site 17:** One stratum incorporated into the landfill stratum because it was found that the landfill includes it. No stratum dropped from further investigation.
- **Site 25:** No stratum was dropped. Part of the Phase II RI design was deferred following the results of the soil gas survey that is to be performed as a preliminary Phase II RI activity.

As far as VOC samples are concerned, EPA has a valid point. However, soil samples for VOC analyses in shallow and surface soils are of marginal value, because of the time that has elapsed since potential releases have occurred, and the potential for shallow VOCs to have volatilized in response to surface weather conditions. "More investigations" of VOCs in surface soil is inappropriate. Soil gas surveys are already proposed in the Work Plan for 10 sites (including the sites encompassed by Site 24).

14. **Deficiency: CAOCs 3, 5, and 12 Analysis of Total Phenols**

Since herbicide MCPP was detected in the soils of CAOCs 3 and 5, total phenols should also be analyzed in the groundwater at the two CAOCs. Phenolic compounds can be derived from the degradation of MCPP (Agertved et

al., 1992). Also, MCPP was detected at an upgradient groundwater monitoring well 12_UGMW31.

Remedy: If phenolic compounds are to be analyzed under the analytical method for SVOCs, this should be indicated in the discussion or table. Otherwise, total phenols should be analyzed for in the groundwater at CAOCs 3, 5, and 12.

Response

Groundwater samples are already being analyzed for SVOCs (and thus phenols) at **each** of these sites (see tables that summarize samples and analytical parameters for each of these sites).

Other General Comments

1. **Deficiency: The LUFT regulatory limits are presented in the body of the report, but each section simply states whether or not they were exceeded.**

   Remedy: A more thorough discussion is needed. Each CAOC should include a discussion of which category on Table 4-8 it falls into, and the reader should be shown, either in a table or in the text, that each of the values detected are below or above the indicated criteria.

   Response

   Site-by-site discussion was avoided to save repetition and space.

2. **Deficiency: The VLEACH model and its results are presented in the body of the report, but each section simply states whether or not the subsurface contaminants are predicted to appear in groundwater at a level higher or lower than the regulatory standard.**

   Remedy: A more thorough discussion is needed. Table 4-13 should be expanded to include all COPCs detected at each CAOC, and the relevant section of the table should be presented in each subappendix.

   Response

   Site-by-site discussion was avoided to save repetition and space.

3. **Deficiency: It is very difficult to determine whether or not only the listed compounds exceed their RBCs, MCLs, etc. Also, limited data is presented to support the risk summary tables presented in the subappendixes. Since these**

tables form the basis of the sampling strategy for Phase II, they need to be clear and verifiable.

Remedy: A more thorough discussion is needed. Table A_-3_ should be expanded to include all COPCs detected at each CAOC.

Response

Disagree. Complete results are provided in the Table A_-1 series for each media. These tables are quite lengthy. Reprinting all these results for the Table A_-3 series would be extremely repetitious, and worse, would cause the COPCs that do exceed risk levels to be lost in the confusion.

4. **Deficiency: The report states that other chemical classes could be included for chemical analysis during Phase II of the RI/FS investigation for other reasons.**

   No explanation or discussion is presented to show how or why chemical classes were included for chemical analysis during Phase II of the RI/FS investigation for other reasons and why they were included.

   Remedy: The paragraph at the end of Section A_.7 of each subappendix should be expanded to include a description of which chemical classes were included for chemical analysis during Phase II of the RI/FS investigation for other reasons, and what these reasons were.

   Response

   This statement was included to satisfy earlier EPA criticism that the DQO rules could potentially screen out some compound that should be included, based on newly discovered site history, or some other reason. This happens very rarely, and would not often be called out at each site. However, it is agreed that when this does occur, it should be mentioned in the text.

5. **Deficiency: The report does not include a bibliography or adequate references for the documents cited.**

   For Example:

   Page 2-10, (TM, 1993) reference should be either (JEG_, 1993) or (TM-00, JEG_, 1993).

   Page 2-25, a reference should be included for the May 1992 and September 1993 Reconnaissance Surveys.

   Pages 4-151 and 4-152, a reference should be included for the Spring 1992 and September 1993 Reconnaissance Surveys.

Remedy: A bibliography section should be added to the report, all documents referenced should be included in it, and references cited by the text should be adequately referenced.

Response

A References section is already included in the Work Plan. However, the references cited here should be corrected.

6. **Deficiency: The report does not include a Table of Contents for each sub-appendix.**

Remedy: A Table of Contents should be included in each subappendix. This would increase the usability of the report by making it easier for find information.

Response

Agree. Note that there is currently a list of figures and tables at the beginning of each subappendix.

7. **Deficiency: Tables, figures, and text in all subappendixes are not consistent on their lists of COPCs.**

For example, Tables A1-2a lists ammonia, nitrate-N and TKN as COPCs for the shallow soil at CAOC 1 whereas, on page A1-4, only nitrate-N is listed. This type of mistake appears throughout the subappendixes.

Remedy: The text, tables, and figures should be revised to insure that all COPCs listed in Table A_-2a, b, and c are accurate, and are shown or listed in the text and on all Figures A_-2 and on Figure A_-3.

Response

The mistake stated here should be corrected. It is disagreed that "this type of mistake appears throughout the subappendixes."

8. **Deficiency: No mention is made of how other aerial photographic anomalies noted by EPA and SAIC are being investigated.**

Remedy: The text should include a description of how the other anomalies noted by EPA and SAIC during the aerial photo reviews are being investigated.

Response

Anomalies noted by EPA or SAIC that lie outside RI site boundaries are beyond the scope of the Work Plan. These should be addressed during base closure activities.

9. **Deficiency: The figures in each subappendix that show the deep borings and wells (Figures A_-3) are not as helpful as they could be because the well and borings are evenly spaced horizontally across the figure, no indication is given to the reader of the horizontal distribution of chemicals at a given CAOC.**

   Remedy: These figures should be to scale in both directions. That is to say, they should be presented as a cross-sectional view.

   Response

   The figures are currently drawn to scale in the vertical direction. The figures were drawn as shown in order to get all the necessary information on them. For horizontal scale, Figure A_-1 (Site Layout for Phase I RI) should be consulted.

10. **Deficiency: Fuel and petroleum hydrocarbons are not always shown on Figure A_-2_. This makes it more difficult to get a full picture of the nature and extent of contamination at each CAOC.**

    Remedy: Figure A_-2_ should show levels for all COPCs including TFH-diesel, TFH-gasoline, and TRFH.

    Response

    As stated on the legend of each figure, TFH-diesel and TFH-gasoline are only included as chemicals of potential concern if they exceed LUFT levels. EPA agreed during the DQO planning process that TRFH would not be included as a COPC.

11. **Deficiency: Section A_.7 does not always contain a discussion of groundwater COPCs.**

    Remedy: Section A_.7 should always include a discussion of groundwater COPCs.

    Response

    Review of the document has determined that Subappendix A3/4 is the only one that did not include a discussion of groundwater COPCs. This subappendix should be corrected.

12. **Deficiency: The soil samples for background concentration determination were collected from locations that are apparently of minimal human impact. However, information of soil characteristics such as mineral composition and grain size distribution were not provided to determine the appropriateness of the soil samples. The capacity for a soil to retain metals is largely determined by its texture and mineral composition. A description of the mineral composition and a plot of the grain size distribution would be useful to determine if the soil samples used for background determination are appropriate.**

Based on Figure 2-5, MCAS El Toro is located on alluvial fan deposits where it receives alluvial deposits from surrounding highlands (Santa Ana Mountains). The lithologies of the highlands consist of diversified rock types, including igneous and sedimentary rocks. The soil underlying MCAS El Toro consist of weathering products from these rock types. However, the background soil sampling locations are primarily located in the highlands northeast of the facility, which excludes many rock types in other directions. Therefore, the representativeness of background soil samples may be questionable.

Remedy: Please provide information on how these background data are comparable to published references for the region.

Response

The EPA toxicologist has already concurred with the position paper that established background. It should not be necessary to return to this issue again. Background samples, weathered products of underlying ingeous and sedimentary rocks, lie upstream of the Station. Each of the four washes that cross MCAS El Toro originate in the foothills northeast of the facility.

Specific Comments

1. **Page 3-2, Paragraph 1, last sentence. The text states that, as more information is collected, COPCs will be added or deleted. Since at each phase of the RI process, classes of chemicals are being eliminated, how will additional COPCs be added? Also, when will the screening process be performed to determine COCs?**

Response

No classes of chemicals were eliminated as COPCs, only as requiring further investigation during the RI. The screening process to determine COCs will take place after the Phase II investigation is completed.

2. **Page 4-18, Paragraph 1, last sentence. The report states "because the design of the Phase I RI provided statistical assurance that commonly occurring chemicals at any of the MCAS El Toro RI/FS CAOCs would have a high**

probability of being detected, chemicals that were not detected during the Phase I investigation may be deleted from the list of COPCs." To date, the Navy has yet to provide adequate documentation to establish that the Phase I sampling provided a high probability of detection. Until this documentation is provided, there is insufficient evidence to support the validity of this statement.

Response

See the responses to "Major General Comments" 1 and 2. EPA requested that the Navy adopt the stratum system, and the statistical conclusions that result. Volumes of data have been produced, and great resources expended to accommodate the EPA request. EPA should indicate specific locations where the conclusions are inappropriate.

3 **Page 4-25, Table 4-3. No Risk-Based Concentrations are listed in this table for TFH-diesel, TFH-gasoline, aluminum, cobalt, copper, gross alpha or gross beta. Every effort should be made to determine values for these chemicals. Also, it should be noted that the lack of risk-based concentrations is not a valid reason to ignore contamination by these chemicals.**

Response

The table of RBCs was prepared with extensive collaboration by EPA. Note that no RBCs are necessary for TFH-diesel and TFH-gasoline. As outlined in the position paper "Total Fuel Hydrocarbons to Represent Petroleum Hydrocarbon," it was agreed that the risks associated with petroleum hydrocarbons are better represented by those associated with BTEX and PAH compounds. These organic compounds are analyzed for under VOCs and SVOCs analyses.

4. **Pages 4-52 and 4-55. Classes of chemicals that were detected during Phase I RI but were not evaluated using the VLEACH modeling are listed. However, very little information is provided as to why they were not evaluated using the VLEACH modeling. The report needs to provide rationale for each exclusion.**

Response

Recall that VLEACH modeling was used only to determine the chemicals in subsurface soil which would be investigated further in Phase II. All but two classes of chemicals were eliminated, as the text states, because they are already being included for further investigation. Methylene chloride was eliminated at certain sites because it was considered to be a lab contaminant using EPA guidance. TFH-gasoline and TFH-diesel, were evaluated by comparison to LUFT guidelines, as EPA previously concurred.

5. **Pages 4-81 to 4-83, Table 4-13. This table is missing information on the detection limits for several components. Also, the text on page 4-85, paragraph 1, does not match the numbers on the table for MCPA and MCPP. Also, the table shows high maximum concentrations for endosulfan sulfate and endrin ketone that are not mentioned in the text.**

Response

Agreed. This should be corrected.

6. **Page 4-102. The section on cutpoints should include a discussion of the range of uncertainty associated with the cutpoints.**

Response

This discussion is provided in the following section (Section 4.13), on the statistical basis for the Phase II design.

7. **Pages 4-103 to 4-148, Section 4.13. It should be clearly stated in the text where the discussion is referring to the sample mean or population mean and where it is referring to the mean of the logarithms. Also, it should be clarified where the text is referring to the risk distribution on and where to the distributions of the COPC concentration data, or their logarithms.**

Response

The text appears to be quite clear on these points. EPA should provide a specific example.

8. **Page 4-104. The Work Plan states that "because the number of samples collected from a stratum is relatively small, there is uncertainty associated with this estimate. In fact an alternate population distribution of values could have yielded a similar set of sample values." There is uncertainty associated with both large and small samples. The point here should be that the Phase I samples are so small that the uncertainty in the data is very large. The similarities of the distributions should be discussed here. The discussion should explain in what way are the distribution similar.**

Response

Although the number of samples collected from surface soil in the strata during Phase I is relatively small (ranging from six to nine samples), nevertheless statistical conclusions may be drawn. The discussion that follows describes these conclusions and addresses the uncertainties. Since there are an infinite number of "hypothesized alternative populations," EPA should recommend one to the Navy for discussion of similarities.

9. **Pages 4-104 and 4-109. The sentence "The relationship between ..." that spans these two pages is unclear. It should be rewritten.**

Response

The sentence appears clear once the words "as the" are deleted.

10. **Pages 4-105, 4-107, and 4-111; Figures 4-6, 4-7, and 4-8. More background information is needed on the construction of the hypothesized and alternative distribution in these figures. If these distributions were taken from another source, then the proper reference should be given. Are these hypothetical cases based on hypothetical data given here just to clarify the concepts or are they based on actual CAOC data? Are Figures 4-6, 4-7, and 4-8 based on the same data set? It appears there are some inconsistencies between the figures. The Y axes of these figures should be labeled. The discussion of the method is based on the assumption of lognormal distributions of risk. It is not clear whether the analytical results from Phase I data support the assumption of lognormality or not. Were there normality and lognormality tests conducted for the different COPCs?**

Response

"Hypothesized and alternative distributions," as described in the text, are purely hypothetical. The figures are presented to clarify the concepts and are not based on actual data. A rereading of the text does not indicate why this confusion should have occurred. Figure 4-9, which presents a probability plot of the logarithms of sample-specific risks for actual surface soil samples collected during the Phase I RI, shows that the hypothetical assumption of lognormal distribution of risk is not unreasonable.

11. **Page 4-110. It is not clear what are degrees of freedom and why were used to select $t_{a(1)}$ and $t_{B(1)}$. The values of these parameters, and consequently the number of samples, can vary considerably for the same probability depending on the degrees of freedom used to select these parameters. The degrees of freedom used and the actual values of $t_{a(1)}$ and $t_{B(1)}$ should be given.**

Response

Agreed. The assumptions used in the calculations were power at 90 percent, and confidence at 95 percent. Values were based on EPA guidance, specifically *Risk Assessment Guidance for Superfund, EPA, March 1989.*

12. **Page 4-113 and 4-117. The discussion of the analysis of the Phase I estimated risks is not very clear. In particular, it is not clear how the sample-specific risks were calculated. Clarification is needed on what contaminants are represented and what are the concentrations. Further discussion is needed**

about Figure 4-10 and Table 4-14. At least five different populations are present in Figure 4-9. An explanation of what causes this should be given in terms of real concentrations for the COPCs not just risk. Analysis of variance is an excellent approach for assessing variability. However, additional discussion of the implementation of the analysis of variance approach for this study should be provided. The discussion should explain what strata and what COPCs were used for this analysis.

Response

Agreed. This discussion should be expanded. Sample-specific risk calculations are an acceptable and standard method of assessing risk. All detected contaminants were considered in the calculations.

13. **Page 4-114. It is not clear what criteria were used to select the MDRD of 4.8 and 7.4. What does this translate to in terms of the MDRD of the actual mean of the concentration values of particular COPCs? What is the percent of MDRD for a specific COPC?**

Response

As stated on page 4-110, the MDRD is a design parameter, selected on the basis of the desired precision of the outcome. Pages 4-114 to 4-120 describe how the MDRD is selected (greater precision and more samples required when more data are needed to make a decision, less precision and fewer samples when the Navy is willing to risk remediation because it appears that the ultimate decision is more certain, etc.).

14. **Page 4-114, Paragraph 2, last line. The "coefficient of variance" should be changed to read "coefficient of variation."**

Response

Agreed.

15. **Page 4-119, Paragraph 3, last sentence. This sentence is unclear. How can the number of samples to be collected for non-carcinogenic risk be based on the carcinogenic risk?**

Response

The text should be corrected to state that when noncarcinogenic risk is present, the carcinogenic risk will drive the selection of number of samples. If no carcinogenic risk is present but the Hazard Index is greater than 1, then a minimum of three additional sample locations will be selected within the stratum.

16. **Page 4-151, Section 4.14.2.2. Why are CAOCs 5, 10, 11, 15, 18, 19, 21, 22, 23, and 24 not discussed? Why are no results presented for CAOC 25?**

Response

The text clearly states the other CAOCs were selected for followup survey in Fall 1993 because: (1) there were expected to be differences in habitat between Spring 1993 (when all sites were surveyed) and Fall 1993; and (2) the selected sites were evaluated to be most likely to have ecological receptors. Also, Site 25 had not yet been established in Spring 1993.

17. **Page 5-4. It is stated that soil gas samples will be analyzed for up to 10 chlorinated solvents, BTEX, and petroleum hydrocarbon fractions. What are the 10 chlorinated solvents that will be analyzed for? Will the measurements of fixed gases be included in the survey? In addition, analysis of vinyl chloride and methane, common landfill gas constituents, should be included int he soil gas surveys for all the landfill CAOCs.**

Response

The details of the soil gas survey are specified in a Soil Gas Survey Work Plan.

18. **Page 6-2, Paragraph 1. In this paragraph the Field Technical Manager is abbreviated as TM. However, in the rest of the report TM stands for Technical Memorandum. This confusion needs to be removed.**

Response

Agreed.

19. **Page 6-5, Paragraph 2. This paragraph is unclear. FC is not previously defined in the text or shown on Figure 6-1, and it should be the Health and Safety manager who reports to the Phase II Project Manager.**

Response

Agreed. "FC" stands for "Field Coordinator."

20. **Page 4. In Step 2 of the DQO process (identify the decision) for the Phase II RI, the report lists potential remedial actions and stating actions to be taken at the substeps. This is incomplete. EPA believes that the major decision at this stage is "does the site pose a risk to human health and the environment?" The second subtask of this phase is to determine what actions need to be taken to answer this question. Among the other questions that need to be answered are "what is the nature and extent of contamination at the site?" and "what are the potential remedial actions available to mitigate risk at the site?" The potential**

remedial actions should only be used to identify the data needs at each CAOC. If risk exists, a feasibility study will be conducted to evaluate remedial purposes. This should be stated very clearly in the DQO process.

Response

The report says "State the actions that may be taken," not "State the actions that may be taken at the substeps." The accompanying text expands on the discussion.

21. **Page 4. It is stated that DQOs were applied prior to the Phase I RI to specify the quantity of data required during Phase I. Please provide a reference to indicate where the results of the Phase I DQO process were presented.**

Response

See the Phase I RI Work Plan and SAP. The point of the paragraph is that the DQO process has expanded substantially since the Phase I plans were prepared as a result of new guidance from EPA.

22. **Page 7. One of the general objectives for the Phase II RI at OU-2 and OU-3 is to derive background concentrations of metals for subsurface soil, groundwater, and surface water. In memorandum presented in August 1993, the Navy requested that background concentrations for metals in groundwater not be established due to the complexity of the geochemistry and the high variability of the data. On page 21, Section A.6.3.3, it is also stated that it was not possible to establish regional background concentrations for inorganics in groundwater during the DQO process due to the complexity of the geochemistry and the high variability of the data. Please clarify if this has been changed and the rationales.**

Response

This has not changed. Therefore, additional data will be collected during the Phase II RI to help evaluate background.

23. **Page 9. Operable Unit 1, OU-1 is defined as the groundwater on- and off-Station that is contaminated with the constituents that have migrated from CAOCs at MCAS El Toro. The definition should be expanded to include the constituents that may become mobile triggered by the contamination from MCAS El Toro. In addition to VOCs, any naturally occurring constituents that may be remobilized by the condition changes in the contaminant plume should also be included as the COPCs for CAOC 18 and 24.**

Response

Any contaminant concentration detected in a groundwater sample that exceeds a regulatory standard is automatically a COPC for OU-1, regardless of whether or not the source has been defined.

24. Page 18. **It is described that the background soil samples for metals were collected at 11 locations randomly selected outside the Station boundaries. However, based on Figure A3-1, Locations of Off-Station Background Soil Samples, in the Phase I RI Technical Memorandum, the 11 locations are concentrated in the northeast direction from the Station. It does not appear that these locations were randomly selected. Please provide the information on how these locations were selected. The representativeness of the background soil samples for metals are crucial because the data generated are used for the statistical comparison. Also, please provide the typical metal concentrations in soil in the region from published references.**

Response

See the response to Other General Comment No. 12. The background locations were selected randomly from a map of undisturbed locations, as described in the Phase I SAP Amendment.

25. CAOC 1, General. **The CAOC covers an area of approximately 40 acres. During Phase I RI, only three surface soil samples were collected from within the CAOC boundary. Unless the assumption of equal probability of finding contamination is demonstrated, inadequate information exists to conclude that no further investigation is required for the Phase II RI. In addition, during the Phase I RI the FS smoke area was not sampled. EPA disagrees that the surface soil sampling results from Phase I RI are representative of the CAOC 1 conditions. The Navy needs to propose more investigations for the Phase II RI.**

Response

This section clearly states that no further investigation is proposed at this time because the site is an active disposal site. It goes on to state that ultimately, before the property may be disposed, the site may require additional investigation. To date, the location of the FS Smoke area has not been definitively identified.

26. CAOC1, General. **CAOC 1 has been used as an explosive ordnance disposal range, typical chemicals associated with munitions were not included in the COPC list. For example, 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), and octahydro-1,3,5,7-tetranitro-1,3,5,7-tetraazocine (HMX), which are commonly found in munitions contaminated soil (Funk et al., 1993), do not appear to have been analyzed for. Also, degradation inter-**

mediates of munitions chemicals, such as parahydroxytoluene, 2,4,6-trihydroxytoluene (Funk et al., 1993) and others, should be identified. Also, the CAOC groundwater shows elevated nitrate concentrations, which may be caused by the degradation of munitions-related chemicals from the CAOC. The Navy is requested to evaluate the need to include these chemicals as COPCs. Groundwater at this CAOC needs to be monitored for nitrate/nitrite and total Kjeldahl nitrogen (TKN).

Response

The Navy will analyze for these chemicals if the team feels that they should be added to the list. Note that Phase I soil samples were analyzed for TKN, nitrate, and nitrite. Nitrate/nitrite (as N) is retained for Phase II work. Since EPA did not recommend analyses for the above compounds when the Phase I Work Plan was approved, they were not included on the COPC list.

27. **Page A1-3, Section A1.1.2. If there is any way to determine where the FS smoke was disposed of, it should be investigated. The FS smoke disposal area should be broken out in to a separate stratum since the pH of the soil made be affected, which could change the mobility of COPCs in this area.**

Response

Agreed. The Navy will entertain EPA's suggestions on how to segregate the FS Smoke Area into a separate stratum.

28. **Page A1-13. In this section it is stated that metals and general chemistry parameters in the groundwater samples from the two downgradient wells will be used for evaluation of the MCAS El Toro background concentrations and geochemical facies. Similar statements also are seen in the discussion of sampling strategy for other CAOCs. Since groundwater beneath CAOC 1 appears to be contaminated with arsenic, nitrate, manganese, and nickel, it is not clear how the contaminated groundwater can be used for the Station background evaluation. In addition, in a memorandum entitled "MCAS El Toro RI/FS, Establishment of Cutpoints for Inorganics in Groundwater, Sediments, and Surface Water" issued by CH2M HILL on August 6, 1993, it was stated that because of the complexity of the geochemistry and the high variability of the data, it does not appear to be feasible to establish regional background concentrations for inorganics in groundwater. Please clarify how the data of naturally occurring constituents in the groundwater will be used for Station background determination and make necessary changes accordingly throughout the document.**

Response

This section did not state that contaminants clearly associated with site activities would be used to develop background. The problem lies in determining what concentrations are ambient, and what concentrations reflect degradation of water quality by site activities. At Site 1, for example, it is not at all clear that arsenic, manganese, and nickel are contaminants. The memorandum in question said that it was not feasible to establish background concentrations at that time. This was after lengthy discussions in DQO meetings failed to reach consensus on how to establish background for inorganics in groundwater. The team agreed that more inorganic data were needed for a thorough analysis of geochemistry, in order to evaluate what inorganic concentrations in groundwater resulted from MCAS El Toro activities.

29. **Figure A1-1. How was the direction of groundwater flow determined for this CAOC, since only two closely spaced wells are shown on this figure? If other regional wells were used, they should be included.**

Response

Agreed. The third well used in flow calculations lies just to the east of Site 1 in Borrego Canyon. This should be mentioned in the text.

30. **Figure A1-1. Why is the "upgradient" soil sample (01_UGS) cross-gradient of the CAOC?**

Response

This surface soil sample is upgradient from the site in a topographical sense (surface runoff or mass wasting would move to the site from this location). This reference does not refer to groundwater.

31. **Table A1-6. This table lists the treatability parameters to be analyzed for. Dissolved oxygen, nitrate, and sulfate should be added to the list.**

Response

Nitrate and sulfate are already listed under General Chemistry. DO should be added.

32. **Page A2-16, Section A2.9.1. This section proposed capping as a remedial approach. However, wouldn't capping the CAOC result in the destruction of habitat for the special-status species identified at this CAOC?**

Response

This section does not propose capping, but merely states that this is one possible alternative. Selection of alternatives will come later.

33. **Page A2-18. Since no information is given about the depth of the landfill, soil gas samples should be collected at 5, 10, and 20 feet below ground surface for this stratum. This will greatly improve the information available for decision-making at this CAOC.**

Response

The Navy does not believe this is necessary. The landfill is not capped internally or externally. From the Phase I RI, the landfill is known to be a likely source of VOC contamination in groundwater. The only question is whether the source may be easily remediated. Shallow soil gas samples are sufficient to locate shallow (i.e., remediable) VOC sources. Otherwise, the landfill will be remediated as a whole unit.

34. **Page A3/4-10. Since SWMU/AOC 194 was once the location of a former incinerator, the proposed COPCs should include typical chemicals that are known to be associated with incinerators; such as dioxins, metals, PCBs, and dibenzofuran.**

Response

These may be added to the list if the team agrees. Due to the expense of their analysis, dioxins/dibenzofurans should be analyzed only from samples focused after the field screening sampling is completed.

35. **Page A3/4-28. Since no information is given about the depth of the landfill, soil gas samples should be collected at 5, 10, and maybe 20 feet below ground surface. This will greatly improve the information available for decisionmaking at this CAOC.**

Response

Again, the Navy does not believe this is necessary. The landfill is not capped internally or externally. From the Phase I RI, the landfill is determined to be a potential source of groundwater contamination (e.g., heptachlor, dieldrin, etc.). The only question is whether the source may be easily remediated. Shallow soil gas samples are believed to be sufficient in locating remediable sources. Otherwise, the landfill will be remediated as a whole unit.

36. **Page A3/4-7. Section states that nine shallow soil samples were collected, but only eight are listed.**

Response

This should be corrected.

37. **Page A3/4-15. EPA disagrees with the way the strata were defined for this CAOC. Each of the AOCs defined in the RFA should be separate stratum, and stratum 1 from CAOC 4 should also be a separate stratum. Otherwise, the assumption that the chances of finding contamination at any point in a stratum are equal is obviously not valid since definably different activities took place in these areas.**

Response

Disagree. As stated in the text, SWMU/AOC 300 and Stratum 1 from Site 4 were found to lie within the boundaries of the Original Landfill (Stratum 1 of Site 3). The remediation of the landfill will include these sites, and separate status should not be necessary. SWMU/AOC 194 will be investigated as a separate AOC, but not as a stratum because all previous and future samples will be collected on a judgmental basis.

38. **Page 3/4-16, Section 3/4.6. This section states that no special-status species use this CAOC, yet Section 3/4.8.1 (page 3/4-18) states that the lining or diversion of the Agua Chinon Creek will be coordinated with the U.S. Fish and Wildlife Service due to the presence of special-status species. Please resolve this contradiction.**

Response

Only a portion of Agua Chinon Creek flows through Site 3/4. Coordination with U.S. Fish and Wildlife Service is necessary only for those portions outside the boundaries of Site 3/4.

39. **Page 3/4-19. No data needs are listed for shallow soil. If this is indeed the case, the text should state that there are no data needs, and why. Otherwise, the data needs should be added.**

Response

Agreed. These were inadvertently left out.

40. **Page 3/4-24, Paragraph 3. The cancer risk is over (greater that) 10^{-6}, not under (less than) 10^{-6}, as stated in the text.**

Response

Agreed.

41. **Page 3/4-25. The discussion on sampling intervals should cross-reference the information provided on page 3/4-30.**

Response

Agreed. These sections (Sections 9 and 10) should be reorganized or combined.

42. **Page 3/27, Paragraph 1. The text states that three water sample locations will be sampled, whereas the figures and tables show four locations (03_AC01-03 and 03_ACX).**

Response

03_ACX is not shown on any figure or table that describes samples that will be collected in Phase II. 03_ACX was a soil sample, not a surface water sample.

43. **Page 3/4-30. Why complete the deep boring, and only sample 0, 5, and 10 feet? It would be more statistically defensible to choose three random locations to sample at 0, 5, and 10 feet and then to locate the deep boring in the area of highest contamination. The deep boring would then be sampled at 10-foot intervals down to the top of the watertable.**

Response

The deep boring will be located based on the results of the soil gas survey. The Navy believes this to be consistent with EPA's expectations regarding the use of field screening sampling to focus sample locations. Additionally, only shallow soil will be sampled at 0, 5, and 10 feet bgs. Subsurface soil is proposed for sampling every 30 feet to the water table (over 200 feet bgs in this area).

44. **Figure 3-2b. Where is the data for sample 03_ACX?**

Response

Sample 03_ACX was a soil sample, not a sediment sample.

45. **Table A3-2a. The table shows that certain metal concentration in shallow soil at SWMU/AOCs 194 and 300 are higher than background levels. Metals were not proposed to be sampled in shallow soil at these two AOCs during the Phase II RI. Please provide the rationales why metals will not be investigated.**

Response

The metals will not be investigated because they did not pose any risk to human or ecological health based on comparison to standards (RBCs and ecological

risk-based standards). The methodology to select chemicals for investigation during the Phase II RI was stated in a position paper and approved by EPA. However, those metals will continue to be COPCs.

46. **Page A5-2. It is stated that almost any types of waste generated at MCAS El Toro may have been disposed of at the Perimeter Road Landfill. Please provide additional information to demonstrate that the proposed classes of chemicals to be analyzed for during the Phase II RI, as shown on page A5-15, will cover all the El Toro Station-specific COPCs. This comment also applies to other landfill CAOCs at the Station.**

Response

Chemicals were selected for further investigation according to decision algorithms developed during the DQO process and approved by EPA. A chemical may be selected as a COPC and still not be investigated further, based on the decision algorithm. If EPA believes that a COPC should be investigated further that has been omitted from the list of future analyses, it should be specific.

47. **Page A5-8, Paragraph 3. The text states that antimony, arsenic, and nitrate concentrations exceed human health criteria, yet Figure A5-3 does not show any arsenic or nitrate. Also, aluminum and TDS concentrations exceeded Secondary MCLs, yet there is no aluminum or TDS shown on Figure A5-3. Finally, chloromethane is shown on Figure A5-3 and not mentioned in the text.**

Response

On the issue of whether or not metals should be on the figure, see the response to "Major General Comment" No. 6. Figure A5-3 also states on the legend that only constituents exceeding Primary MCLs are included. Secondary MCLs are not health based. Chloromethane is listed in the text as a COPC, and VOCs are specified for further investigation during Phase II.

48. **Page A5-10, last sentence. The text makes the generic statement that in-situ technologies were not considered appropriate. This statement needs to be explained to explain why in-situ technologies were not appropriate.**

Response

This statement is referring to subsurface soil. Groundwater and subsurface soil samples have so far not demonstrated that a contaminant source exists in the subsurface that will need to be remediated.

49. **Page A5-15 and Figure A5-6. The new proposed well is not downgradient of the CAOC. The well is about 2,000 feet downgradient from the CAOC, which is too**

far away from the CAOC. Contaminants released from the CAOC can be significantly diluted to less than the method detection limits at the proposed location. Please provide rationale for the proposed location of the well, or relocate the well.

Response

This well should be part of OU-1. At the time the Work Plan was written, it was felt that since OU-1 was proceeding directly to a ROD, additional regional wells outside of the southwest portion of MCAS El Toro should be associated with OU-2 or OU-3.

50. **Table A5-3b. The gross alpha and gross beta values and MCLs reported are below the method detection limit. Also, no contract required detection limit, RBCs or risk ratios are shown. These discrepancies need to be addressed. This comment applies to all other Tables A_-3_ where gross alpha and/or gross beta were detected.**

Response

Agreed. Note that there are no RBCs for gross alpha or gross beta (these are screening analyses).

51. **Table A5-6. This table indicates that the soil gas samples with be collected at 5-foot depths, but the text indicates that they will be collect at 10 and 20 feet. Which is correct? In general, collecting soil gas samples only at 5 feet in conditions such as are encountered at the facility may not be adequate to detect significant VOC concentrations. Collecting samples at 10 and 20 feet should be considered.**

Response

The table, not the text, is correct. The text should be modified. See the response to comment No. 33, above.

52. **Page A6-2. It is indicated that SWMU/AOC 236 will not be included in the Phase II investigations because it is not related to drop tank drainage activities. Please provide information on how SWMU/AOC 236 will be investigated.**

Response

There is no advantage in adding this area to the CERCLA process. However, the Navy will consider investigating SWMU/AOC 236 as part of base closure activities.

53. **Page A6-7 and 8. The 1991 aerial photograph shows a triangular-shaped impoundment partially filled with liquid east of the site. Although the impoundment is probably not related to the drop-tank drainage activities at the CAOC, please provide information on how this impoundment will be investigated.**

Response

There is no advantage in adding this area to the CERCLA process. However, the Navy will consider investigating this impoundment as part of base closure activities.

54. **Page A6-8. If drums and stains were reportedly seen on the 1975 and 1976 aerial photographs, please provide references where the information was presented. Also, please indicate if it is possible to obtain these aerial photographs.**

Response

This information on page A6-8 was provided under the section heading, "SAIC Survey." EPA has a copy of this SAIC report.

55. **Figure A6-3. Shows that the nickel concentration increases from 230 micrograms/liter at the upgradient well to 06_UGMW28 to 866 micrograms/liter at the downgradient well 06_DGMW69. Please provide possible explanations for the increase in the nickel concentration.**

Response

It is premature to provide a definitive explanation for the increase. The Work Plan recommends additional investigation during the Phase II RI.

56. **Table A6-6. The first and fourth line under shallow soils are not clear. No discussion of grid sampling is presented in the text, grids are not shown on Figure A6-6, and no stratum 4 is defined. Also, the totals are incorrect.**

Response

The text and figures are correct, but the table incorrectly states that grid samples will be collected and should be modified. "Stratum 4" on the table should be changed to "Stratum 3." Also, the totals are correct.

57. **Page A7-4, Paragraph 2. The report needs to identify AOCs 71 and 72 on Figure A7-1. Please provide rationales if they should also be broken out as separate strata, or if they will be investigated under a separate program.**

Response

It is agreed that these AOCs should be shown on the figure. They do not need to be broken out as separate strata, since the strata will be investigated by field screening sampling prior to the collection of Level III samples. In addition, there is no indication that releases ever occurred at these AOCs.

58. **Page A7-7 and A7-8. An open storage area has been identified in the EPA aerial photograph analysis. Please provide information on how the area is being investigated.**

Response

This area, currently covered by 14 inches of concrete, is being investigated by soil gas survey as part of Site 24 activities.

59. **Page A7-16. The section states that the criteria are conservative, and, therefore, can be relaxed. This is not acceptable. The criteria are conservative to insure that they are protective of human health and the environment. Either the report needs to make a convincing argument that less conservative standards are sufficiently protective, or these standards must be used.**

Response

This section actually states that the habitat is limited in this stratum, located next to a busy runway. The ecological-based lead criterion is far more conservative than the human-based criterion. Since there is no habitat, the conservative ecological criterion should yield to the human criterion.

60. **Page A7-17. The last paragraph is unclear. It implies that three additional sets of samples after the first may be collected. Everything else in the section indicated that only two additional sets, maximum will be collected. This paragraph should be clarified.**

Response

The Navy disagrees with EPA's assessment that the paragraph is ambiguous. EPA should clarify this comment.

61. **Figure A7-3. What are the water levels for 07_DGMW91 and 43?**

Response

These should be added to the figure.

62. **Table A7-3b. The addition is incorrect for Noncancer Risk Ratio, stratum 3. It should be 0.67, not 0.65.**

Response

EPA is apparently referring to Table A7-4. The slight discrepancy is a result of rounding during addition (done by computer). Note that either number represents a ratio less than 1.0.

63. **Table A7-6. The number of location should be 20 - 37, not 21 - 28 as shown in the table. The number of samples for stratum 5 should be 9, and the total should be 60 - 111.**

Response

Agreed. The table should be modified.

64. **Page A8-4, Paragraph 3. The report needs to identify AOCs 104, 105, and 106 on Figure A7-1. Also, please provide information on how these AOCs are to be investigated. Should they be broken out as separate strata?**

Response

Disagree. These "drum storage areas" are located within the fenced Defense Reutilization Marketing Organization (DRMO), and were not isolated from the general storage that takes place within the DRMO. This area was investigated during Phase I. During Phase II, the East Storage Yard will be further investigated with field screening sampling.

65. **Page A8-6, Section A8.3.2. The data should be listed by strata (e.g., East and West Storage Yards should be listed separately).**

Response

Agreed.

66. **Page A8-9, Paragraph 2. This paragraph says that the CAOC is used by birds and mammals. However, paragraph 3 says that it was not investigated because it provides no habitat. These statements are contradictory. If the CAOC is used by animals, ecological considerations must be used.**

Response

Paragraph 2 is incorrect and should be modified. The area is not used by the animals and birds listed.

67. **Page A8-15, Stratum 5. This section states that, because no soil samples were collected in the top 5 feet, there is no risk, and, therefore, no soil samples will be collected. This is circular logic. This is only valid if the Navy can document that the fill for stratum 5 was clean soil, if this cannot be documented, than it should be sampled.**

Response

The section statement is incorrect. Samples were collected at depths of 0 and 5 feet at three locations in Stratum 5. The reason ecological samples will not be collected is because no contaminant was found that exceeded ecological criteria, and in any case, there is no habitat in this parking lot. The section should be modified.

68. **Figure A8-6. The area shown should be moved further to the right so that Well 08_DGMW74 is included on it since the well is part of the proposed monitoring network for CAOC 8.**

Response

Agreed.

69. **Table A8-4. The Cancer Risk Ratio addition for Strata 1 and 3 are incorrect.**

Response

Again, the addition was performed by computer. The fact that the result is off by 0.01 is due to rounding.

70. **Table A8-5. Text and Table A8-6 say that the soil samples will be analyzed for Pest/PCBs and TFH-diesel (page A8-21). Table A8-5 only shows Pest/PCBs. Also, Table A8-6 shows that Strata 1, 3, and 4 and groundwater will be analyzed for "other (treatability parameters)." However, the text does not mention analyzing Strata 1, 3, and 4 and groundwater for "other (treatability parameters)" (page A8-19 through A8-22) or on Table A8-5.**

Response

Table A8-5 should be modified to include TFH-diesel. The Table A_-6 in each subappendix lists treatability parameters, but these are not mentioned in the Section 9 or 10 writeup. Instead, they are always discussed in Section 8, "Potential Remedial Actions and Associated Data Needs."

71. **Pages A9-2 and A9-3. If the operational history of Pit 2 is unknown, there does not appear to be any basis for assuming that there is an equal chance of finding contamination at any spot in either pit. Pit 2 should be a separate stratum.**

Response

The pits were used for fire training activities. Therefore, similar contaminants will be found in either pit.

72. **Page A9-3, Section A9.1.2. If the aerial photos shown liquid flowing from the pits, there are enough reasons to suspect that the area surrounding the pit may have been contaminated with the chemicals disposed of in the pits. Therefore, the area around them should be included in the stratum. Please provide the rationale(s) why the area is excluded form the pits.**

Response

It is agreed that this area should be investigated further. However, it should be established as a separate stratum or AOC, not as part of the existing pit stratum.

73. **Page A9-1. Downgradient monitoring Well 09_DGMW75 is not downgradient of the CAOC. A new well should be installed north-northeast of the CAOC, before the taxiways. Otherwise, very little information exists to discuss the impact of this CAOC on groundwater. Also, since background levels for groundwater are being determined on a CAOC by CAOC basis, an upgradient well should be proposed.**

Response

Three additional wells are proposed adjacent to Well 09_DBMW45 to form a cluster as part of the Site 24 investigation. It is agreed that a new well north-northeast of Site 9 would also be desirable. As described in the Phase I RI SAP, Well 07_DBMW43 at Site 7 was meant to an upgradient well for Site 9. Finally, it has not been agreed by the team that background levels for groundwater are being determined on a site by site basis.

74. **Table A9-5. The text and Table A9-6 shown analysis for "other (treatability parameters)." Table A9-5 does not. This discrepancy should be resolved.**

Response

None of the Tables A_-5 show treatability parameters. The "Other" category was meant for nonstandard analyses.

75. **Page A10-2. What is the condition of the concrete "cap?" If it is cracked or otherwise damaged, sampling should be conducted underneath it.**

Response

The word "cap" is never mentioned. Sampling did take place beneath the concrete in Phase I. This area will be part of the Site 24 soil gas survey. If areas of potential contamination are discovered, the sampling design may be revised. EPA will be part of this decision process.

76. **Page A10-6. Why is there no discussion of ecological exposure in the conceptual model?**

Response

Since this area is a taxiway, covered with concrete and concreted soil with Marsden matting, there is no habitat at Site 10.

77. **Figure A10-1. Well 10_DGMW77 is not downgradient of the CAOC. EPA recommends that existing well 22_DBMW47, 09_DGMW75 and 09_DBMW45 be used as downgradient monitoring wells, and 07_DGMW71 and 18_TIC057 be used as upgradient monitoring wells.**

Response

Well 10_DGMW77 is downgradient of Site 10. The other wells are being used as up- and downgradient wells, with the exception of Well 18_TIC057, a water supply that has since been abandoned.

78. **Table A10-6. The total number of samples to be collected should be 9 rather than the 10 shown on the table.**

Response

Agreed.

79. **Page A11-2. It is indicated that a tank and several drums were observed during a site visit in October 1993. Please provide information on the material stored in the tank and drums. Apparently, these tanks and drums were discovered very recently. The Navy should re-evaluate the contents of these containers and the analytical methods used during the Phase I RI to ensure that these chemicals are among the chemicals being analyzed.**

Response

Field screening samples will extend out from Strata 1 and 2 and be collected throughout the entire yard, if necessary. Sampling should remain focused on the release that caused this yard to become a site.

80. **Page A11-9. Why only two additional samples for stratum 2? Table 4-15 indicates that, for cancer risks of 10^{-5} and 10^{-4}, three samples will be collected.**

Response

Agreed. The correct number is indicated in Section 10, page A11-11. The text on page A11-9 should be modified.

81. **Page A13-17. The proposed groundwater monitoring parameters do not include dissolved metals. Within the contaminant plume with aromatic compounds (i.e., BTEX), microbial degradation of aromatic compounds may result in elevated dissolved metals in the contaminated groundwater. Please make changes in relevant sections to include the sampling and analysis of total and dissolved metals.**

Response

The proposed parameters do include dissolved metals. Groundwater samples will be filtered as specified in the Phase II SAP.

82. **Page A16-20. It is stated that there is a possibility that CAOC 16 may be a contamination source for the contaminated groundwater at CAOC 13. Based on the information presented in this document, it does not appear that CAOC 16 is a likely source for the benzene in the groundwater of CAOC 13. The contaminated groundwater beneath CAOC 13 contains high levels of benzene and other aromatic compounds at lower levels, however, the groundwater beneath CAOC 16 does not contain BTEX. A proposed upgradient monitoring well located between CAOCs 13 and 16 may be too far away from both CAOCs, which may not generate useful groundwater samples to reach conclusions.**

Response

The Navy agrees it is unlikely that Site 16 is the source of the aromatic volatile compounds detected in the vicinity of Site 13. However, the Tank 398 investigation demonstrated that sometimes contaminants will follow buried stream channels and migrate to the west of the site, "apparently" cross-gradient from the site. There is inadequate downgradient coverage at Site 16 at present to state that the groundwater does not contain BTEX (additional wells are proposed for Phase II). In fact, subsurface soil data from Site 16 does indicate the possibility that petroleum hydrocarbons are migrating to the groundwater. Finally, the proposed well provides needed regional coverage and allows monitoring of the Desalter Project.

83. **CAOC 17. The proposed groundwater monitoring parameters do not include total Kjeldahl nitrogen (TKN), chemical oxygen demand (COD), and dissolved metals. These are useful parameters to demonstrate groundwater contamina-**

tion by landfill leachate. Groundwater contaminated by landfill leachate often contains elevated levels of these constituents and parameters. They should be sampled and analyzed for in groundwater samples from both upgradient and downgradient wells. The field-measured parameters should include dissolved oxygen, pH, Eh, temperature, and electrical conductivity. This comment also applies to other landfill CAOCs.

Response

These parameters are included in the Phase II sampling, with the exception of TKN. The Navy will consider including TKN if the team wishes.

84. **Pages A17-2 and A17-17. It is stated that almost any type of waste generated at MCAS El Toro may have been disposed of at this landfill. Please provide additional information to demonstrate that the proposed classes of chemicals to be analyzed for during the Phase II RI will cover all the El Toro Station-specific COPCs. This comment also applies to other landfill CAOCs at the Station.**

A soil gas survey will be conducted at CAOC 17. What are the VOCs that will be analyzed for in the soil gas samples? The analytes of the soil gas samples have to include the typical landfill gas constituents.

Based on the subsurface soil sampling and analysis results, the groundwater samples need to be analyzed for total phenols because of the presence of MCPP in the subsurface soil. Please clarify if the phenolic compounds will be analyzed under the analytical methods for semivolatile organic compounds.

Response

See the response to Comment No. 46, above. It is agreed that soil gas VOCs should be specified. Soil gas analyses should include methane. The team should reach consensus on this issue prior to Phase II sampling. Phenols will be analyzed as part of SVOC analyses.

85. **CAOC 24. A total of eight groundwater monitoring wells is proposed to be installed within the boundaries of CAOC 24 to characterize the vertical distribution of the contaminants. Based on the TCE concentration contour maps shown in Figure 2-8 and 2-10, the TCE plume from MCAS El Toro shows the characteristics that DNAPLs may occur or might have occurred. If the TCE source is located near CAOC 9, apparently the plume has migrated upgradient from the source. This often is one of the characteristics of DNAPLs. A well cluster is proposed to be installed at depths of approximately 250, 350, and 400 feet near well 09_DBMW45 because this well is located near the center of a suspect DNAPL pool. EPA concurs with this approach. The document, however, does not provide a discussion on how to minimize the potential for**

promoting downward DNAPL migration when conducting drilling and well installation in the vicinity of this area. Please provide an evaluation for the potential presence of DNAPLs using the available soil and groundwater data.

Based on the information presented on the two figures, CAOC 8 also is a suspect source for the TCE plume. However, only one new well is proposed for CAOC 8. The Navy's current proposal for the Phase II investigation in the vicinity of CAOC 8 does not seem adequate. Prior to the well installation, a soil gas survey will be conducted at this CAOC to identify the locations to install the proposed monitoring wells. Dependent on the soil gas survey results, EPA may request that more monitoring wells be installed.

Response

The text clearly states that the location of the wells, and the need for additional wells, will be re-evaluated after the results of the soil gas survey are available. Presently, there is very little evidence to suggest that Site 9 is the source of the VOC plume. If the soil gas survey indicates that it is the source (which is doubtful), then the deeper wells will certainly be re-evaluated.

On the other hand, there is very little evidence at present to suggest that DNAPLs are present at depth beneath the water table. Some liquid phase compounds may be present at residuum in the soil column or near the water table. However, it is very unlikely that contamination would spread 2,000 feet upgradient of Site 9, the so-called "center of a suspect DNAPL pool." The well cluster is not being installed to evaluate the DNAPL pool, but to evaluate the possible vertical extent of contamination originating from an upgradient source.

86. CAOC 24. **The CAOCs for the CAOC 24 are limited to VOCs detected in soil and groundwater (see page A24-12). The COPCs for the groundwater are shown in Table A24-2c. It appears that the COPCs for CAOC 24 consist of all VOCs detected in groundwater at CAOCs 7, 8, 9, 10, 12, 18, 21, and 22. Major VOCs of concern include chlorinated and aromatic VOCs. However, certain VOCs that are known to be derived from degradation of PCE and TCE are not included on the list of COPCs. For example, 1,1-dichloroethene (1,1,-DCE), and vinyl chloride are not included in the COPC list. These compounds need to be included in the COPC lists for the soil and groundwater at CAOC 24.**

Response

The Navy agrees each of these compounds should be on the list for groundwater and soil. As indicated in the text, all of these compounds will be analyzed for in groundwater during Phase II, and in soil during the soil gas survey. Additional soil samples for VOCs may be specified after the soil gas survey.

87. **Page A24-23. It is stated that mud rotary drilling will be used to drill the borehole for the deepest well of the proposed well cluster. The well will be used for groundwater quality monitoring purposes. Please provide additional information on how the other two wells will be installed.**

Response

The mud rotary drilling allows for the collection of borehole geophysical data. The other wells will be drilled and constructed according to the provisions of the Phase II SAP.

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