

CLEAN

Contract No. N62474-88-D-5086

Contract Task Order 0208

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**NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA**

**HORIZONTAL CONDUIT STUDY
DRAFT FINAL FIELD WORK PLAN
RESPONSES TO AGENCY COMMENTS**

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July 2, 1993

**RESPONSE TO COMMENTS ON
HORIZONTAL CONDUIT STUDY
DRAFT FINAL FIELD WORK PLAN**

JUNE 30, 1993

This report presents point by point responses to regulatory comments on the "Draft Final Field Work Plan" for the horizontal conduit study prepared March 23, 1993 by PRC Environmental Management, Inc. (PRC) and Montgomery Watson for Naval Air Station (NAS) Moffett Field, California. Mr. Michael Gill of the U.S. Environmental Protection Agency (EPA) submitted comments in a letter dated April 22, 1993, and Ms. Elizabeth Adams of the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), submitted comments in a letter dated April 26, 1993.

Comments from Mr. Michael Gill, EPA

GENERAL COMMENTS

Comment No. 1: A logical approach of how the objectives, as presented in Section 2.0, will be accomplished has not been described in this work plan.

EPA realizes that the work plan itself is an approach. However, additional sampling to be conducted during Phase II is dependent upon the results of the Phase I investigation, yet the strategies to be employed to determine the media and locations for additional sampling are not presented.

For example, in order to map the storm drain and sewer systems, the Navy states that pipeline inverts will be surveyed and wire tracing will be used to resolve connectivity and location uncertainties for pipes not shown on the existing maps. Pipeline elevations will be interpolated

between measured manhole locations. What is not described in the work plan is whether cross-sections of pipelines will be prepared and compared to known water table elevations. This type of strategy would determine where pipelines lie below the water table and assist in Phase II sampling decisions that ultimately will determine the extent of horizontal conduits.

EPA recommends that a section be added to the work plan that presents an overview of the strategies that will be used to accomplish the objectives. In particular, please describe what interpretive methods will be used to determine where the storm drain system and sanitary sewer lines intersect the water table. This would be a necessary first step in addressing the third objective of the study to assess the potential effects of these man-made horizontal conduits on groundwater flow patterns and potential influence on solute transport.

Response:

Elevation and pipeline connection data will be compiled and then organized using a Geographic Information System (GIS). The elevation data collected during Phase I will be analyzed using GIS techniques (in GEO-SQL) to evaluate the flow characteristics and determine system segments subject to seasonal flooding, infiltration, or exfiltration. Pipeline segments that may be subject to infiltration will be determined by comparing system elevation data to potentiometric surface data. A paragraph containing this information has been added to Section 5.1.3 of the field work plan.

Comment No. 2:

Phase II sampling should be justified. To assist in a cost effective Phase II sampling effort, please describe what interpretive methods will be employed to determine whether the storm drain system or sanitary sewer lines preferentially transport groundwater contamination. Phase II sampling media and locations, determined by

an analysis of the Phase I investigation and a logical strategy, will preferably be targeted and cost effective. Please provide justification for Phase II sampling media and locations prior to proceeding with this phase of the study.

Response:

The Horizontal Conduit Study is being conducted in two separate phases so that Phase I data can be used to define and justify the locations, media, and analytical parameters for the Phase II investigation. The Phase I work plan in Section 5.1.3 indicated that surveying, wire tracing, water sampling, and flow measurements will be conducted in Phase I. The water samples will be collected at strategic locations, which may allow the initial determination of pipeline segments that are receiving groundwater from the regional volatile organic compound (VOC) plume. The pipeline flow measurements will also allow the definition of pipeline segments that are subject to infiltration or exfiltration by comparing upstream versus downstream flows. The work plan will be amended after Phase I to include information and rationale for the Phase II sampling locations.

Comment No. 3:

Please summarize what strategies will be employed during the investigation to determine interferences and/or impacts by the pipelines on the following geologic or manmade features:

- interferences with sand channels;
- interferences with pumping stations; and
- interferences with roads and buildings due to compaction.

Please state whether an analysis of the effect of these features in the potential flow of contaminants through horizontal conduits will be presented as part of the study.

Response:

The relationship and potential impact on flow conditions of horizontal conduits to sand channels and pumping stations will be evaluated during Phase II. During Phase II, pipeline segments exhibiting anomalous flows will be studied to determine the nature of the infiltration or exfiltration. The effects of compacted soils around horizontal conduits near buildings and roads will not be analyzed in this investigation since compaction would tend to decrease soil permeability. The flow characteristics of backfill materials will be addressed in Phase I through the collection of soil samples for analysis of permeabilities adjacent to pipelines and in native undisturbed soils adjacent to pipeline trenches. The potential effects of pipeline backfill materials on flow will be investigated and addressed in this investigation.

Comment No. 4:

The work plan states in Section 5.1.5 that information from previous investigations will be incorporated into this study including information from the North Base study. EPA requires clarification as to whether an analysis of horizontal conduits potentially directing contaminants into the wetlands will be conducted. TCE and 1,2-DCE have been detected in groundwater samples in these sensitive areas.

Response:

One of the objectives of the Horizontal Conduit Study is to assess whether the subsurface storm drain and sanitary sewer systems are providing conduits for the accelerated transport of the regional VOC plume. Another of the objectives of this study is to evaluate whether the storm drain system is transporting contaminants of concern from known Navy sources to the wetland areas where the storm drain system historically discharged and presently discharges.

Comment No. 5:

Although the cover page says this document is "Final," it is being reviewed as a draft, since no versions have been delivered before.

Response:

Comment noted. A revised cover page was later sent out indicating that the document was a "Draft Final" version. The next version, which will include the responses to agency comments, will be designated a "Final" version.

SPECIFIC COMMENTS

Comment No. 1:

Section 2.0, Page 3, 1st Paragraph

This section lists the underground infrastructure at NAS Moffett Field that could act as horizontal conduits. Additional underground structures that may or may not be present at the facility are drainage tiles. Clay tiles are often used to drain land overlying seasonal high water tables. Such conditions occur at NAS Moffett Field. Please respond as to whether the possibility of drainage tile lines being installed at the facility has been investigated.

Response:

The Navy has determined that "french drains" exist in the runway area. These lines were installed within the aggregate base of the runway to allow the removal of excess groundwater from the aggregate base. These lines are located outside of the regional VOC plume and so are not being investigated at the same level of detail as the storm drains and sanitary sewers underlying the regional VOC plume. The french drains will be investigated to determine their locations for further reference and to determine their effects on groundwater flow patterns beneath the runway area.

Comment No. 2:

Section 5.1, Page 6

The final sentence of the second paragraph requires further clarification. Limited sampling will be conducted to assess the

potential value of future water and sediment sampling within the storm drain and sanitary sewer systems. A response to general comments 1 and 2 may help to clarify what strategy will be used to determine Phase II sampling locations.

Response:

The limited sampling described in Section 5.1 involves the collection of undisturbed formation samples and utility line backfill samples at the locations indicated in Figures 4A through 5D. Undisturbed samples will be analyzed for triaxial permeability rates per ASTM method D-5084 or EPA-9100 as applicable. These samples are intended to determine whether the permeability of the material in the backfill zone adjacent to the pipelines is the same as the undisturbed native materials. Soil samples corresponding to (or associated with) the permeability samples will also be collected for sieve analysis per ASTM Method D-422 to assist in soil classification.

Comment No. 3:

Section 5.1.2, Pages 18 and 19

During Phase I, 10 water samples will be collected from the storm drain system and 7 water samples will be collected from the sanitary sewer system. The Navy states that these system water characteristics will be compared to groundwater characteristics. The Navy does not explain the purpose for comparing the system water characteristics to groundwater characteristics, nor is a rationale for the choice of system sampling locations presented.

- Please discuss the strategy for preliminary water sampling and present the rationale for the choice of sampling locations.
- Were sample locations chosen in pipelines that are potentially in contact with groundwater (i.e., pipelines that are located below the seasonal high water table)?

Response:

The Phase I water sampling locations were selected to provide information on the general characteristics of system segments. The presence of compounds of concern in the system at concentrations similar to groundwater will indicate that groundwater infiltration may be occurring. The Phase I survey data will allow the Phase II investigation to focus on system segments subject to groundwater infiltration from the regional VOC plume.

Comment No. 4:

Section 5.2, Page 20

The Navy states "factors such as pipeline condition, potential for infiltration or exfiltration...will be evaluated during Phase II of the horizontal conduit study." Video surveying will be performed during the investigation which will assist in documenting infiltration into or exfiltration out of pipelines. Please describe other techniques that will be employed to determine locations of infiltration into or exfiltration out of the pipelines.

Response:

Video surveying may be conducted to locate infiltration and exfiltration locations. Additionally, the Navy will collect flow measurements at various manholes throughout the study area to assess whether flows through the system are increasing or decreasing. The flow data, when used with the surveying results, will help to identify pipeline segments that may be influenced by groundwater and may be subject to infiltration if below the water table or exfiltration if above the water table.

Comment No. 5:

Section 5.2.1, Page 21

This section qualifies which laboratory methods will be used to analyze soil and sediment samples. EPA Method 8020 for benzene,

toluene, ethylbenzene, and xylenes (BTEX) is listed. Since samples will already be analyzed by an EPA CLP Method for volatile organic compounds (VOCs), EPA Method 8020 would be redundant. Method 624 measures benzene, toluene, and ethylbenzene and Method 8240 measures benzene, toluene, ethylbenzene, and total xylenes.

- Is there a reason to retain Method 8020 from the list of soil and sediment analytical methods?
- Will both Methods 624 and 8240 be used to analyze VOCs?

Response:

This section of the work plan has been revised to indicate that the soil and sediment samples will be analyzed using CLP SOW 1990 methods for volatile organic compounds. EPA methods 8240 and 8020 will not be used.

Comment No. 6:

Section 7.1, Page 30

Elevation and pipeline connection data will be compiled and then organized by a geographic information system (GIS). As an extension to this approach, EPA suggests utilizing GIS analytical techniques to calculate where the pipelines pierce the groundwater table. This could be accomplished by creating a data set representing the elevations of the pipeline segments and comparing it to an elevation model representing the groundwater table.

Response:

See response to General Comment 1.

Comment No. 7:

Section 10.0, Pages 37 and 38

The text mentions that Phase I field activities are expected to take place in Feb/March 93, yet the chart on page 38 shows these on a

separate schedule. Please explain. The work plans should precede the field work.

Response: The text in Section 10.0 and Figure 12 have been corrected and are now in agreement. Both have been updated to reflect the current schedule.

Comments from Ms. Elizabeth Adams, RWOCB

GENERAL COMMENTS

Comment No. 1: The Horizontal Conduit Study is an opportunity to evaluate the pathways of contamination transport on site. Our agency is concerned with not only contaminant transport within Moffett Field, but any potential for contamination to be leaving the site through horizontal conduits. Pathways within the site and exiting the site should be part of the potential conduit evaluation during Phase I, and be used to inform the decisions regarding sampling points during Phase II. How will the data from Phase I be reported? The work plan for Phase II sampling should include rationale for sampling points based on the findings from Phase I.

Response: The data collected during Phase I will be used to prepare a revised work plan, which will include all the available information about the potential conduits from Phase I, will describe the activities to be conducted during Phase II, and will include the sample rationale.

Comment No. 2: This work plan needs to include an evaluation of horizontal conduits for contaminants other than just total petroleum hydrocarbons (TPH) and volatile organic compounds (VOCs). There is data which shows the presence of PCBs in the sediments within the storm water retention

ponds at the end of Zook Road and Lindburg Avenue and within the sediments outside of the building 191 pump station in the Navy Channel. Both these areas have been subject to storm water discharges and potential sources for this contamination should be included within the scope of this study. Pesticides have been detected in the soil and sediment samples taken from the Lindburg Road ditch and the storm water retention pond. The sources of these contaminants may be from the storm drains acting as a horizontal conduit. All soil and sediment samples in this area should be analyzed for both pesticides and PCBs.

Response:

The presence of pesticides and polychlorinated biphenyls (PCBs) in the sediments in the storm water retention ponds and the Navy channel will be evaluated during the site-wide ecological assessment. The purpose of the Horizontal Conduit Study is to evaluate whether the subsurface infrastructure is serving as a conduit for relatively accelerated migration of contaminated groundwater from known on-base and off-base sources.

Comment No. 3:

In addition, the sediment samples taken from the storm sewers should be analyzed for metals. Since Moffett Field is a closing base, it is essential to conduct sampling and analyses to evaluate the storm sewer's contents in order to remediate any contamination present before transfer of the base occurs.

Response:

There are no known or identified metals sources at NAS Moffett Field. The purpose of the Horizontal Conduit Study is to evaluate whether the subsurface infrastructure provides conduits for relatively accelerated migration of contaminated groundwater from known on-base and off-base sources.

Comment No. 4:

Please provide some rationale as to why this study focuses primarily on the western side of the base. What is the potential for contaminants to migrate through horizontal conduits on the eastern side of the base? Both the east and west sides of the runway are subject to drainage structures and other potential conduits.

Response:

The Horizontal Conduit Study was developed to determine if the subsurface infrastructure is providing a conduit for the accelerated transport of contaminants in the regional VOC plume, and to evaluate whether contaminants are being spread through the system. Since the regional VOC plume is found only on the west side of the base, the primary emphasis of the horizontal conduits investigation is also on the western side of the base. The potential for contaminants originating from sites on the east side of the base to migrate through conduits on the east side of the base will be evaluated and addressed within the individual source control actions for the east side of the base.

SPECIFIC COMMENTS

Comment No. 1:

Section 5.1, Page 6

Phase I should evaluate the flow patterns of sediments and effluent within the storm and sewer lines, past and present discharge areas, and areas of sediment accumulation, as well as mapping the location of the system. Some analysis and evaluation of source pathways should be included in the scope of Phase I.

Response:

This evaluation is beyond the scope of the investigation. Sediments in the infrastructure will be analyzed only to aid in evaluating whether the subsurface infrastructure provides conduits for relatively

accelerated migration of contaminated groundwater from known on-base and off-base sources.

Comment No. 2:

Section 5.1.2, Page 19

Water samples being collected from the manhole inverts and sanitary sewer during Phase I should not be composited. The potential for volatilization of possible contaminants is too great to composite the samples. Water samples should also be analyzed for metals with detection limits which comply with the effluent limitation values for fresh water aquatic life on the enclosed table. These values are from the San Francisco Bay Basin Water Quality Control Plan.

Response:

Samples from individual manholes and sanitary sewers will not be composited. The intent of the work plan was to indicate that the sample from each individual manhole will be a composite of all of the individual lines flowing into the manhole. The word "composite" has been removed from the work plan. There are no known sources of metals at NAS Moffett Field.

Comment No. 3:

Are any sediment samples being taken from the sewers or manholes in Phase I?

Response:

Sediment samples from the sanitary sewers and storm drain systems will be collected only during Phase II.

Comment No. 4:

Section 5.2.1, Page 21

Please clarify how the field team will determine whether a suspected fuel source exists in order to gather soil and sediment samples for

TPH analysis. Will this be accomplished by field screening or by some other means?

Response: Sediment samples adjacent to known fuels sources will be tested for TPH contamination. The wording has been changed in the final field work plan.

Comment No. 5: Which EPA CLP method will be used to analyze VOCs in the soil and sediment samples? Soil and sediment samples should also be analyzed for metals and PCBs and Pesticides in areas which may be a potential source pathway for the PCB and Pesticide contamination already documented.

Response: Soil and sediment samples collected during Phase II of the investigation will be analyzed for VOCs using EPA CLP SOW/1990 methods. The wording in the final field work plan has been changed to clarify the CLP method that will be used for the analysis. There are no known sources of pesticide/PCB contamination at NAS Moffett Field.

Comment No. 6: Section 5.2.2, Page 22

Please clarify which method will be used to analyze the water samples.

Response: Water samples will be analyzed per EPA CLP SAS/1990 methods. This wording has been included in the final field work plan.

Comment No. 7: Section 6.1.2, Page 27

These soil samples should also be analyzed for PCBs in areas which may be a source to the present PCB contamination.

Response: There are no known sources of pesticide/PCB contamination at NAS Moffett Field. The locations listed in RWQCB general comment 2 are being evaluated in the site-wide ecological assessment and the operable unit (OU) 6 human health risk assessment.

Comment No. 8: Section 6.2.2, Page 28

This section needs more detail. The PRC SOP 6 outlines several methods for sediment sampling. The agencies need to know the methods which will be used in obtaining sediment samples from the various sample points: storm and sewer lines, manholes, utility lines, and any outfall areas which may be included in the scope of work.

Response: Sediment samples from thick cohesive sediment layers will be collected using a California Modified Split Barrel Sampler or, if loosely consolidated, a stainless steel sludge sampler. Samples from thin sediment accumulations will be collected using stainless steel collection spoons or trowels. This wording has been added to the final field work plan. Sediment samples from outfall areas such as the wetlands and the Northern Channel will be collected as part of the Site-Wide Ecological Assessment and OU6 Human Health Risk Assessment, and as described in the Final Site-Wide Ecological Assessment Work Plan.