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

December 4, 1992

Stephen Chao
Project Manager
Western Division
Naval Facilities Engineering Command
900 Commodore Way, Bldg. 101
San Bruno, CA 94066-0720

Subj: Draft Final Phase I Site-Wide Ecological Assessment Work Plan Comments

Dear Mr. Chao:

The United States Environmental Protection Agency (U.S. EPA) has reviewed the subject document. Enclosed please find comments made by the U.S. EPA's ecologist. Denise Klimas of the National Oceanic and Atmospheric Administration has been out of the office during most of the comment period. Her comments will be sent to you a few days later.

Since the U.S. EPA requested to expand the OU 6 Remedial Investigation into a Site-Wide Ecological Assessment (SWEA), there has been little communication between the Navy, its contractors and the regulatory agencies. The lack of communication has resulted in some of the major comments made by the agencies on the Draft OU 6 RI Work Plan remaining unaddressed.

The U.S EPA suggests that a meeting be arranged to discuss the Draft Final Phase I SWEA Work Plan comments in order to ensure ultimate approval of the Work Plan. Based on our past communications, we believe that we can resolve the remaining deficiencies in the work plan during an informal dispute resolution period. Therefore, upon consultation with the FFA Parties, we are extending the time period for initiation of formal dispute to January 18, 1993. Within the next 30 days, we would like to see you prepare a Technical Memo addressing our comments on Sections 3-6 of the Workplan, as outlined on page 2 of our attached comments, so that this work can proceed. We can negotiate a submittal date for the revised workplan and dates for the submittal of the various Ecological Assessment reports during the informal dispute resolution period.

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If you have any questions, please feel free to contact me at (415)744-2386.

Sincerely,

for Lida Tan
Remedial Project Manager

cc: Elizabeth Adams (RWQCB)
Cyrus Shabahari (DTSC)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
RESEARCH AND DEVELOPMENT
OTTRS/Technical Liaison Program

3 December 1992

MEMORANDUM

FROM: Joseph Greenblott, ORD Technical Liaison-Region 9

TO: Lida Tan, RPM-Region 9
Roberta Blank, RPM-Region 9

TOPIC: Comments on Draft Final Phase I Site-Wide Ecological Assessment Work Plan: Naval Air Station, Moffett Field, California

The following comments pertain to the 3 November 1992 Draft Final Phase I Site-Wide Ecological Assessment Work Plan: Naval Air Station, Moffett Field, California, prepared by PRC Environmental Management, Inc. and James M. Montgomery, Inc. under CLEAN Contract No. N62474-88D-5086, Task Order 0134.

GENERAL COMMENTS

This draft final workplan is a vast improvement over the previous draft. The Navy and its contractors are to be commended for their efforts. The workplan, however, still does not address many critical issues discussed in previous comments and at agency meetings. While it is EPA's desire to begin work on this ecological assessment with due haste, we must also ensure that the approach is consistent the good science and makes the most efficient use of resources and data.

The approach that EPA supports is an iterative, phased approach. The Phase I assessment involves summarizing and evaluating all available information on the site so that additional data gathering efforts will be highly productive. It is hoped that the detailed comments contained in this memorandum will help to improve understanding of EPA's approach to ecological assessments.

The overall goal of the Phase I assessment should be to develop a site conceptual model by which a detailed and coordinated field investigation can be planned. That site model will be refined as more detailed information is collected and analyzed in subsequent phases. The rationale for this approach is that it will save time, money, and generate high quality data. Phase II field studies should be based on the conceptual model developed in the Phase I assessment, and incorporate sampling and analyses for both biotic and abiotic parameters, including contaminants. EPA considers this approach to

hold the greatest promise for conducting a thorough, yet efficient ecological assessment that addresses the concerns of all interested parties.

Although I do not recommend approval of this workplan at this time, I do recommend that some sections of this workplan be approved and that work begin as soon as possible, conditional on satisfactorily addressing the comments contained in this memorandum and those supplied by the other regulatory agencies and the various Natural Resource Trustees.

The following activities are recommended for approval upon satisfactorily addressing relevant comments:

> Sections 3.0, 4.0 (with the exception of 4.4--Phase I sampling should be conducted only in Northern Channel: a detailed Field Sampling Plan should be prepared that includes specific sampling and analytical objectives and rationale; sampling, sample handling, and analytical procedures; and data management and treatment), 5.0, 6.0 (excluding 6.3 and 6.6).

Comments relevant to these sections should be addressed in a technical memorandum that can be appended to this workplan to avoid any additional delays; however, the workplan should be rewritten as a Phase I workplan before being approved.

Sections 7.0 and 8.0 should be excluded from the Phase I assessment and substituted with a section for developing a site conceptual model. Sections 9, 10 and 11 should be modified to address the specific work to be conducted under the Phase I assessment. An additional section should be added to identify and present data gaps and make recommendations for the Phase II assessment approach.

SPECIFIC COMMENTS

2.0 PURPOSE AND OBJECTIVES

Page 2, paragraph 2

> The text states: "The purpose of the site-wide field investigation is to determine if contamination exists in the storm water retention ponds or wetlands in or adjacent to the facility and to assess whether there is risk posed to ecological receptors in those areas." As stated in my comments on the 3 July draft workplan for OU6, "Figure 7 of the draft work plan (Previous Soil and Sediment Sampling Locations with BNAs/PCBs/Pesticides Above Reporting Limits) and Figure 8 (Previous Soil and Sediment Sampling Locations With TPH Above Reporting Limits) [figure 8 and 9 of the draft final workplan] clearly show sufficient numbers of contaminated samples in and around sensitive habitats to indicate a potential risk to ecological

r ceptors...," because there are potentially complete exposure pathways. Since risk (defined as the chance of injury, damage, or loss) has already been established, one goal of the overall ecological assessment should be to "evaluate the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors[1]." Objectives of the ecological assessment should include establishing remediation goals that are protective of the environment, and evaluating the efficacy of remedial options in meeting those goals.

Page 3, paragraph 1

The workplan states that it is a site-wide workplan, but then states that it addresses only OU6 and portions of OU2, because, "... potential impacts from other OUs is much smaller, and therefore they are not addressed in this work plan." This is not consistent with EPA's definition of a site-wide ecological assessment. This reason why EPA requested expansion of the workplan to include the entire site was to evaluate all potential impacts on ecological receptors that result for on-site contamination. No OUs should be excluded from evaluation at this time. Groundwater may serve as a contaminant source to or a sink from sensitive habitats. In addition, treatment of groundwater can drastically impact wetlands and other surface waters by altering their hydrology. Upland contaminated soils, golf courses, and paved areas (OUs 1-3) may likewise be sources of contaminants to sensitive habitats through non-point source contributions and by contributing to groundwater contamination.

Page 3, paragraph 3

Change the second sentence to read "These conditions include the presence of chemical contaminants in soil and groundwater and the potential that some of these chemicals are reaching adjacent or on-site streams, wetlands, storm water retention basins, terrestrial, or marine environments."

Page 4, paragraph 1

While a "weight-of-evidence" can a be useful complement to a stressor-response-based risk assessment, EPA prefers to make decisions based on stressor-response relationships and prefers that uncertainty be quantified in a probabilistic manner. This approach offers much greater certainty in decision-making than does planning an investigation based on a weight-of-evidence approach, which relies on professional judgement to a greater extant. A probabilistic risk assessment will report potential risk as a probability of some magnitude of impact to a receptor at a given exposure.

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1 Framework for Ecological Risk Assessment. February 1992. U.S. Environmental Protection Agency, Risk Assessment Forum. EPA/630/R-92/001, pp2.

Page 4, paragraph 2

Sections no. 1 (Background and Site Description) and 2 (Plan for Site Characterization) should be included in the Plan for Problem Formulation (Section 3). Problem formulation is similar in concept to developing the conceptual site model, and is a product that begins to be developed in the Phase I Assessment. It includes site description. For the Phase I assessment the site characterization, as described, should be based on available data and the results of the site reconnaissance survey. Additional field data should be collected, as necessary, during Phase II.

3.0 BACKGROUND AND SITE DESCRIPTION

Page 5

Much of the information contained in this section, together with additional data to be gathered as part of the Phase I ecological assessment, will be useful in developing a conceptual site model for the Phase I assessment. This model should integrate what is known about the site (e.g., surface features, hydrological characteristics, habitats, biotic receptors, and both chemical and non-chemical stressors) and make qualitative predictions about contaminant fate and transport and exposure to ecological receptors. These predictions (hypotheses) should be used to focus and coordinate the field studies in Phase II.

3.2 CHARACTERIZATION OF OPERABLE UNITS

Page 9, paragraph 1

While OUs other than OUs 6 and 2 may not support sensitive ecological receptors, they can contribute to impacts on sensitive habitats, as previously discussed in these comments.

4.0 PLAN FOR SITE CHARACTERIZATION

4.1 OBJECTIVES

Page 12

Change the second sentence to read, "The primary objectives of the Phase I site characterization are to:"

Change the third objective to read, "Evaluate, through direct observation and reported information, the general functional condition and boundaries of surface water bodies and wetlands on and around the site."

Change the fourth objective to read, "Evaluate potential exposure pathways of sensitive species and biological communities to contaminated environmental media."

4.2 CHARACTERIZATION OF TERRESTRIAL HABITATS

Page 12

Since the text states that the objectives of the habitat survey include identifying the nature and composition of aquatic habitats, change the heading to read: "4.2 CHARACTERIZATION OF HABITATS"

Page 12, paragraph 3

Change the first sentence to read, "The objective of the Phase I habitat survey..."

Change the third bulleted activity to read, "Recommend species or groups of species..." Selection of sensitive species and other assessment endpoints should be done within the context of habitats and the larger landscape ecology. Screening out species is not appropriate for Phase I: however, the data supplied in Phase I should be used to focus future assessment efforts.

4.2.3 Field Assessments

Page 15, paragraph 2

The text states the objective of the site survey, "... is to provide an inventory of terrestrial fauna on site." A valid inventory of the terrestrial fauna at the site cannot be accomplished without conducting an extensive wildlife survey performed over several seasons. EPA does not consider an extensive wildlife survey to be necessary for the Phase I ecological assessment; rather, the Phase I assessment should include a reconnaissance survey (or surveys) which will identify habitats and record observations of wildlife as a secondary objective. This information should be compiled with previously reported information on wildlife expected to be present on or that utilize resources at the site, as well as areas potentially impacted by contaminants from the site or potentially impacted by remediation of contaminated media. Detailed wildlife surveys should be postponed until the Phase II ecological assessment and should focused on measurement endpoints selected on the basis of data from the Phase I assessment. Such field work should be coordinated with non-biological sampling and analysis to be most efficient and to provide the highest quality data.

4.2.6 Data Products

Page 16, paragraph 1

Change the third bullet to read, "Recommendation of species or groups of species..."

Page 16, paragraph 2

The final report should integrate all information on habitats, species, and contaminant exposure and toxicity into a conceptual site model site that can be used to focus the Phase II field investigation.

4.3 WETLANDS DELINEATION AND FUNCTIONAL ASSESSMENT

Page 17, paragraph 2

What is the objective of the intensive effort in wetland delineation during the Phase I assessment? The U.S. Army Corps of Engineers (USACoE) Wetland Delineation Manual describes the criteria for application of Clean Water Act Section 404, and as such constitutes a regulatory-defined wetland. However, for the Phase I assessment we are interested in functionally-defined habitats that may impacted or sensitive to chemical stressors or adversely impacted by remediation. These are not necessarily included in USACoE-defined wetlands. In addition, the State may have a regulatory definition that may be substantially different from the USACoE definition. A more appropriate definition may be that used by U.S. Fish and Wildlife Service, which requires only one of the three criteria to be met for an area to be considered a wetland. A better approach for a Phase I habitat characterization would be to characterize each habitat according to ecological definitions, as agreed upon by the experts participating in the proposed field reconnaissance survey.

4.3.2 Wetlands Delineation Field Program

Pages 18-19

It is recommended that activity 5 be amended to use the U.S Fish and Wildlife wetland criteria or any State criteria that may exist, or any other means of "functionally" describing a habitat more ecologically applicable than the USACoE regulatory criteria. The purpose of the Phase I ecological assessment is to develop a conceptual model that will support the planning of a more intensive sampling and analysis effort (if one is determined to be necessary) in the Phase II ecological assessment. To develop this model, it is important that the Phase I assessment be inclusive, and not exclude any habitats from consideration prior to agency evaluation. Phase I requires only a qualitative habitat characterization developed from available information and the reconnaissance survey. The intensive effort described in the workplan, beginning with activity number 3,

should be postponed until the Phase II assessment (if it is necessary at all). To make the most effective use of resources and data, these activities should be coordinated with Phase II biotic and abiotic sampling and analyses in the wetlands. Such coordination will minimize the disturbance to sensitive habitats and provide better data than would be possible through separate investigations.

4.4 SAMPLING OF ENVIRONMENTAL MEDIA

Page 22

While the revised workplan has addressed some of the concerns raised in the agency meeting of 31 August 1992 and in my written comments of 17 August 1992 regrading the adequacy of the proposed field investigation (see 25 November 1992 letter from James M. Montgomery, Inc. to Stephen Chao: NAS Moffett Field Remedial Investigation/Feasibility Study Responses to Comments), others concerns have not been adequately addressed. In addition, sampling and field activities, other than a site reconnaissance survey for habitat characterization, were to be planned as part of the Phase II ecological assessment, as agreed to at the agency meeting of 31 August 1992.

The specific data quality objectives for each aspect of the field investigation have not been negotiated. While some explanation has been provided for the location of sample stations, the rationale for the number of sampling locations also is not provided, and the number and location of sampling stations is relatively unchanged from those proposed in the previous draft of this workplan (with the exception of the addition of 4 sampling stations in OU6 on the dry land south of the Navy Storm Water Retention Pond and east of the NASA/Navy Storm Water Retention Pond). Is the sampling array statistically designed and based on known or estimated spatial variability? Will the results of the proposed field investigation satisfy the need for evaluating the extent of contamination, given the large spatial variability observed during previous sampling of environmental media? Will negative results have sufficient statistical certainty to eliminate the need for further field activities, or will the results only provide a basis for disputes between agencies? The rationale for proceeding in a step-wise process is to insure (1) the acceptability of both data and data interpretation to all agencies, and (2) that the assessment proceeds without major procedural or administrative interruptions.

As per my comments to the previous draft of this workplan, I recommend an intensive synaptic field investigation be conducted as part of the Phase II investigation. Because this will require more detailed planning and inter-agency cooperation, it is again recommended that the majority of this section be omitted from the Phase I workplan, with the following exception:

4.4.1 Sampling Locations

Page 22, paragraph 5

Northern Channel. Because no data have previously been reported, EPA concurs with the need to conduct a preliminary evaluation of sediment, water, and biota contamination in the Northern Channel. The approach outlined in this section is adequate for this purpose.

5.0 PLAN FOR PROBLEM FORMULATION

Page 24

Problem formulation is not a stage--it is a process. It has its beginnings in the Preliminary Site Assessment only begins to be refined during the development of the Phase I workplan, and continues as an iterative process throughout the ecological assessment. As such, the objectives and scope of the project will likely change significantly and become more specific as a result of new information.

5.1 IDENTIFICATION OF CONTAMINANTS OF CONCERN

Page 24

Identification of contaminants of concern should be inclusive during the Phase I assessment. Although this point was disputed in the response to my comments on the previous draft workplan, all contaminants should be considered during the Phase I ecological assessment as being *de facto* contaminants of concern when and where there are potentially complete exposure pathways. This should be part of the site conceptual model that should include a discussion of contaminants in relation to potential exposure to and impacts on ecological receptors, as well as contaminant concentrations relative to background levels. Recommendations for refinement of contaminants of concern should be based of this information; however, the final determination should be the result of discussion and agreement with the regulatory agencies and Federal and State Natural Resource Trustees. No chemical should be eliminated from consideration at this stage.

5.2 IDENTIFICATION OF ECOLOGICAL RECEPTORS

Page 25

The list of ecological receptors should be inclusive for the Phase I assessment. It is not appropriate at this stage to eliminated any species or habitat from consideration. The Phase I assessment report should recommend assessment and measurement endpoints. Final selection of assessment and measurement endpoints should be made collectively by the regulatory agencies, DOD and the other Natural Resource Trustees.

6.0 PLAN FOR EXPOSURE ASSESSMENT

6.3 QUANTIFICATION OF RELEASE, MIGRATION, AND FATE

Page 27, paragraph 3

Use of equilibrium partitioning models are only valid for non-polar organic compounds and some metals. In addition, since sediment ingestion may be an important exposure pathway for benthic and epibenthic fauna, pore-water equilibrium partitioning may significantly underestimate exposure. Bioassays and toxicity tests, as part of the Phase II investigation, should provide better empirical data than modeling.

6.3.1 Estimating Exposure in Wetland Soils/Sediment from Organic Contaminants: Equilibrium Partitioning

Page 28, paragraph 3

The recommended use of the equilibrium partitioning model is based on the assumption that ingestion of sediment or soil is not a significant exposure pathway. There are insufficient data to either accept or refute this assumption. Sediment quality criteria should not be based on based on this model without further identification and evaluation of significant pathways of exposure.

6.4 IDENTIFICATION OF EXPOSURE PATHWAYS

Page 29, paragraph 1

For the Phase I ecological assessment, it is important to consider all potential exposure pathways. Justification for exclusion of an exposure pathway should be made as a result of the Phase I assessment and subsequent assessment activities. Information provided in the Phase I report should be used to focus the assessment on significant exposure pathways.

6.4.1 Aquatic Exposure Pathways

Page 29, paragraph 2

Bio-accumulation through the foodweb and transfer of contaminants between trophic levels often represents significant routes of exposure for higher trophic levels. Evaluation of these exposure pathways is absolutely essential. While a quantitative evaluation of these pathways is not be possible as part of the Phase I assessment, a qualitative assessment based on a conceptual foodweb is required. An objective of subsequent field investigations may be to quantitatively evaluate these pathways.

6.4.2 Terrestrial Exposure Pathways

Page 30, paragraph 1

All terrestrial exposure pathways should be evaluated in Phase I.

6.5 CHARACTERIZATION OF RECEPTORS

Page 30, paragraph 2

As stated previously in these comments, problem formulation is a process, not a discrete task. Receptor characterization should be inclusive for the Phase I ecological assessment. Assessment and measurement endpoints will be selected cooperatively by the regulatory agencies, DOD and the other Natural Resource Trustees. This will be based, in part, on the information provided and recommendations made in the Phase I assessment report.

Page 30, paragraph 3

Change the fourth bullet to read, "Benthic invertebrates within potentially impacted waterbodies, including the northern channel, golf course ponds, storm-water retention ponds, wetland and intertidal habitats."

6.6 ESTIMATION OF EXPOSURE POINT CONCENTRATIONS

Page 31

When using exposure-point concentrations as a tool to predict ecological impacts, consideration must be given to the fact that exposure point concentrations, as defined in this workplan, do not necessarily reflect bio-availability or behavioral factors that effect exposure and dose. With humans, these considerations are accounted for in referenced doses or slope factors; however, these dose-exposure relationships have not been established for most ecological receptors, nor should they be. Direct bio-assays and toxicity tests that account for these factors can and should be performed in the Phase II assessment.

Page 31, paragraph 4

Change the first sentence to read, "Predicted exposure point concentrations will be presented in tables ..." This estimation should be based on data obtained in the Phase II field investigation that includes bioassays and toxicity tests. Currently, there is insufficient data to make reasonable quantitative predictions/estimates of exposure and impacts. This activity should be postponed to the end of the Phase II assessment.

7.0 PLAN FOR ECOLOGICAL EFFECTS ASSESSMENT

Page 32

This approach will not substitute for site-specific empirical data because of the impossibility of estimating the uncertainty of the data. Ecological effects will be quantitatively assessed from empirical data derived from the Phase II field and laboratory investigation.

8.0 PLAN FOR RISK CHARACTERIZATION

Page 33, paragraph 4

Neither AWQCs or the sediment quality data were designed to be used to assess adverse ecological effects from Superfund sites. The AWQCs were developed as part of the NPDES program for end-of-pipe discharges, and the Long and Morgan sediment quality data were prepared from literature-reported data as part of the NOAA Status and Trends program. Neither are can be applied as stressor-response estimates with any confidence to Superfund sites.

8.1 AQUATIC EFFECTS CHARACTERIZATION

Page 33, paragraph 1

The assumption that exposure is continuous and equal to surface water contamination concentrations may be erroneous. Contaminant concentrations may fluctuate due to variations in precipitation and water levels. Exposure concentrations may also vary seasonally and diurnally, depending on species' life stages and behaviors. See above comments with regard to AWQCs, etc. Establishing SQCs should be a final product of the ecological assessment. SQCs should be recommended as one of the last activities of the ecological assessment, after completion of the field and laboratory investigations, and should be based on site-specific empirical data.

8.2 TERRESTRIAL ECOLOGICAL EFFECTS CHARACTERIZATION

Page 34, paragraph 2

Because "...the majority of available toxicity information for NAS Moffett Field-related chemicals is for species other than those expected at the facility..." literature derived data is inappropriate. The ecological effects assessment should be based on site-specific field- and laboratory-derived empirical data obtained as part of the Phase II assessment.

8.4 POTENTIAL HABITAT MODIFICATION

Page 35, paragraph 1

Change the last sentence to read, "Modifications may include alterations of soil, sediment, groundwater, or freshwater flow environments, or alterations to the quality of these environments, as well as other alterations that would affect habitat quality.

8.5 RISKS RELATED TO TOXIC EFFECTS OF CONTAMINANTS

Page 35

The proposed method for assessing potential adverse effects, the hazard quotient method, can be useful in screening potential exposure pathways or in developing priorities from among several different sites. Its applicability for assessing the site-specific adverse effects are limited and may be considered at best a preliminary step in an ecological assessment that is useful in developing a workplan. Further, effects levels derived from the literature or laboratory studies designed for extrapolation to humans, because of the organisms and methodologies used and the inability to calculate realistic uncertainties, have little validity in ecological assessments. Because of the number of species involved, variable sensitivities of individual species and life stages to chemical stressors, sub-acute impacts that may have dramatic effects of populations, potential bio-accumulation, and the complexity of trophic level interactions, use of a hazardous quotient for anything other than a screening tool is unacceptable in ecological assessments. Even when used as a screening tool, hazard quotient models should be based on dose and toxicity data that are derived from or supported/verified by field sampling, laboratory analyses, bioassays, and toxicity tests.

8.6 PRESENTATION OF RISK

Page 35

See above comments regarding use of published water and sediment quality criteria. EPA prefers that, when possible, risk be expressed as a stressor-response function, and that uncertainty be quantified and probabilistic.

9.0 UNCERTAINTIES

Page 36

When possible, uncertainty should be treated statistically, and minimized through a consistent DQO process and statistically designed and interpreted field and analytical investigations.

10.0 DATA QUALITY OBJECTIVES

Page 37

The discussion of DQOs will necessarily continue and evolve throughout the assessment. Confidence levels will need to be negotiated prior to Phase II to statistically design field studies.

11.0 SAMPLING METHODOLOGIES

Pages 38-39

There is no discussion of biotic sampling and analysis methodologies. All discussion of sampling and analytical methodologies should be included in an independent Field Sampling Plan for each field/laboratory study conducted as part of the ecological assessment. This will be necessary as prior to initiating any Phase I or Phase II field work.