



June 10, 1996

Mr. Stephen Chao
Department of the Navy
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Drive, Building 208
San Bruno, California 94066-5006

CLEAN Contract Number N62474-88-D-5086
Contract Task Order 0208

Subject: Horizontal Conduit Study Response to Comments and Errata Sheets

Dear Mr. Chao:

Enclosed are three copies of responses to comments made by the U.S. Environmental Protection Agency (EPA) regarding the Final Horizontal Conduit Study Report dated August 4, 1995. As requested by the regulatory agencies, errata sheets have been prepared in addition to response to comments. These errata sheets are also enclosed. Additional copies of the response to comments and errata sheets are also being distributed to regulatory agencies, project personnel, and interested parties.

If you have any questions, please call either of us at (303) 295-1101.

Sincerely,

A handwritten signature in cursive script that reads "Skip Dinges".

H.M. (Skip) Dinges, P.E.
Project Engineer

A handwritten signature in cursive script that reads "Michael N. Young".
for Michael N. Young
Project Manager

HMD/mlr

Enclosures

**HORIZONTAL CONDUIT STUDY
RESPONSE TO COMMENTS AND ERRATA SHEETS
MOFFETT FEDERAL AIRFIELD**

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**MOFFETT FEDERAL AIRFIELD
RESPONSE TO COMMENTS AND ERRATA SHEETS
FINAL HORIZONTAL CONDUIT STUDY REPORT**

This report provides PRC Environmental Management, Inc.'s (PRC's) responses to comments on the Final Horizontal Conduit Study Technical Memorandum dated August 4, 1995. The comments were submitted by the U.S. Environmental Protection Agency (EPA) in a letter dated September 20, 1995. Further explanation of the comments and potential responses were discussed during a conference call held on October 18, 1995.

GENERAL COMMENTS

Comment 1: The Introduction and Conclusion of the Horizontal Conduit Study Technical Memorandum should address the real potential that sources of VOCs to the sanitary sewer may be from discharges of chemical substances from facility activities to the sanitary and stormwater sewers, both in the past when it was a common practice and presently. Though the cation/anion study helps to interpret the water sample results and the origin of the water flows, it cannot positively prove the origin of all VOCs within the systems. For instance, in the sample from manhole C-8, the study showed a combination of groundwater and tap water; therefore occasional discharges of chemicals to the sewers cannot be overlooked as a potential source to the levels of contaminants in the system flows at that point.

Except for spills documented for stormwater permitting or compliance with the local sanitary sewer, most of the past discharges to both sanitary sewers and stormwater lines cannot be documented or proven at this time. The effects of these potential past discharges, to the system flow water and the environment, cannot be evaluated since sampling did not occur after the events. However, the presence of paint in the storm drain during the latest sampling, as well as the presence of phenol in the sewer water samples during the ERM/Aqua Resources investigation, clearly indicate that sporadic releases of chemicals do occur to these systems. For these reasons the report should accurately represent the possibility of past discharges to the systems in the Introduction and include these potential discharges from facility activities in its discussion of the data in the Conclusion.

Response: The Navy acknowledges the potential for illicit discharges of hazardous substances into the storm drain and sanitary sewer systems during the life of the systems. However, this study focused on the possibility of subsurface infrastructure providing a conduit for accelerated migration of contaminated groundwater from known sources. Based on the nature of the systems, particularly the sanitary sewer system, it can be assumed that a possibility exists and has existed for the disposal of hazardous chemicals into the systems. The fact that disposal has taken place and may continue to take place is irrelevant to the focus of this study.

The conclusion of the study has been changed to reflect the fact that any area of the base which the lines are subject to potential exfiltration, may have been impacted by disposal of hazardous chemicals upstream. Section 2.0 of the report has been changed to indicate that the report focuses on the present practices of disposal in the systems and that past practices may have had effects on the current state of contamination at Moffett Federal Airfield.

Comment 2: Data from this report show that VOCs are present in the system flows from groundwater infiltrating the sanitary sewer in areas that contain high VOC concentrations, including the westside aquifer area. This system flow is subject to exfiltration in the northeastern regions of the sanitary sewer that cross under the runway areas. Review of data generated by the video survey of the sewer lines in this area (9B-15) show many areas with broken joints, radial and long cracks. The potential for contaminated sewer flow to exfiltrate in these areas is high and therefore the Navy should recommend either mitigation actions to avoid the spreading of groundwater contamination to these areas and/or an investigation to determine the extent of the potentially impacted groundwater surrounding these lines. Was the sewer line east of manhole 15B surveyed? If so, what were the results?

Response: The conclusion of the report states that exfiltration of contaminated groundwater is a possibility in the northeastern regions of the sanitary system. The following is found in Section 9.11, Page 91:

"The sanitary sewer system provides this pathway through infiltration of contaminated groundwater into the lines and then transported to the Sunnyvale POTW. Some of this contaminated groundwater may exfiltrate in downstream areas where the sanitary lines are subject to seasonal exfiltration".

In response to the potential spreading of contamination in the reaches of the sanitary system subject to potential exfiltration, the Navy conducted a sanitary sewer rehabilitation project. The goal of the project was to reduce the volume of groundwater infiltrating into the system. The relining of the sanitary sewer line G from manhole G-10 to manhole G-2 was completed in January 1995. A short description of the project has been added to Section 9.11.

A review of the physical layout of the system reveals that the possibility of infiltration is greater than the possibility of exfiltration. In the areas of the sanitary system that are subject to possible infiltration the lines lie as much as 2 feet below the piezometric surface. This provides a much greater pressure gradient for flow than the probable maximum gradient of 4 inches in the area of exfiltration.

SPECIFIC COMMENTS

Comment 3: Figure 4-1, page 8. Various errors in this figure need correction. These include:

- Site 1 landfill is too small
- there are two golf course landfill #3's
- Site 24 not labeled
- there are two golf course landfill #2's
- there should be no Site 25; it is not in the legend

Response: *Figure 4-1 has been updated in accordance with the comments.*

Comment 4: Section 5.0, page 9. The discussion of the known sources should be revised to more accurately describe the VOCs found in the Building 88 investigation. The Navy is stating that it is only a source of PCE contamination even though low levels of TCE, up to 140 parts per billion (ppb), and other VOCs were found in the soils at Building 88.

PCE and TCE were found in the waste samples collected from Sump 66 in November 1985. TCE was also found in unsaturated soils during the Operable Unit 2 (OU2) West remedial action. The levels of TCE detected in the unsaturated soils were below

the action level specified in the Record of Decision. The action level was determined based on the potential for the leaching of TCE into groundwater at levels above MCLs. Based on information available, the Navy believes that the only possible source of Navy TCE contamination within the aquifer would be releases from Sump 66 or its lines and fittings.

PCE is used in this report as an indicator chemical to assist in the evaluation of the extent of contamination resulting from Building 88. The determination of the extent of contamination of the congeners of PCE resulting from activities at Building 88 is not necessary. The use of PCE as an indicator chemical helps to more closely determine where the infiltration and exfiltration may be occurring. Section 5.1 of the report has been changed to indicate that although both PCE and TCE contamination has resulted from operations at Building 88, PCE has been used as an indicator chemical.

Response: PCE and TCE were found in waste samples collected from Sump 66 in November 1985 (ERM 1986). TCE was also found in unsaturated soils during the Building 88 investigation. The levels found in the unsaturated soils, however, were below the action level specified in the Record of Decision (ROD). The action level was determined based on the potential for the leaching of TCE into groundwater at levels above MCLs. Based on information available, the Navy believes that the only possible source of Navy TCE contamination within the 11 and 12 aquifers would be releases from Sump 66 or its lines and fittings.

PCE is used as an indicator chemical to assist in the evaluation of the extent of contamination resulting from Building 88. The determination of the extent of contamination of the congeners of PCE resulting from activities at Building 88 is not necessary. Section 5.1 of the report has been changed to indicate that although both PCE and TCE contamination has resulted from operations at Building 88, PCE has been used as an indicator chemical throughout the report.

The mutual decision by the potentially responsible parties (PRPs) to contribute to the remediation of the regional plume allows the Navy to focus efforts on the collection and treatment of contaminated groundwater in the expanded Site 9 area regardless of the source and composition of contamination.

Comment 5: Section 7.3.1, page 24. The text should note that flow in the sanitary sewer system may be impacted by precipitation due to the common connection of drainage areas, such as the Aircraft Washrack #1 to the sanitary sewer.

Response: *The purpose of this section of the report is to discuss the discharge measurements which have been made during other investigations. No analyses or conclusions are provided in this report other than those given by the original authors. A review of the data however does indicate that the sanitary sewer system does exhibit significant response to rainfall. A contributing factor to this is connection of drainage areas and direct connections of roof drains to the sanitary sewer system. Section 9.5 of the report has been changed to indicate that based on historical studies, both the storm drain and sanitary sewer systems are likely impacted by precipitation.*

Comment 6: Section 8.1.1, pages 32 & 35, Steam System. The City of Sunnyvale allows up to 1,000 ppb total VOCs to their sewage treatment plant. These levels in the sump could be a potential problem if conduits to groundwater exist. Please include the chemical data associated with this sump and steam line in the report. Please annotate this steam line on Figure 8-15.

Response: *The location of the steam line is indicated on Figure 8-2. The chemical information for the sump is included as Table 1 attached to these response to comments. The levels found in the sump are similar to those found in groundwater in the area.*

Comment 7: Sections 8.3 and 9.4. The objectives for this study, as stated in the text, was to determine if porous trench material was providing a horizontal conduit for accelerated migration of contaminated groundwater. Sections 8.3 and 9.4 should clarify in which excavation areas this may be occurring due to the sandy silt soils or concrete backfill materials encountered, and identify the areas of higher permeability. Was the concrete backfill materials crushed concrete?

Response: *Section 8.3.6 states, in sentence two of paragraph two, that "Pipe bedding at this location consisted of poured concrete up to the spring line of the pipe." This section continues by stating that "Medium to fine sand encountered in VHHC-12 appears to indicate the presence of engineered backfill along this line." Engineered fill was not detected at any other excavation location. Although there are other pipes located in sand channels, if a pipe is located in a sand channel, there is no relative acceleration*

along the pipe in comparison to the sand channel. Section 9.4 summarized this correctly by stating that "Results of the grainsize analysis and permeability tests indicate that the backfill material of old construction, and in most cases new construction, used native material with similar permeability when compared to surrounding area soils. Except in localized instances, no accelerated transport of chemicals takes place in infrastructure backfill." The text is very clear and no changes are needed in either section.

Comment 8: Section 8.4, page 55, para 3. Please clarify this paragraph. It is difficult to determine the conclusion. Was the sanitary sewer only mislabeled on a map that the contractor used? Was the 8" pipe actually the sanitary sewer line? After discussion this with PRC on September 20, 1995 (M. Gill/S. Dinges phone conversation), we understand that a well collection system in the Site 9 area would sufficiently cover any possible contamination in this tunnel area around Hangar 1. This should be stated in the document.

Response: *Based on the general location of the sanitary sewer and storm drain lines in the vicinity of the tunnel, both lines should intersect the tunnel. To verify this a Navy contractor went into the tunnel and conducted a visual inspection in the assumed area of intersection. The Navy believes that the sanitary sewer line does in fact intersect the tunnel. The storm drain line does not intersect the tunnel. The exact routing of the storm drain line in the vicinity is unknown. It is assumed that the storm drain line goes underneath the tunnel.*

Section 9.11 of the report has been changed to indicate that the all of the sources of contamination on the western side of the base will be controlled and remediated through the regional groundwater remediation program. The Navy is participating in the program through the pumping and treating of groundwater in the expanded Site 9 area.

Comment 9: Figures 8-15 and 8-16, page 65, 66. The plumes shown on these figures should be renamed "Navy VOC Plume" to more accurately reflect the nature of the commingling of Navy and MEW groundwater contamination in the area.

Response: The area of the plume shown in the figures is that of the extent of the PCE plume from Building 88. It would be inaccurate and inappropriate to label this plume the Navy VOC plume. The actual extent of other contaminants which may have been contributed by the Navy may differ from the area of PCE contamination shown on the figures.

Comment 10: Section 8.6.3, page 78, para 3. There is evidence of a cracked line at the Craft Hobby shop. Exfiltration very possibly has occurred. Please clarify if this is a source of contamination to the groundwater. Because of the distance from the hobby shop to manhole C-8 (approximately 600 feet), a data gap exists. Additional sampling immediately upgradient of C-8 closer to the hobby shop may provide an answer to this source question.

Response: The Navy is collecting samples from the vicinity of the sanitary sewer during the Eureka data resampling effort. In previous documents, the Navy has reviewed the data available and concluded that the Craft Hobby Shop is not a source area. The U.S. EPA has concurred with this evaluation. However, when the data from the Eureka data resampling effort is received, the possibility of the Craft Hobby Shop as a source of groundwater contamination will be reevaluated.

Comment 11: Section 9.2, page 87. Work was done on tunnel #1 and the French drains and should be mentioned in this section. They were included after the initial screening.

Response: The comment is correct. Tunnel #1 and the French drain system were investigated more fully during the study. The text has been changed to indicate this.

Comment 12: Section 9.10, page 90, paragraph 2. The contaminated groundwater which enters the sanitary sewer lines in these areas consists of more than just PCE. Please revise the text to more accurately describe the VOC contaminated groundwater.

Response: As discussed in the response to Comment 4, PCE has been used as an indicator chemical. The complete profile of the samples taken has been discussed throughout the report. The use of PCE does not indicate that the Navy believes that only PCE contamination was contributed by the Navy. The use of PCE as an indicator chemical helps to more closely determine where the infiltration and exfiltration may be occurring.

Comment 13: Section 9.11, page 91. In response to EPA's comment #3 in the Draft Final comments, the Navy stated that the conclusion would be edited to include the results of the Storm Drain Action and the Sanitary Sewer Action as they relate to the purpose of the HCS. This was not done. Please add this description to the conclusion.

Response: The correction to the report as indicated in the response to comments was inadvertently omitted. The following information has been added to Section 9.11.

Information gathered during the course of the horizontal conduit study has been used to initiate two remedial efforts called the Sanitary Sewer Action and the Storm Drain Action. The Sanitary Sewer Action entailed lining line G of the sanitary sewer system to reduce infiltration of contaminated groundwater. Some infiltration is still suspected through service lines and associated connections.

The Storm Drain Action involves transporting water from the Hangar 1 and Electrical Vault 5 sumps to the Building 45 treatment system (a component of the Site 9 source control measure). The water is then treated and released to the storm drain system.

TABLE 1
HORIZONTAL CONDUIT STUDY
STEAM VAULT AT WESCOAT ROAD
ANALYTICAL RESULTS (10/26/1993)

Compound	Concentration ¹ (µg/L)	Detection Limit (µg/L)
Tetrachloroethene	ND	5
Trichloroethene	10	5
Trans-1,2-dichloroethene	ND	5
Cis-1,2-dichloroethene	ND	5
Vinyl Chloride	ND	10

Note:

- ¹ All other volatile organic compounds analyzed in EPA method 624 resulted in a non-detect reading. Detection limits were either 5 or 10 µg/L.

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MOFFETT FIELD
SSIC NO. 5090.3

ERRATA SHEETS WERE INSERTED IN THE
FINAL HORIZONTAL CONDUIT STUDY
TECHNICAL MEMORANDUM

DATED 04 AUGUST 1995

AND FILED AS ADMINISTRATIVE RECORD NO.
N00296.002287