



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
841 Chestnut Building  
Philadelphia, Pennsylvania 19107-4431**

September 30, 1996

Mr. Orlando Monaco  
Naval Facilities Engineering Command  
Environmental Contracts Branch  
10 Industrial Highway  
Lester, Pennsylvania

Re: Naval Air Warfare Center (NAWC), Warminster, PA

Dear Mr. Monaco:

This letter provides EPA's response to a "Draft Site 6 Removal Evaluation Report" as submitted by Brown and Root Environmental under cover letter dated August 14, 1996. Attached are detailed comments on this document (Attachment A).

EPA agrees that a response action is necessary to address health risks associated with the three areas identified to be of concern in the report. However, as reflected in the attached comments, available information appears to be inadequate to identify the full nature and extent of contamination of concern in these areas.

The report appears to conclude that no further CERCLA response actions are required at Site 6 beyond those addressing the three referenced areas. With regard to this apparent conclusion, as reflected by the attached comments, EPA believes the data included and referenced in the report is inadequate to meet CERCLA remedial investigation (RI) requirements for Site 6 and, as a result, is inadequate to assess the need for response actions elsewhere within Site 6.

As you are aware, Section XIII. of our interagency agreement indicates that a removal action proposal should provide "...documentation that the action...contributes to the efficient performance of any long-term remedial action..." No documentation is provided in this regard. With the pending closure of NAWC and the priority for expediting the reuse of NAWC property, this provision takes on added significance. Given these circumstances, we recommend the completion of additional RI work at Site 6 be expedited and, if appropriate, all contamination of concern addressed under one response action.

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Again, please find attached detailed technical comments on the subject document. Please give me a call if you have any questions.

Sincerely,

A handwritten signature in cursive script, appearing to read "Darius Ostrauskas".

Darius Ostrauskas  
Remedial Project Manager

cc: Tom Ames, NAWC  
David Kennedy, PADEP  
Nancy Rios  
Kathy Davies

## EPA COMMENTS ON DRAFT REMOVAL EVALUATION REPORT FOR SITE 6

### 1.0 INTRODUCTION

#### 1.1 PURPOSE OF REPORT

While it is indicated that the investigative data in this report will be used "...to evaluate the need for a removal action or other response actions at the site" (i.e., for risk assessment purposes), this was not a data quality objective of the subject investigation. In particular, the "Field Sampling Plan for the Site 6 Engineering Evaluation/Cost Analysis (EE/CA) for NAWC" issued by Brown and Root Environmental on October 5, 1995 (hereafter referred to as Brown and Root(1995) indicated the purpose of the investigation was "to generate volume estimates for materials contained within Site 6, and to perform waste characterization activities to support the evaluation of removal alternatives".

#### 1.2 SITE BACKGROUND

The figures suggest Site 5 is part of Site 6. Please clarify.

For purposes of clarity, this section should be divided into subsections, where each subsection provide a background for a particular disposal area and the basis for the estimated area of the feature.

Visual observations (e.g., identification of surface depressions) also helped identify disposal areas. Please reference these observations for individual disposal areas as needed.

In Figure 1-1, features identified by EPIC (1994) should be clearly distinguished from "moderate EM anomalies".

In the case of trenches identified by EPIC, indicate whether the trench is "possible", "probable", or known.

Many of the trench or pit identifier assignments were not provided by EPIC (1994) as indicated in the text. In particular, features with identifiers P6A, TR6C, TR6D, TR6E, TR6G and TR6F were identified by Brown and Root.

The basis for the number and areas of "inphase geophysical anomalies" and/or "moderate EM anomalies" in Figure 1-1 is not clear based on a review of Figure 3 and Figure 4 in Brown and Root (1995). To confirm, definitions should be provided for "inphase geophysical anomaly" and "moderate EM anomaly" and the areas of these anomalies clearly indicated on a map.

Based on a review of Figure 5 in Brown and Root(1995) and the attached information developed by Brown and Root (Attachment 1), the basis for the location of the areas with "significant soil gas results" in Figure 1-1 is unclear. A "significant soil gas result" should be defined and the areas of these results located for a map.

As discussed, based on the review of a recently available photo dated 1957, EPIC has identified a "probable lagoon" at the location of the "possible trench TR4", as reported in EPIC (1994). This feature should be identified in Figure 1-1 and addressed throughout the balance of the report. (TR4 was never identified or discussed in the report.) EPIC has described the material in this "probable lagoon" as a "dark-toned liquid" and noted a possible pit next to the "probable lagoon". The photo of concern and additional interpretation information should be available shortly. EPIC has also indicated that the previously reported mounded material (MM2) within Site 6 appears to be "piles of textured debris consistent with concrete waste".

It should be noted that, prior to the subject investigation, "surface" debris (describe nature) was observed to cover portions of Site 6.

The text refers to "...preliminary investigation reports for the Phase III RI..." as a basis for the background information. However, there are no such reports included in the references and it is otherwise unclear what reports are being referred to. These references should be identified and available for review.

Additional comments on background information for specific disposal areas are provided below by disposal area:

#### PIT P6F

Figure 1-1 does not appear to fully include the areal extent of the in-phase geophysical anomaly of this feature as depicted in Figure 3 of Brown and Root(1995). In addition, the basis for the "area of significant soil gas results" at P6F in Figure 1-1 is unclear. To what extent did the soil gas survey cover the in-phase geophysical anomaly of concern?

#### TRENCHES TR11/6C and TR6D

The relative location of these features in Figure 3 of Brown and Root (1995) differs from the locations presented in Figure 1-1. Which figure is representative of the actual locations? In addition, based on Figure 3 in Brown and Root (1995), TR11 appears to extend further east than depicted in Figure 1-1.

No identifier is provided for the small "inphase geophysical anomaly located immediately south of TR11/TR6C. Based on a review of Figures 3 and 4 in Brown and Root (1995), the basis for this anomaly is unclear.

#### TRENCH 6G

As noted earlier, "Possible Trench TR4" has been "upgraded" to a "Probable Lagoon" (a new identifier should be provided) and a new "possible pit" has been identified.

The identifier "trench 6G" implies that the entire area of TR6G was a (potential) trench. However, based on the shape and size of this area as depicted on Figure 1-1, this would not appear to be the case. (The area of TRG was not identified as a potential trench in EPIC (1994)). What is the basis for the area of TR6G in Figure 1-1? The detection of "moderate EM anomalies" and/or the results of soil gas screening volatile organics should be discussed in this regard. In addition, note that Figures 3 and 4 in Brown and Root (1995) indicates a different area for TR6G.

Two apparent significant in-phase geophysical anomalies depicted in Figure 3 of Brown and Root (1995) are not depicted in Figure 1-1. The basis for the area of "moderate EM anomaly" is unclear based on a review of Figure 4 in Brown and Root (1995).

#### TRENCH 6E

The basis for the three separate subareas, the location of the inphase geophysical anomalies and moderate EM anomalies, and the area of significant soil gas results is unclear. Figure 5 of Brown and Root (1995) and Attachment 1 indicate soil gas screening was not performed for the majority of this area. It is implied this area consists of or includes a trench. What is the basis for this apparent conclusion?

## 2.0 FIELD INVESTIGATION

Based on observations from the testpits, bores and otherwise, the estimated areal and vertical extent of surface/subsurface debris should be provided on a figure. The impact of the debris on the effectiveness of soil gas and geophysical surveys should be discussed.

After discussing field observations from the investigation, the estimated areal and vertical dimensions of each disposal area should be provided.

Where appropriate, refer to soil gas screening results as a basis for the identification of a disposal area. Currently, only Pit 6F is referred to as disposal area based on this information.

## 2.1 TRENCH 12/POSSIBLE PIT 7 (TR12/P7)

It is noted that only one test pit was conducted and no soil samples were collected from the eastern third of this estimated 260 foot long trench despite both the detection of hazardous substances in soil gas and the apparent detection of in-phase geophysical anomalies in this interval of the trench.

It is noted that the test pits in this case encountered four crushed drums, two with waste material still present.

## 2.2 POSSIBLE PIT 6A (P6A)

It is indicated that "...based on available information, the approximate dimensions of P6A are 30 feet by 30 feet". Given only one test pit was conducted and the test pits are reported to average 20 feet by 4 feet, it is unclear what the basis for this estimate is.

## 2.3 TRENCH 6B (TR6B)

While it is indicated that this feature was identified in part through aerial photo studies, EPIC (1994) did not identify this feature. Please correct as needed.

What is the basis for concluding the observed sheeting was asbestos?

## 2.4 TRENCH 11/TRENCH 6C (TR11/TR6C)

It is indicated that test pit S6-TP03 was excavated "...toward the southeastern end of the suspected trench..." However, Figure 3 in Brown and Root (1995) indicates that an in-phase geophysical anomaly apparently associated with this known trench extended over 100 feet past this test pit to the approximate location of test boring S6-SB06. It is also noted that while a crushed, empty drum was encountered, no soil sample was collected below the drum.

## 2.6 TRENCH 6G (TR6G)

As noted earlier, "Possible Trench TR4", as identified in EPIC (1994), has been upgraded by EPIC to a "probable lagoon". Based on these aerial photos and observations from the test pits, the location of this probable lagoon is now covered with up to 10 feet of debris and/or fill material. The limitations of the soil gas and geophysical surveys and test pits in assessing the probable lagoon should be discussed. In addition, as noted earlier, a possible pit within this area has recently been identified by EPIC. This pit will likely require investigation once more information becomes available.

It is indicated that in test pit S6-TP15, "...a layer of construction debris was encountered from a depth of 3 feet to 6.5 feet", that "...the probable original topsoil layer was encountered at a depth of 6.5 feet...", and that soil sample S6-TP15-01 "...was collected from the soil at a depth of 1.5 feet". It is unclear whether this soil sample was collected from soil overlying the debris or from below the apparent top of the original topsoil layer.

It is indicated that test pit S6-TP16 was excavated "...near the northeastern end of the suspected trench". However, this test pit does not appear to be near possible trench TR4 identified in EPIC (1994). Considering the 7 foot depth of the debris encountered at this location, the volume debris placed in this area appears to be significant.

The perched water encountered in test pit S6-TP18 should not be referred to as "groundwater".

While 63 ug/l of 1,1-dichloroethane was detected in soil gas within the area of 6G, test pits in this area did not detect elevated VOC's by PID, suggested that this hot spot may not have been investigated as planned.

#### 2.7 POSSIBLE PIT 6F (P6F)

This area was not identified through aerial photo interpretation as suggested.

Given only two test pits (and no soil bores) were conducted in this area), the basis for the estimated area (80' X 40') and location of this disposal area is unclear.

#### 2.8 POSSIBLE TRENCH 6E (P6E)

This area was not identified in EPIC (1994) as suggested. As noted under Section 1.2, the elevated soil gas readings within the suspected trench have not been reported in the listed references to date.

Given the objective of test pit S6-TP20 was to investigate an elevated soil gas level and no PID reading of background were encountered, it appears the location of the soil gas "hot spot" may not have characterized.

What was the depth of test pit S6-TP22? Given no waste was encountered at this location, why was a sample collected? On the other hand, while waste was encountered in test pit S6-TP20, no soil sample was collected.

## 2.10 Miscellaneous Test Pits and Other Surface Debris

Test pit S6-TP22 is already discussed under Section 2.6.

## 3.0 ANALYTICAL RESULTS

As with the other sections,, it is suggested that information for each disposal area be discussed in a separate subsection. As currently presented, the discussion does not provide a clear picture of the relevant information.

Provide the criteria for performing a full TCL analysis for a sample location.

When discussing sample results, the sample number(s) should be always be identified.

The legend in Figure 3-2 includes "Soil Boring Sample Locations", but the associated map does not.

### 3.1 ORGANIC ANALYTICAL DATA

It is indicated that the "...drum contents from TR12..." contained particular contaminant concentrations. However, there were two drums with material removed from this trench. The analytical results for each drum should be discussed by sample number, as well as contaminant levels from soil samples collected below drums.

While it is suggested that one drum with material was excavated from trench 6D, Section 2.5 indicates that two drums were excavated and that a composite sample (apparently) was collected from these drums. Please clarify.

It is indicated that "concentrations of semi-volatile compounds were unremarkable in surface (soil?) samples collected from Site 6. Please define "unremarkable".

The frequency of sub-surface soil sample analysis for SVOCs should be noted. Why are the referenced subsurface SVOC concentrations "notable"? Were there any other soil or waste samples which exceeded risk-based concentrations (RBCs) for SVOCs?

Were pesticides detected in any surface soil samples above RBCs? What was the frequency of pesticide/PCB analysis for subsurface soil samples? What pesticides (and associated concentrations) were detected in samples from TR6E and P6F? Were RBCs exceeded?

Considering one of the two samples analyzed for TCLP and characteristic parameters was determined to be a RCRA hazardous waste, the results should not be described as "unremarkable".

### 3.2 INORGANIC ANALYTICAL DATA

The definition of "representative concentration" should be identified.

### 4.0 RISKS AND CONCLUSIONS

Generally, the "risk assessment" conducted in this case does not conform to RI requirements for CERCLA NPL sites. Pertinent comments are as follows:

a) The number of samples and analyses are inadequate to confirm that the individual disposal areas within Site 6 do not pose an unacceptable risk. (This is not unexpected given the work plan for the subsurface investigation (Brown and Root (1995)) did not identify use for risk assessment purposes as data quality objective.) For example, in the case of the trenches within Site 6, the RI data base is not consistent with that being generated for trenches at Site 4 per the "Removal Verification Sampling Plan for Site 4". In the case of larger "areas", e.g., TR6E and TR6G, a sampling grid should be established and an appropriate number of samples collected to demonstrate statistically (per EPA guidance) that the area has been adequately characterized for risk assessment purposes. In addition, it is noted that out of the 35 sample locations, only 14 were analyzed for SVOCs and only 18 were analyzed for the pesticide/PCB fraction.

b) Due to the areal extent of Site 6, the risks associated with individual disposal areas should be evaluated separately. Maximum concentrations for each disposal area (rather than representative concentrations calculated using data from the entire area of Site 6) should be evaluated to identify the "contaminants of concern" for each disposal area.

c) The additive effects of non-carcinogens should be considered in the assessment of non-carcinogenic risks for each disposal area.

d) As in the case of the development of "Removal Verification Sampling Plan for Site 4", risks under both the recreational and residential land use scenarios should be evaluated. In addition, EPA guidance considered in the development of the "Removal Verification Sampling Plan for Site 4" should be considered in scoping additional RI work at Site 6.

#### 4.1 COMPARISON TO SOIL CRITERIA

##### 4.1.2

Again, it is suggested that this section be organized by disposal areas. Comments further below will be presented in this manner.

The EPA residential RBC for ingestion of chromium should be the criteria for hexavalent chromium (390 ug/kg) unless data indicates it is trivalent.

Note the EPA residential ingestion RBC for Aroclor-1254 is 1.5 mg/kg, not 83 ug/kg as indicated on p.4-6 and Tables 4-1 and 4-2.

Identify where and to what extent excavated drums exceeded criteria for bis(2-ethylhexyl)phthalate.

Generally, the text at the bottom of page 4-7 needs to be clarified/edited. Exceedances are referenced for drum samples from TR6D and TR6G. However the compound of concern is not identified. It is indicated that chrysene was detected at 1,315 ug/kg "...at this sample location in TR6E...", but location is not referenced.

##### TRENCH 12/POSSIBLE PIT 7 (TR12/P7)

Only three soil samples and a samples of waste from one drum were collected from this area. Given the estimated 260' length of this trench, the detection of hazardous substances in multiple soil gas stations, the discovery of four crushed drums in three test pits, the number of samples collected does not appear sufficient for risk assessment purposes.

##### TRENCH 6B (TR 6B)

Only one sample (soil) was collected from this feature estimated to be 100' in length.

##### TRENCH 11/TRENCH 6C

Only one sample (of charred material) was collected from this feature which is estimated to be 240' in length. While a crushed drum was uncovered, no soil sample was collected from below the drum.

It is indicated that an "isolated pocket of charred material" in this trench was removed and it is implied that no associated, residual soil contamination of concern remains. However, there were not enough test pits to confirm this was the only "pocket" of concern in this trench and there is no soil sampling to confirm there is no residual soil contamination.

#### TRENCH 6D

Two crushed drums were removed from this estimated 120 foot trench. While five samples were collected, three were from one test pit area and one was from a soil boring with no waste.

#### TRENCH 6G

This area of about 25,000 square feet is covered with debris which covers a reported 5,000 square feet. Four of the five test pits encountered debris down to at least 6.5 feet. Two crushed drums were removed. However, only four soil samples and two waste samples were collected from this area.

It is noted that the EPA RBC for chrysene was exceeded in a drum sample from this trench.

#### TRENCH 6E

This area with an apparent 8,400 square foot moderate EM anomaly was reportedly covered with about 800 square feet of surface debris. Only one test pit and one soil boring were conducted within this area where debris was encountered at 6.5 to 10 feet in depth. The soil boring encountered refusal at 4 feet. Only two samples collected, both from within the debris.

It should be noted that the referenced exceedance of PADEP criteria for 2-butanone was in a sample from TP-21 in Trench 6E.

#### Sample S6-TP08

This sample location, which was selected based on a field observation, contained 164 mg/kg antimony, above the EPA RBC of 31 mg/kg. No action is currently proposed for this location. This appears to be an oversight. Note that this sample location is about 100 feet from PIT 6A, where antimony also exceeded the RBC. The area between these two sample points should also be investigated.

#### 4.2 SUMMARY OF CONCLUSIONS

Note that elevated levels of CERCLA hazardous substances and/or industrial-type wastes were encountered within thick layer of debris deposited in the south and southeast portion of Site 6, e.g., soil associated with debris in test pit S6-TP21 within the area of "Trench 6E" contained elevated levels of PAHs and test pits within the area of "trench 6G" encountered two crushed 55-gallon drums and "small pockets of a light blue crystalline like material" found to contain highly elevated levels of copper. Considering the debris is reported to cover half an acre and only seven (7) test pits were conducted in this debris, the

possibility of additional industrial-type wastes and/or elevated levels of CERCLA hazardous substances within the debris cannot be ruled out. In addition, based on a review of the logs for test pits S6-TP23 and S6-TP24 in the area of "Pit P6", it is not clear whether the waste encountered at Pit P6 is the contents of a pit dug into the original ground surface or part of the deposited debris. In any case, the text which suggests that the surface debris in the south-southeast portion of Site 6 is only "construction" in origin should be deleted.

As noted earlier, it is not clear that the extent of the contamination of concern in the vicinity of "Pit 6F" has been reasonably estimated based on the two test pits conducted. In addition, it does not appear that the entire extent of geophysical anomalies identified in the area of P6F (see Figure 3 in Brown and Root(1995)) have undergone soil gas screening or otherwise been investigated.

With regard to the extent of P6A, based on review of the log for the test pit conducted within this area, the basis for estimated dimensions of this area of concern is also unclear. In addition, as noted earlier, soils from test pit S6-TP08, about 100 feet southeast of "Pit 6A", exhibit similar contaminants and levels.

With regard to the limited action area recommended for TR6E (40 by 20 feet), again note that TR6E can be estimated to be 8,400 square feet in size and has been investigated to date by only two test pits and one soil boring that terminated at 3 feet.

Finally, it is implied that the disposal areas which are not proposed for a response action are not impacting groundwater. Available information should be reviewed to confirm this and a discussion included regarding this review and the conclusions.

# MEMORANDUM

**TO:** Mr. Orlando Monaco  
Naval Facilities Engineering Command  
Northern Division  
Environmental Contracts Branch, Mail Stop No. 82  
10 Industrial Highway  
Lester, PA 19029

**From:** W. David Fennimore, P.G., Earth Data Incorporated  
J. Anthony Sauder, P.E., Pennoni Associates, Inc.  
Anthony S. Bartolomeo, P.E., Pennoni Associates, Inc.

**Date:** October 9, 1996

**Subject:** NAWC Warminster

The purpose of this memorandum is to provide comments on the following documents:

1. *Nature and Extent of Contamination Excerpt for Focused RI for Groundwater Report, NAWC Warminster Pennsylvania - Brown and Root Environmental, June 1996.*
2. *Feasibility Study Report for Groundwater in Areas A, B & D NAWC Warminster, Pennsylvania - Brown and Root Environmental, June 1996.*

We have reviewed the above referenced documents on behalf of Warminster Township, The Warminster Township Municipal Authority and the Federal Lands Reuse Authority - Bucks County, Environmental Subcommittee.

**Comments:**

- ▶ By definition under CERCLA, the Remedial Investigation (RI) defines the full nature and extent of contamination and provides the technical basis for the selection of remedial action alternatives addressed by the Feasibility Study (FS).

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In its present form the "Nature and Extent Excerpt" provides an incomplete and technically unsound basis for the selection of remedial alternatives. In that RI activities are currently underway in Areas A and B it is unclear how it can be stated that there is "sufficient information to identify a final remedy for all groundwater zones for Areas A and B" as is stated on page E-2 of the draft FS.

Accordingly, we believe that the selection of a final remedy for areas A and B groundwater at this time is premature.

- ▶ The regional hydrogeologic model adopted by the Navy's consultants characterizes the subsurface beneath the site as three different zones. The use of this model is inappropriate as it attempts to over simplify a complex hydrogeologic flow regime and ignores the importance of structural geology and subsurface fracturing in the migration of contaminants through the subsurface. Numerous hydrogeologic investigations conducted at sites in the Stockton Formation indicate that the surficial deposits and the fractured bedrock form a hydraulically connected hydrogeologic system.
- ▶ The dimensions of on-site and off-site plumes attributable to the Navy have not been determined. For example, it is unclear whether the contamination in HN-52 came from Area A or Area D and how far beyond HN-52 the contaminants extend. An analysis of plume(s) shape(s), orientation and extent both on-site and off-site should be performed. Data presentation should include, at a minimum, a site plan showing contaminant isoconcentration contours, a fracture trace analysis, identification of potential contaminant migration pathways and geological cross-sections.
- ▶ An analysis of the vertical extent of contamination attributable to the Navy both on-site and off-site should be provided. The analysis should present adequate quantitative data on the distribution of hydraulic head within the aquifer to reasonably support the Navy's conclusion that "an upward vertical flow gradient from deeper to shallow water bearing zones within the Stockton Formation has limited the vertical extent of contamination".
- ▶ An analysis of the effect of pumping on-site and off-site water supply wells (including the former Wagner well) should be performed.
- ▶ It is stated on page 4-10 of the FS that WTMA Well 26 serves as a collection point for contaminated groundwater between the base and the municipal well. It is acknowledged that Well 26 has the incidental benefit to the Navy of minimizing

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migration of some hazardous substances from NAWC Warminster by influencing the regional hydraulic gradient. However, analysis of the capture zone for WTMA Well 26 shows that some of the off-base contamination (i.e. HN-52) may be outside the Well 26 capture zone. If fractures and joint systems are oriented in the directions indicated by fracture trace analysis, then the theoretical capture zone would tend to be narrower, drawing water from further upgradient and intercepting less of the contaminant plume than would be included for unfractured rock. Additional off-base extraction wells may be needed to intercept all of the off-base contamination attributable to the Navy.

- ▶ Concentrations of Trichloroethylene (TCE) in on-site monitoring well HN-111 indicate the presence of Dense Non-Aqueous Phase Liquids (DNAPL) within the bedrock. The concentrations of TCE detected in the Wagner well and off-site monitoring well cluster HN-16 indicate significant groundwater impact off-site of Area A. Further, there appears to be a direct correlation between intrusive activities conducted in Area A and the increase in contaminant levels seen in the Wagner well. The FS lists the restoration of affected groundwater as a Remedial Action Objective for Area A.

Recent research conducted by the EPA has concluded that while groundwater extraction and treatment systems are generally effective in maintaining hydraulic containment of dissolved phase contaminant plumes, complete aquifer restoration to health based levels may not be technically feasible in fractured rock media contaminated by DNAPL's. As a result, it is the opinion of the undersigned that the community should be made fully aware that it may not be possible to ever restore the aquifer to the levels suggested in the FS.

- ▶ The nature and extent document states that chemicals "occasionally" associated with the degradation of TCE and PCE were detected in Area A groundwater. However, the document makes a point of stating that vinyl chloride and chloroethane were not detected in any of the groundwater samples in Area A.

It is widely accepted within the scientific community that chlorinated solvents such as TCE and PCE can be transformed microbiologically or abiotically into other compounds some of which have been shown to be more hazardous in drinking water than the parent compounds. Of particular concern is vinyl chloride which has been clearly demonstrated to be the terminal product of the transformation of TCE. Vinyl chloride is a known carcinogen which is more mobile in groundwater than TCE. The current MCL for vinyl chloride is 2 ug/l, while the Navy's contract detection level is 10 mg/l. Because the Navy has chosen a detection level that is higher than existing

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drinking water standards, it cannot say, and should not imply that vinyl chloride is not present at levels that could potentially threaten public health, safety or welfare (since it is possible that vinyl chloride exists above the drinking water standard, but below the contract quantification limit). The final documents released to the public should therefore contain some discussion regarding the discrepancy between the Navy's sample detection levels and the drinking water standards, so that the public is not misled concerning the risks that have not been quantified.

- ▶ If the stream bordering Area A is above the groundwater level, what is the source of the stream? A perched water table or surface source? These would have implications for contamination migration pathways.
- ▶ The statement is made that the "groundwater downgradient of Area A does not appear to be impacted by releases of inorganics at the base." However, well HN-15 shows high metal concentrations at an intermediate depth. HN-15 is located along a fracture trace that is shown as passing through Area A. If the fracture trace represents a system of fractures or joints, the metals found at an intermediate depth may have originated in Area A.
- ▶ An extraction well near MW-2 would be more effective at intercepting the contaminant plume west of the proposed line of extraction wells.
- ▶ Long term monitoring is proposed for 24 monitoring wells. Before a long term monitoring plan is finalized, it will be necessary to delineate the extent of contamination from Area A and D.
- ▶ Data to date show that there has been no decrease in TCE concentrations in Area B over the last three years. The chemical fate and transport model shows a decrease to below the MCL in eight years. This may not occur if there is a contribution from a source of TCE. Efforts should be made to identify and remove sources of contamination before other remedial alternatives are considered.
- ▶ The contamination shown for well HN-02 is not shown within any of the proposed extraction well capture zones. This area of contamination should be addressed.
- ▶ The proposed reinjection wells are to be 100 feet deep. This appears deeper than the present contamination plume. If there is a malfunction in the treatment system, there is the risk of pumping contamination deeper into the aquifer.

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- ▶ If the Navy's historical activities at NAWC-Warminster included the use of radioactive substances/radionuclides, the investigation must include an investigation for these substances, which it so far has not done. None of the publicly-released reports prepared to date have even discussed this issue, including an explanation for why such substances are not on any of the target compound lists developed for the site.

1311.m5

# MEMORANDUM

**TO:** Mr. Orlando Monaco  
Naval Facilities Engineering Command  
Northern Division  
Environmental Contracts Branch, Mail Stop No. 82  
10 Industrial Highway  
Lester, PA 19029

**From:** W. David Fennimore, P.G., Earth Data Incorporated *WDF*  
J. Anthony Sauder, P.E., Pennoni Associates, Inc. *JAS*  
Anthony S. Bartolomeo, P.E., Pennoni Associates, Inc. *ASB*

**Date:** October 9, 1996

**Subject:** NAWC Warminster - Comments on Site 6 Removal Action Report

We have reviewed the Site 6 Removal Evaluation Report and offer the following comments:

1.) NAWC Warminster was placed on the National Priorities List (NPL) in October 1989. Site 6 is one of the eight original disposal sites identified under the NPL listing. Reportedly, Site 6 received wastes over a 20 year period from 1960-1980. To date, seven years after the NPL listing, the Navy claims to have identified 13 disposal trenches in Area 6 while acknowledging that the total number of disposal trenches in Area 6 is still unknown.

Review of the Site 6 Removal Evaluation Report clearly confirms that Site 6 was operated as an unpermitted landfill which received a variety of hazardous wastes (including drummed wastes). In that there still may be additional undiscovered buried waste the full nature and extent of contamination attributable to Site 6 has not been determined. As a result, conclusions regarding the risks associated with Site 6 are based on an incomplete database and are therefore technically unsupported.

2.) The Removal Evaluation Report attempts to minimize the results of the soil sampling which was performed despite the fact that TCE was detected in half of the surface soil samples and that the concentration of TCE detailed in three subsurface samples exceeded the PADEP's medium specific concentrations for soil to groundwater. Additionally, the concentration of selected metals including chromium (which exceeded PADEP, EPA and RBC for residential areas) were reported to be several orders of magnitude above background.

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3.) The fact that significant concentrations of VOC's were detected in samples collected from material available from crushed drums leads to the reasonable assumption that other drums of VOC-containing waste may still be buried in the other unidentified disposal areas.

4.) The nature of the construction debris may have compromised the results of the surface geophysical methods used to locate buried metal objects. The construction debris' thickness (6'-11'), irregular slopes, and inbedded rebar would interfere with the delineation of geophysical anomalies.

5.) In that the full nature and extent of contamination has not been defined, it is questionable whether the proposed limited Removal Action will accomplish much. Additional investigation to locate all source areas and a comprehensive sampling of suspected source areas are necessary.

The community and EPA were lead to believe that the Navy's intention was to remove all waste materials deposited by the Navy in all of the pits and trenches. Given the nature of the wastes which have been encountered, the removal action should remove the entire contents of all of the disposal trenches rather than focusing on the few isolated hot spots which were identified.

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