

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

REGION 2
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RETURN RECEIPT REQUESTED

Mr. Kevin Cloe
Navy Technical Representative
Installation Restoration Section (South)
Environmental Program Branch
Environmental Division,
Atlantic Division (LANTDIV), Code EV23KC
Naval Facilities Engineering Command
1510 Gilbert Street
Norfolk, VA 23511-2699

Re: Naval Station Roosevelt Roads - EPA I.D. Number PRD2170027203

1. January 8, 2004 Draft Additional Data Collection Investigation Report for SWMU 9 (Fuel Tanks 212 -217)
2. January 21, 2004 Draft TCE Plume Delineation & Source Investigation Report for Tow Way Fuel Farm

Dear Mr. Cloe:

The United States Environmental Protection Agency (EPA) Region 2 has completed its review of the above documents which were submitted on behalf of the Navy by Baker Environmental's letters of January 8 and 21, 2004, respectively. As part of its review, EPA requested our contractor, Booz Allen Hamilton, to review both documents. Based on Booz Allen's and our own reviews, EPA has the following comments:

Draft Additional Data Collection Investigation Report for SWMU 9

EPA finds that the January 8, 2004 Draft Additional Data Collection Investigation Report ("ADCIR") for SWMU 9 is acceptable. Since the results of the ADCIR shall be incorporated into the draft Final Corrective Measure Study (CMS) Report for SWMU 9, in the draft Final CMS, when developed, please clarify the equations and exposure parameters used in the ADCIR to calculate lead and zinc risks. Also, the draft Final CMS report should specify the source(s) for the lowest observed adverse effect level (LOAEL), no observed adverse effect level (NOAEL), and maximum acceptable toxicant concentration (MATC) values presented in Tables 4-2, 4-4, 4-9, and 4-12 of the ADCIR.

Draft TCE Plume Delineation & Source Investigation Report for Tow Way Fuel Farm

EPA finds that the January 21, 2004 Draft TCE Plume Delineation & Source Investigation Report for Tow Way Fuel Farm ("TCE Source Investigation Report") is not yet fully acceptable. Specific comments are given in the enclosed Technical Review dated February 13, 2004. However, since the results of the TCE Source Investigation Report shall be incorporated into the draft Final Corrective Measure Study (CMS) Report, please address the comments given in the enclosed Technical Review in the draft Final CMS report, when developed, rather than submitting a revised TCE Source Investigation Report at this time.

In addition, since the TCE releases do not appear to be associated with either SWMU 7 or 8, the currently defined solid waste management units (SWMUs) at Tow Way Fuel Farm, and further since the CMS already being finalized for the SWMU 7 & 8 releases does not address the TCE releases, EPA requests that henceforth, the potential source area and associated TCE plumes at Tow Way Fuel Farm be designated as new SWMU #55, pursuant to the requirements of Module III of the RCRA permit.

Furthermore, as discussed in Mr Dale Carpenter's letter of January 30, 2004 regarding the Draft CMS Final Reports for Tow Way Fuel Farm (SWMU 7 & 8) and SWMU 53, any future CMS Final Reports, including those for SWMU 9 and newly designated SWMU 55 (TCE plumes at Tow Way Fuel Farm), must thoroughly consider the impact of the planned closure of Naval Station Roosevelt Roads (NSRR) on March 31, 2004. Those CMS's must indicate how the Navy will ensure that the proposed Corrective Action Objectives (CAOs) remain appropriate when the installation is closed and the site is transferred to private or other ownership. The discussion of CAOs should thoroughly describe their basis and the land use assumptions that were made in their development. The discussion provided in the CMS Report should be adequate to establish that the CAOs will remain appropriate after the property transfers. The future use of the site should be clearly established in the CMS Report, and the evaluations of implementability and effectiveness should thoroughly consider this issue.

As part of the technical evaluation and justification for any recommended final remedy, any future CMS Final Reports should clearly identify any specific land-use control (LUC) mechanisms that will be utilized (e.g., fencing, signage, covenant restrictions, zoning/permitting requirements) as part of the final remedy.

Also, future CMS's evaluation of alternatives should thoroughly and specifically consider the time that each alternative will require to reach the CAOs for each media. This evaluation is required by Section IV.A.1.c.ii of the "Scope of Work for the CMS" given in Appendix B of the facility's 1994 RCRA Permit. Specific time frame estimates should be identified and thoroughly justified for each alternative component and considered as part of the technical, human health, and cost evaluations. Preference should be given to alternative components that permanently reduce contaminant concentrations and the related potential for exposure in the shortest relative time period.

If you have any questions, please telephone me at (212) 637- 4167.

Sincerely yours,



Timothy R. Gordon,
Remedial Project Manager
Caribbean Section
RCRA Programs Branch

Enclosure

cc: Mr. Julio I. Rodriguez Colon, P.R. Environmental Quality Board, with encl.
Mr. Sindulfo Castillo, Public Works Dept., Naval Station Roosevelt Roads, with encl.
Ms. Kathy Rogovin, Booz Allen & Hamilton, w/o encl..
Mr. Mark Kimes, Baker Environmental, with encl. ✓

TECHNICAL REVIEW

JANUARY 21, 2004

DRAFT TCE DELINEATION & SOURCE INVESTIGATION REPORT TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
CEIBA, PUERTO RICO

REPA3-1203-023

February 13, 2004

I GENERAL COMMENTS

1. The potentiometric surface in the study area has been depicted based on water level measurements taken on September 23 and September 25, 2003, in Figures 3-3 and 3-4, respectively. These depictions show significantly different flow directions from the apparent source area around monitoring wells 7MW07 and 7MW24. Because these different depictions of the potentiometric surface strongly influence the evaluation of the placement of investigation sampling locations and the placement of the sentinel well, additional efforts should be undertaken to resolve the apparent discrepancies in these two depictions of the potentiometric surface in the investigation area. A program of frequent water-level monitoring from all wells available in the immediate area is recommended.

II SPECIFIC COMMENTS

Section 5.0 TCE Investigation Results

Section 5.4 Comparison to Criteria and Corrective Action Objectives

2. The Draft TCE Investigation Report (pg. 5-2) indicates that Corrective Action Objectives (CAOs) for several of the constituents detected in the trichloroethylene (TCE) delineation and source investigation have previously been established in the Task I Corrective Measures Study (CMS) Report. CAOs for other constituents that were detected in the recent investigation have not been established. The Draft TCE Investigation Report (pg. 6-1) recommends that the CMS include a screening level risk assessment for several compounds that were detected during the recent investigation at levels above those found in previous investigations, and use the screening level risk assessment to establish CAOs for those constituents. However, as requested during the review of November 24, 2003, Draft CMS Final Report, all CAOs established in the Task 1 CMS Report should be reevaluated to determine if the assumptions used in developing those CAOs are consistent with the recent changes in planned land use.

Section 5.5.1 Plume Delineation

3. The Draft TCE Investigation Report (pg. 5-3) indicates that the investigation objective of placing a sentinel well downgradient of 7MW07 was achieved. However, the report fails to adequately demonstrate that groundwater flowing from the area of 7MW07 is intercepted by the sentinel well 7MW21. As indicated in Comment No. 1, there remains considerable uncertainty regarding flow directions in the study area. Moreover, the groundwater quality data taken as field parameters (Table 4-3) indicate significant differences in water quality between the source area (monitoring wells 7MW07 and 7MW24) and the sentinel well, 7MW21. Of particular note are the observed differences between specific conductance and oxidation reduction potential. These differences may indicate that the proposed sentinel well likely does not intercept groundwater flowing from the source area. Moreover, the Draft TCE Investigation Report (pg. 3-3) has acknowledged that deeper contact observed between the decomposed and lithified bedrock at 7MW07 "might be due to a narrow fracture and attendant weathered zone at the well." If this is the case, the migration of dissolved contaminants away from the source area may follow a narrow fracture that would be difficult to trace and monitor. The suitability of the proposed sentinel well should be adequately justified. Consideration should be given to concluding that use of sentinel wells in this area may not be feasible (see Comment No. 4).

4. The Draft TCE Investigation Report (pg. 5-3) indicates that the investigation objective of providing "a current understanding of the extent of the TCE plume in the groundwater" has been achieved. The report further concludes that, "it appears that extent of the TCE groundwater plume has been delineated horizontally." However, the report also concludes that, "in the vertical direction, the TCE contaminant has been characterized to the extent practical." Among the factors cited for limiting the extent of the investigation in the vertical direction was the concern of breaching the bedrock if the wells were drilled deeper. While it is not clear how additional drilling in areas downgradient of the source area, where dissolved contaminants are likely to predominate, would adversely impact the vertical distribution of contaminants, it is likely that in such a geologic environment it may not be feasible to fully characterize the vertical extent of the plume. However, this infeasibility also impacts the delineation of the horizontal extent of the plume, including the areas downgradient from the source. Thus, it is not clear that the horizontal and, particularly, the downgradient extent of the plume has been fully delineated.

The current data suggest that TCE has not migrated much beyond the source area. However, no plausible explanation for such behavior has been provided. Extremely slow groundwater flow velocities could be responsible for such behavior, but no analysis of flow velocities has been provided. Natural attenuation may be responsible for limiting the migration of the plume, but no analysis of natural attenuation has been provided. However, groundwater quality data do not appear to indicate levels of TCE daughter products that would be indicative of significant degradation. Moreover, the field data on

the oxidation-reduction potential in groundwater in the source area (Table 4-2) do not appear to indicate conditions that are conducive to reductive dechlorination. In the absence of additional analysis that provides a reasonable explanation for the apparent failure of the plume to migrate, it would appear reasonable to conclude that the plume is continuing to migrate with contaminant levels similar to those in the source area. It would similarly be reasonable to conclude that the reason the plume has not been detected in downgradient areas is because the bedrock geology is too complex to trace the plume reliably, particularly if the depth of vertical sampling is limited.

**DRAFT ADDITIONAL DATA COLLECTION
INVESTIGATION REPORT FOR SWMU 9**

EPA COMMENT NO. 1:

EPA finds that the January 8, 2004 Draft Additional Data Collection Investigation Report ("ADCIR") for SWMU 9 is acceptable. Since the results of the ADCIR shall be incorporated into the draft Final Corrective Measure Study (CMS) Report for SWMU 9, in the draft Final CMS, when developed, please clarify the equations and exposure parameters used in the ADCIR to calculate lead and zinc risks. Also, the draft Final CMS report should specify the source for the lowest observed adverse effect level (LOAEL), no observed adverse effect level (NOAEL), and maximum acceptable toxicant concentration (MATC) values presented in Tables 4-2, 4-4, 4-9, and 4-12 of the ADCIR.

Strategy: This comment is limited to a request to provide specific exposure parameters that were used in the dietary intake models to calculate lead and zinc risk estimates for upper trophic level receptors. This information was previously presented in the Revised Draft RFI report dated March 10, 2003 (note this document was referenced in the Draft Additional Data Collection Report for SWMU 9). We will address this comment by pulling the appropriate tables text from the draft final RFI that present this information and incorporate them into the draft final CMS.

**DRAFT TCE PLUME DELINEATION & SOURCE INVESTIGATION
REPORT FOR TOW WAY FUEL FARM**

EPA COMMENT NO. 1:

EPA finds that the January 21, 2004 Draft TCE Plume Delineation & Source Investigation Report for Tow Way Fuel Farm ("TCE Source Investigation Report") is not yet fully acceptable. Specific comments are given in the enclosed Technical Review dated February 13, 2004. However, since the results of the TCE Source Investigation Report shall be incorporated into the draft Final Corrective Measure Study (CMS) Report, please address the comments given in the enclosed Technical Review in the draft Final CMS report, when developed, rather than submitting a revised TCE Source Investigation Report at this time.

Strategy: Comment Noted.

EPA COMMENT NO. 2:

In addition, since the TCE releases do not appear to be associated with either SWMU 7 or 8, the currently defined solid waste management units (SWMUs) at Tow Way Fuel Farm, and further since the CMS already being finalized for the SWMU 7 & 8 releases does not address the TCE releases, EPA requests that henceforth, the potential source area and associated TCE plumes at Tow Way Fuel Farm be designated as new SWMU #55, pursuant to the requirements of Module III of the RCRA permit.

Strategy: All future work associated with this site will be designated SWMU 55.

EPA COMMENT NO. 3:

Furthermore, as discussed in Mr Dale Carpenter's letter of January 30, 2004 regarding the Draft CMS Final Reports for Tow Way Fuel Farm (SWMU 7 & 8) and SWMU 53, any future CMS Final Reports, including those for SWMU 9 and newly designated SWMU 55 (TCE plumes at Tow Way Fuel Farm), must thoroughly consider the impact of the planned closure of Naval Station Roosevelt Roads (NSRR) on March 31, 2004. Those CMS's must indicate how the Navy will ensure that the proposed Corrective Action Objectives (CAOs) remain appropriate when the installation is closed and the site is transferred to private or other ownership. The discussion of CAOs should thoroughly describe their basis and the land use assumptions that were made in their development. The discussion provided in the CMS Report should be adequate to establish that the CAOs will remain appropriate after the property transfers. The future use of the site should be clearly established in the CMS Report, and the evaluations of implementability and effectiveness should thoroughly consider this issue.

Strategy: Noted. The CMS will address CAOs with regard to property transfers.

EPA COMMENT NO. 4:

As part of the technical evaluation and justification for any recommended final remedy, any future CMS Final Reports should clearly identify any specific land-use control (LUC) mechanisms that will be utilized (e.g., fencing, signage, covenant restrictions, zoning/permitting requirements) as part of the final remedy.

Strategy: Noted.

EPA COMMENT NO. 5:

Also, future CMS's evaluation of alternatives should thoroughly and specifically consider the time that each alternative will require to reach the CAOs for each media. This evaluation is required by Section IV.A.1.c.ii of the "Scope of Work for the CMS" given in Appendix B of the facility's 1994 RCRA Permit. Specific time frame estimates should be identified and thoroughly justified for each alternative component and considered as part of the technical, human health, and cost evaluations. Preference should be given to alternative components that permanently reduce contaminant concentrations and the related potential for exposure in the shortest relative time period.

Strategy: Noted. Time frames will be established, where possible, for any Corrective Measure proposed per the RCRA Permit.

BAH GENERAL COMMENT NO. 1:

- 1. The potentiometric surface in the study area has been depicted based on water level measurements taken on September 23 and September 25, 2003, in Figures 3-3 and 3-4, respectively. These depictions show significantly different flow directions from the apparent source area around monitoring wells 7MW07 and 7MW24. Because these different depictions of the potentiometric surface strongly influence the evaluation of the placement of investigation sampling locations and the placement of the sentinel well,*

additional efforts should be undertaken to resolve the apparent discrepancies in these two depictions of the potentiometric surface in the investigation area. A program of frequent water-level monitoring from all wells available in the immediate area is recommended.

Strategy: Noted. The new wells installed during this last investigation will be added to the list of wells measured for water levels in the RCRA monthly monitoring program.

BAH SPECIFIC COMMENT NO. 2:

Section 5.0 TCE Investigation Results

Section 5.4 Comparison to Criteria and Corrective Action Objectives

2. *The Draft TCE Investigation Report (pg. 5-2) indicates that Corrective Action Objectives (CAOs) for several of the constituents detected in the trichloroethylene (TCE) delineation and source investigation have previously been established in the Task I Corrective Measures Study (CMS) Report. CAOs for other constituents that were detected in the recent investigation have not been established. The Draft TCE Investigation Report (pg. 6-1) recommends that the CMS include a screening level risk assessment for several compounds that were detected during the recent investigation at levels above those found in previous investigations, and use the screening level risk assessment to establish CAOs for those constituents. However, as requested during the review of November 24, 2003, Draft CMS Final Report, all CAOs established in the Task I CMS Report should be reevaluated to determine if the assumptions used in developing those CAOs are consistent with the recent changes in planned land use.*

Strategy: This will be dealt with in the same fashion that we are dealing with the TWFF. Wait for outcome of March 30, 2004 Meeting. Industrial will remain industrial, we will not evaluate for residential scenario.

BAH SPECIFIC COMMENT NO. 3:

Section 5.5.1 Plume Delineation

3. *The Draft TCE Investigation Report (pg. 5-3) indicates that the investigation objective of placing a sentinel well downgradient of 7MW07 was achieved. However, the report fails to adequately demonstrate that groundwater flowing from the area of 7MW07 is intercepted by the sentinel well 7MW21. As indicated in Comment No. 1, there remains considerable uncertainty regarding flow directions in the study area. Moreover, the groundwater quality data taken as field parameters (Table 4-3) indicate significant differences in water quality between the source area (monitoring wells 7MW07 and 7MW24) and the sentinel well, 7MW21. Of particular note are the observed differences between specific conductance and oxidation reduction potential. These differences may indicate that the proposed sentinel well likely does not intercept groundwater flowing from the source area. Moreover, the Draft TCE Investigation Report (pg. 3-3) has acknowledged that deeper contact observed between the decomposed and lithified bedrock at 7MW07 "might be due to a narrow fracture and attendant weathered zone at the well." If this is the case, the migration of dissolved contaminants away from the source area may follow a narrow fracture that would be difficult to trace and monitor.*

The suitability of the proposed sentinel well should be adequately justified. Consideration should be given to concluding that use of sentinel wells in this area may not be feasible (see Comment No. 4).

Strategy: While BAH concluded that the groundwater in the sentinel well is characteristically different than that in the source area well, and may not be intercepting groundwater flowing from the source area, it is important to note that other wells within the TCE plume exhibit higher conductivities similar to 7MW21, namely 7MW24, 7MW23, and 7MW22. While conductivities are useful to distinguish between different groundwater systems in geologically different formations, or significantly different depths, when there is not a significant difference in geologic formations or depths and conductivities are different, other explanations for the differences must be sought. In this case, the influence of recharge on the groundwater should be taken into account. It is possible that some wells are located in areas where surface recharge is more likely to infiltrate than others. In those cases, the conductivities may be reduced from the typical conductivities. In general, the entire groundwater quality spectrum should be evaluated when determining if the well locations are placed correctly. Since there is not a significant difference in the conductivity of wells 7MW23, 7MW24, and 7MW21, and both 7MW23 and 7MW24 intercept the TCE plume (TCE= 87 and 1600 ug/L respectively), the conductivity in 7MW07 is anomalous, and is likely caused by the effect of recharge at that location. The conductivity in well 7MW21 is not significantly different than the previously mentioned wells, and its analytical results are likely to be representative of the extent of the TCE plume.

The difference in the oxidation-reduction potential at 7MW21 may be explained by the antecedent hydrology in the area of this well. This area may not be as susceptible to recharge due to the presence of fine-grained marine sediment (see Appendix A), and as such would not be flushed with oxygen-rich recharge on a regular basis. Another explanation is that the decomposition of the organic material in the marine sediment would reduce the oxidation-reduction potential in that area. The only other well with a similar negative oxidation-reduction potential is 7MW10, located fairly close to 7MW21, implying that this phenomenon is location-specific and not groundwater specific. (7MW08 also has negative ORP, but that is explained by the presence of fuel compounds at that location.)

It is noted that the delineation of the TCE plume is subject to uncertainty in both the horizontal and vertical directions as concluded by BAH. The use of a sentinel well in this complex geology may or may not be feasible but well 7MW21 is still useful for information on the TCE plume. It is noted that surface water and sediment samples collected during the January 2002 Additional Data Collection Investigation in the Ensenada Honda downgradient from the TCE site showed no contamination in the Honda at that time. Considering the relatively low levels of TCE at the site, it is unlikely that any migration to the Honda, should it be occurring, would result in an ecological risk.

BAH SPECIFIC COMMENT NO. 4:

4. *The Draft TCE Investigation Report (pg. 5-3) indicates that the investigation objective of providing "a current understanding of the extent of the TCE plume in the groundwater" has been achieved. The report further concludes that, "it appears that extent of the TCE groundwater plume has been delineated horizontally." However, the report also concludes that, "in the vertical direction, the TCE contaminant has been characterized to the extent practical." Among the factors cited for limiting the extent of the investigation in the vertical direction was the concern of breaching the bedrock if the wells were*

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drilled deeper. While it is not clear how additional drilling in areas downgradient of the source area, where dissolved contaminants are likely to predominate, would adversely impact the vertical distribution of contaminants, it is likely that in such a geologic environment it may not be feasible to fully characterize the vertical extent of the plume. However, this infeasibility also impacts the delineation of the horizontal extent of the plume, including the areas downgradient from the source. Thus, it is not clear that the horizontal and, particularly, the downgradient extent of the plume has been fully delineated.

The current data suggest that TCE has not migrated much beyond the source area. However, no plausible explanation for such behavior has been provided. Extremely slow groundwater flow velocities could be responsible for such behavior, but no analysis of flow velocities has been provided. Natural attenuation may be responsible for limiting the migration of the plume, but no analysis of natural attenuation has been provided. However, groundwater quality data do not appear to indicate levels of TCE daughter products that would be indicative of significant degradation. Moreover, the field data on the oxidation-reduction potential in groundwater in the source area (Table 4-2) do not appear to indicate conditions that are conducive to reductive dechlorination. In the absence of additional analysis that provides a reasonable explanation for the apparent failure of the plume to migrate, it would appear reasonable to conclude that the plume is continuing to migrate with contaminant levels similar to those in the source area. It would similarly be reasonable to conclude that the reason the plume has not been detected in downgradient areas is because the bedrock geology is too complex to trace the plume reliably, particularly if the depth of vertical sampling is limited.

Strategy: It is acknowledged that the geology is complex in this area, and the conclusions stated above by BAH are reasonable.

Vertical drilling in downgradient areas may provide an additional pathway for vertical movement of DNAPL. While DNAPL was not found at this site, this was not known prior to this investigation, and because of this, vertical drilling was limited to the upper 1 foot of the lithified bedrock. Since the dissolved phase of the TCE plume is unlikely to migrate vertically, and all the vertical depths of the temporary wells were placed at levels similar to the highest concentrations in the previous TCE investigation, it can be assumed that, while there is still uncertainty in the vertical delineation, that the majority of the TCE plume has been characterized with depth.

It is likely that a combination of natural attenuation and dilution are keeping the TCE concentrations low in the downgradient area. The well with the highest TCE concentration, 7MW07, and a new well, located downgradient of the source area, 7MW23 (7TCETW204), indicated that dechlorination of TCE to cis 1,2-DCE is occurring to some degree in a few locations. Other wells also had evidence of degradation products to a lesser extent. Further dechlorination of cis 1,2-DCE to vinyl chloride may not be occurring or may result in immediate oxidation of the vinyl chloride due to the aerobic environment. It is noted that even in wells 7MW23 (7TCETW204) and 7MW07, where the cis 1,2-DCE concentrations were the highest, that the oxidation-reduction potential was above zero and the dissolved oxygen was just slightly less than 1.0 mg/L, indicating that dechlorination is occurring even in conditions that are only mildly anaerobic. This reductive dechlorination is likely to provide some stability for the TCE plume.