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**DEPARTMENT OF THE NAVY**

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**NOV 06 1998**

U.S. Environmental Protection Agency  
Region III  
Attn: Mr. Robert Thomson (3HS50)  
1650 Arch Street  
Philadelphia, Pennsylvania 19103

Re: Response to Comments on the Supplemental Field  
Investigation Plan, Landfill C and Landfill D,  
St. Juliens Creek Annex Site, Chesapeake, VA

Dear Mr. Thomson:

We are in receipt of your letter dated October 15, 1998.  
Enclosed please find the response to your comments and the  
comments provided by the Virginia Department of  
Environmental Quality (VDEQ).

A site visit to St. Juliens Creek Annex and meeting with  
members of the Navy, EPA, VDEQ, and BTAG is tentatively  
scheduled for the first week of December of this year.  
During this site visit and meeting, these comments and  
responses to comments will be discussed. As stated in these  
response to comments, the revised tables, figures, and  
sections of text will be available for review and discussion  
during this meeting. With concurrence on these revisions,  
additional drafts of this workplan will not be required  
prior to finalizing this document.

The Remedial Project Manager, Mr. Tim Reisch, will be  
contacting you to coordinate this site visit and meeting.

Re: Response to Comments on the Supplemental Field  
Investigation Plan, Landfill C and Landfill D,  
St. Juliens Creek Annex Site, Chesapeake, VA

If you have any questions, please contact Mr. Tim Reisch at  
(757) 322-4758.

Sincerely,

*N. M. Johnson*

N. M. JOHNSON, P.E.  
Head  
Installation Restoration Section  
(North)  
Environmental Programs Branch  
Environmental Division  
By direction of the Commander

Enclosure

Copy to:  
COMNAVBASE Norfolk (Mr. Gary Koerber, N45)  
VDEQ (Ms. Sharon Wilcox)  
Administrative Record File (St. Juliens Creek Annex,  
Chesapeake, VA)

**RESPONSE TO COMMENTS  
SUPPLEMENTAL FIELD INVESTIGATION PLAN  
LANDFILL C AND LANDFILL D  
ST. JULIENS CREEK ANNEX SITE  
CHESAPEAKE, VIRGINIA**

**United States Environmental Protection Agency (USEPA)**

**1.0 GENERAL COMMENTS**

1. The document does not include a list of acronyms used throughout the document. This reference should be included at the beginning of the document, typically after the Table of Contents page.

**Response:** A list of acronyms has been added to this work plan addendum and will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

2. Several sections of the document refer to previous documents for information concerning analytical methods, frequency and types of QA/QC samples, sample collection procedures (including holding times, preservation and sample containers), well construction methods and decontamination procedures. Referenced documents include the previous remedial investigation (CDM Federal 1997) and the RI Work Plan (CDM Federal 1997). It is suggested that the information for the items listed above be provided in the appropriate sections of this document in order to allow this document to stand alone.

**Response:** The intent of this work plan addendum (and future work plan addendum's) is to efficiently develop site specific work plans and avoid the process of duplicating standard operating details (i.e., method holding times, etc.). As a result, this work plan addendum (and future work plan addendum's) is not intended as a standalone document and is designed to be used in conjunction with "master" work plans.

At this time, the addition of information already included in the above referenced RI Work Plan (CDM Federal 1997) has not been incorporated into this document. However, Section 1.0 of this work plan addendum has been revised to indicate that the "Final Landfill C and Landfill C Work Plan, dated May 1997" should be referenced for pertinent information regarding this supplemental site investigation (CDM Federal is currently developing a Master Work Plan for St. Juliens Creek Annex which will govern all future remedial investigation activities at the Annex).

3. Phosphorus was detected in surface water at Landfill D during preliminary investigations. However, phosphorus is not included in the analyte list for the supplemental activities. Phosphorus should be included in the supplemental activities in the media were it was previously detected in order to maintain consistency with previous investigations.

**Response:** The analysis for total phosphorus for surface water at Landfill D has been added to Table 3-2. The revised table will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

4. Neither nitroamines or explosives were included in the analyte groups for either the preliminary or the supplemental field activities. Nitroamines and explosives were included in the analyte groups for Landfill B and the Burning Grounds areas of the study. Since the historical site use was not provided in this document, it cannot be determined whether nitroamines or explosives are appropriate analyte groups for these sites. Inclusion or exclusion of these two analyte groups should be clarified for Landfills C and D.

**Response:** Based on historical information and past sampling conducted at Landfill C and Landfill D, there is no indication that nitroamines or explosives were used or disposed of at these two landfills. As a result, the analysis for these compounds was not performed during the initial investigation (as approved by EPA) and is not planned for during the supplemental investigation. Additional text will be provide in sections 1.0, 3.3, and 3.3 to provide additional information. The revised text will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

5. The BTAG provided comments on work in progress on ecological risk assessments (ERA) for Landfills C and D in July of 1998. The subject documents state that during the preparation of the ERA as well as during discussions with team members, it became apparent that additional data were necessary to fully define the extent of contamination. It does not appear that proposed sampling addresses the previous comments.

**Response:** The ERA Work in Progress was intended to present the status of the on-going work at St. Juliens Creek and discuss the overall ERA approach used in the document with the BTAG during a site visit in March 1998. The document was submitted with known data gaps which were discussed during the March meeting; it was not intended to serve as a draft ERA or as a stand alone document. The sampling proposed in the background investigation and the two supplemental field work investigations at St. Juliens included recommendations of the March 1998 meeting. However, BTAG's written comments on the ERA Work in Progress were received after the submittal of the revised draft of the Background Study and two site specific supplemental field investigation work plans.

From the latest comments received (background study and the two supplemental field work investigations) it is acknowledged that additional sampling is required to address the BTAG concerns, see response to comment # 6 below. It is recommended that a St. Juliens Creek site visit and meeting be conducted to jointly locate these additional samples in lieu of one (or both) of the days BTAG is tentatively scheduled to visit NAS Oceana in Virginia Beach.

6. Although a conceptual model or exposure pathway analysis were not presented in the previous work in progress document or the subject documents, the BTAG continues to assert that site characteristics indicate contaminant migration from the above sites to aquatic areas is probable. Therefore, the BTAG reiterates a request to sample the central area of the tidal wetland and St. Juliens Creek in association with Site 2 and Blows Creek, the estuarine emergent marsh, and the confluence of Blows Creek and the Elizabeth River in association with Sites 3, 4, and 5. We note that background (i.e. upgradient) samples are proposed for St. Juliens Creek and Blows Creek. Once these samples are collected a quick screening level risk assessment should be performed following the 1997 EPA Guidance for Conducting Ecological Risk Assessments For Superfund.

**Response:** The request for sampling St. Juliens Creek for determining possible impacts resulting from past activities involving Landfill B raises some concerns, however, there is agreement that the possibility of contaminant migration from Landfill B to St. Juliens Creek has not been thoroughly addressed.

Concerns associated with St. Juliens Creek sampling are as follows:

- St. Juliens Creek is located in a very industrialized area with the potential for significant environmental impacts from many sources.
- Samples collected from St. Juliens Creek would be expected to contain numerous contaminants resulting from surrounding area industrial activities.
- Determination of environmental impacts (if any) on St. Juliens Creek resulting solely from Landfill B activities appears to be remote based on the potential for significant contribution of contaminants from industrial sources along St. Juliens Creek and the limited contamination identified within Landfill B during the initial site investigation.

With these concerns in mind but realizing that possible environmental impacts from Landfill B need to be investigated, four (4) "reference samples" are proposed for St. Juliens Creek. Reference samples (surface water and sediment) will be collected at two (2) upstream and two (2) downstream locations of Landfill B. These samples will also be located in depositional environments similar to that observed near Landfill B (e.g., low energy stream flow). The analytical results obtained from these samples will be used in the risk management process and to gain a better understanding of the water quality within St. Juliens Creek. This data will not be used as a screening tool.

One additional surface water and sediment sample is also proposed at the discharge end of a culvert pipe which directs water from Landfill B into St. Juliens Creek (during high tide water flow is actually reversed and flows into the Landfill B site). In addition, during the initial site investigation, one (1) surface water and one (1) sediment sample was collected at the mouth of the culvert which exits the Landfill B area. Both of these locations are most representative of contaminants potentially exiting the Landfill B area and impacting St. Juliens Creek. This data and other ecological site data would be used as part of the ecological risk screening process.

Sampling within Blows Creek also raises some concerns. Due to the tidal impact of the Elizabeth River on the water levels within Blows Creek, and the potential for "washing" contaminants into Blows Creek from the Elizabeth River, surface water and sediment samples would be expected to contain contaminants from the numerous industrial sources in the area. Sampling locations within Blows Creek may not provide helpful site specific assessment data; however, during the initial investigations locations within tributaries exiting a site and entering Blows Creek were sampled to determine the extent of any site related contamination. Additional sample locations following this rationale are proposed for the supplemental field investigation.

During the initial site investigation of the Burning Grounds, two (2) sediment samples were collected immediately north of Blows Creek and south of the site. These samples were found to be more similar to surface soils due to the very limited intermittent flow in this area. However, sampling this area is expected to identify any possible surface water/overland flow contamination originating in the Burning Grounds and entering into Blows Creek. Therefore, three (3) additional surface soil sample locations are proposed for this area.

Landfill D will also be sampled at points downgradient/downstream of the site but prior to entering Blows Creek. Currently, four (4) surface water and four (4) sediment samples are proposed for Landfill D in tributaries flowing into Blows Creek (2 surface water/sediment sample locations were sampled during the initial site investigation). The proposed sample locations are expected to identify any possible surface water/sediment contamination originating in Landfill D and entering into Blows Creek.

Surface water/sediment locations associated with Landfill C are areas of ponded water. No drainage ways or overland flow from Landfill C into either the Elizabeth River or Blows Creek have been observed. As a result, no direct impacts from Landfill C would be expected.

7. The draft Work Plan indicates that composite samples from 0-2 feet will be collected to evaluate the potential exposures to burrowing organisms as suggested by NOAA. Although this seems like a reasonable approach, NOAA suggests coordination with the BTAG on this issue. Surface soil samples are proposed to be collected from 0-3 inches. Normally, BTAG requests a 0-6 inch

interval for surface soil collection, and 0-3 inch for sediment. A six inch to two foot interval may also be necessary, since subsurface soil data will be needed for the completion of the ERA.

**Response:** The intent of the supplemental sampling depths is to satisfy all of the needed data gaps from one location when possible. This will limit the number of sample locations resulting in decreased sample analysis providing as much data as possible using the funds available. Surface soil sample depths will be changed to 0-6 inches for this investigation as well as the supplemental field investigations at St. Juliens Creek sites. These data and the data from the previous sampling events will be used in determining both human health and ecological risk concerns.

The initially proposed range of the composite samples of 0-3 feet, from ground surface to depth where soils would not be impacted by the water table (typically 4 - 5 feet bgs), was thought to be most suitable for potential exposure to burrowing animals. Further scoping of this project identified concerns that the composite range of 0-3 feet may dilute contaminants in these samples; therefore, a composite depth of 0-2 feet was determined to be more appropriate for use in the initial screening in the ERA process. As burrowing animals may go deeper than the proposed 0-2 feet composite sampling interval, the interval may influence potential risk to error on the conservative side. Therefore, this information will be reviewed and discussed in the risk management steps built into the ERA process. The text for the work plan will be revised to provide the rationale in determining the composite soil sampling interval of 0-2 feet. The revised text will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

8. Please report on Tentatively Identified Compounds (TICs) in the analysis of samples obtained from the St. Juliens Creek Annex.

**Response:** Comment noted. Tentatively Identified Compounds will be reported in the Remedial Investigation Report.

## 2.0 SPECIFIC COMMENTS

1. **Table 3-1 and Table 3-2.** The sampling and analysis rationale for Landfill C provided in Table 3-2 were compared with the data gaps identified for Landfill C in Table 3-1 for each media and activity. The numbers and locations of the additional samples appear sufficient to achieve desired objectives with two exceptions. The first exception is determination of background levels of metals concentrations at the site. However, since the determination of background levels of metals concentrations at the site will be addressed in another document, no corrective action is necessary. The second exception is the number and location of surface soil samples. Table 3-1 indicates that the extent of contamination has not been defined to the south, east and west of the site. Figure 3-1 and Section 3.3.3 present additional surface soil sampling locations primarily to the west and south of the site,

but not to the east/northeast. It is not clear that the additional sampling locations are adequate to define the extent of contamination to the east/northeast of the site. It is recommended that additional surface soil samples be collected in to the east/northeast of the site to define the extent of contamination in this area of the site.

**Response:** The eastern and northern boundaries for Landfill C coincide with the St. Juliens Creek Annex property boundary. Because the site boundary and property boundary coincide, sample collection to the east/northeast would have to occur on property not owned by the Navy. This has limited the ability for collecting samples to the east and north.

2. **Table 3-2, Surface Soils (Landfill C).** TPH analysis has been added to the analyte group for surface soil supplemental sampling and analysis at Landfill C. However, the methodology for the TPH analysis has not been provided. The methodology for TPH analysis of surface soils should be included in Table 3-2 and in the corresponding sections of text.

**Response:** TPH surface soil samples will be analyzed using Method 8015M. Reference to Method 8015M will be added to Table 3-2 and Section 3.3.3. The revised table and text will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

3. **Table 3-2, Subsurface Soils (Landfill C).** TOC analysis has been added to the analyte group for subsurface soil supplemental sampling and analysis at Landfill C. However, since TOC analysis is typically performed only on sediment samples from the site, it is not clear why TOC analysis has been added to this media. Addition of TOC analysis for subsurface soils should be clarified in the corresponding section of the text.

**Response:** The TOC analysis for subsurface soils indicated in Table 3-2 is incorrect. TOC analysis for subsurface soils has been removed from Table 3-2. The revised table will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

4. **Table 3-2, Surface Waters (Landfill C).** Neither TOC nor Total Phosphorus analysis is included in the analyte group for surface water supplemental sampling and analysis at Landfill C. These two parameters are included for surface waters at Landfill D, the other site in this study. Inclusion of these two parameters in the analyte group for surface waters at Landfill C should be considered in order to maintain data consistency in the study area.

**Response:** During the initial site investigation, surface water samples at Landfill D were not analyzed for TOC. Table 3-3 has been revised to reflect this. Table 3-2 has

been revised to include the analysis for total phosphorus in surface water samples at Landfill C. Total phosphorus analysis has also been added to Table 3-4 for surface water samples collected at Landfill D. The revised tables will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

5. **Table 3-2, Sediment (Landfill C).** Neither TOC nor Total Phosphorus analysis is included in the analyte group for sediment supplemental sampling and analysis at Landfill C. These two parameters are included in the preliminary study of sediments. Inclusion of these two parameters in the analyte group for sediments is recommended in order to maintain data consistency with previous sampling rounds and data.

**Response:** TOC and total phosphorus has been added to Table 3-2 for sediment sample analysis at Landfill C. TOC and total phosphorus has also been added to Table 3-4 for sediment sample analysis at Landfill D. The revised table and text will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

6. **Table 3-3 and Table 3-4.** The sampling and analysis rationale for Landfill D provided in Table 3-4 were compared with the data gaps identified for Landfill D in Table 3-3 for each media and activity. The numbers and locations of the additional samples seem sufficient to achieve desired objectives with two exceptions. The first exception is the determination of background levels of metals concentrations at the site. However, since the determination of background levels of metals concentrations at the site will be addressed in another document, no corrective action is necessary. The second exception is the number and location of surface soil samples. Table 3-3 indicates that the extent of contamination has not been defined to the north, south, east and west of the site. Figure 3-2 and Section 3.4.2 present additional surface soil sampling locations primarily to the north, west and south of the site, but not to the east. It is not clear that the additional sampling locations are adequate to define the extent of contamination to the east of the site. Table 3-4 indicates that a road runs along the eastern boundary of Landfill D and Blows Creek borders to the south, apparently making collection of east and southeast samples difficult. It is recommended that additional surface soil samples be collected to the east of the site, across the bordering road if necessary, in order to define the extent of contamination east of the site.

**Response:** Sample collection to the east of Landfill D is difficult because the St. Juliens Creek Annex property boundary coincides with the road (Patrol Road) adjacent to Landfill D's eastern extent. Sampling for extent of surface soil contamination to the east would require sampling on property not owned by the Navy.

7. **Figure 3-2.** Section 3.4.2 indicates that four additional surface soil samples will be collected in the area between Landfill C and Landfill D. However, these samples are not presented on Figure 3-2. The relative locations of the two landfills are also not presented in Figure 3-2. Therefore, the four sampling locations described in the Section 3.4.2 cannot be determined. The locations of the four sampling locations and relative locations of the two landfills should be presented in Figure 3-2 in order to demonstrate the appropriateness of these sampling locations.

**Response:** An additional figure has been added which shows the locations of Landfill C and Landfill D relative to one another as well as the four (4) proposed soil sample locations between Landfill C and Landfill D. This figure will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

8. **Section 3.4.** This section does not include a discussion of the supplemental sampling of groundwater at Landfill D. Table 3-4 does indicate that all existing locations will be sampled in the supplemental activities, but that no additional monitoring wells will be constructed. A summary of these supplemental activities should be included a separate subsection of Section 3.4.

**Response:** Supplemental groundwater sampling activities of existing monitoring wells at Landfill D has been added to Section 3.4. The revised text will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

9. **Table 3-4, Surface Water (Landfill D).** Neither TOC nor Total Phosphorus analysis is included in the analyte group for surface water supplemental sampling and analysis at Landfill D. These two parameters are included for surface waters in the preliminary study. Inclusion of these two parameters in the analyte group for sediments is recommended in order to maintain data consistency with previous sampling rounds and data.

**Response:** Total phosphorus analysis has been added to Table 3-4 for surface water samples collected at Landfill D; however, TOC analysis for surface water has not been added. During the initial site investigation activities, surface water samples were not analyzed for TOC, Table 3-3 has also been revised to reflect this correction. The revised tables will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

10. **Table 3-4, Sediment (Landfill D).** Neither TOC nor Total Phosphorus analysis is included in the analyte group for sediment supplemental sampling and analysis at Landfill D. These two parameters are included in the preliminary study of sediments. Inclusion of these two parameters in the analyte group for sediments is recommended in order to maintain data consistency with previous sampling rounds and data.

**Response:** TOC and total phosphorus analysis has been added to Table 3-4 for sediment sample analysis at Landfill D. The revised table will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

11. **Table 3-2 and Table 3-4.** These tables indicate the analyte group for each media to be sampled. However, neither these tables, nor the associated text indicate whether low level VOC analysis will be performed for groundwater and surface water samples. Low level VOC analysis is recommended and should be clarified in the analyte group section of these tables.

**Response:** Table 3-2 and 3-4 have been changed to indicate low-level volatile analysis for groundwater samples. Surface water samples will not be analyzed using low-level methods to stay consistent with previous investigation activities. The revised tables will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

**Virginia Department of Environmental Quality (VDEQ)**

**Comment 1. Page 4, 3.3.1, Third Paragraph**

It is not clear from the description provided, what activities are to take place.

The road crossing the landfill is approximately 600 feet long, assuming the boundaries of the landfill as indicated by Figure 3-1 are correct. Please locate the proposed 50 foot long test lines on a figure or describe the decision making process to be used to select the "DPT line positioning" in the field. Is there any indication of the orientation of the trenches in the landfill? Was all of the waste placed in trenches or was some spread, disposed of in a pit, or placed in "blocks"? Was there any cover placed on this landfill? How deep is it?

Two "aliquots" of soil are being collected from each boring. Does this mean that one split spoon sample will be obtained to a depth of just short of the groundwater and that the sample will be divided in half lengthwise, with one half of the sample being retained and the other being field tested? Please describe the means to collect the field test sample from the soil boring core. Will compositing be performed? Was the intent to state that discrete vertical sections of the core sample will be identified visually in the field and tested individually using a PID or other similar instrumentation? Please describe these procedures in detail being specific as to the decision making and sampling process and the field analytical procedures.

I am not familiar with a procedure for a "semi-quantitative immunoassay" test kit to test for TPH. Are we concerned with biologicals? Please provide additional information regarding the field test procedure/equipment.

Describe the decision making process to select 4 samples to receive "full analysis".

Please describe the sampling procedure to the samples to receive "full analysis" and identify exactly what is "full analysis". Reference to "as described below" refers to samples from 0 to 2 ft bgs. It does not appear to apply to this situation.

**Response:** As indicated in the Preliminary Results listed in Table 3-1, no clear indication of landfilling activity at Site C has been identified from the field investigation to date. No indication of fill was found in any of the borings drilled to date and no trenches or blocks (cells) were identified in Environmental Photographic Interpretation Center (EPIC) study of historical aerial photographs. A possible pit(s) was identified in the EPIC study along the road that crosses the site. Review of information collected to prepare the 1981 Initial Assessment Study (NEESA, 1981) confirms this location as a probable "oily sludge" disposal pit. The DPT lines (lines of DPT borings shown are shown on Figure 3-1) will be located in the field with the use of Figure 3-1 and historical aerial photographs. In addition, every effort will be made to maximize the information obtained from the borings. Therefore if evidence of contamination is found, the locations of DPT borings may be adjusted in the field.

The third paragraph of Section 3.3.1, Disposal Area Investigation, will be re-written for clarity and to add detail. This revised text will be available for review during the

meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations. The objective of the borings is to identify and sample waste, if it exists. The samples will be collected using a DPT rig and a 4-ft long Macro Core sampling device or equivalent. The core sample will be examined for visible indications of waste material. If an interval of waste is identified, that interval will be sampled and sent to the off-site laboratory for "full analysis", i.e., analysis for TCL organics, TAL inorganics and TOC (see Table 3-2, Analyte Group). These are the same analyses that will be used for all subsurface soil samples from the site.

If there is no visual evidence of waste material, a sample from along the length of each 2-ft section of the core will be placed in a jar (until the jar is approximately half full) for headspace analysis. The remaining sample from each 2-ft section will be placed in a separate container for hydrocarbon analysis utilizing a field test kit.

The headspace jar will be sealed with aluminum foil, the lid will be placed on the jar, and the jar will be allowed to warm to room temperature. The lid will be removed and the probe of the PID inserted through the aluminum foil. A reading of the organic vapors present in the "headspace" of the jar will be made.

The sample with the highest headspace reading (or the sample immediately above the water table, if no headspace readings are observed) will be analyzed using a field test for hydrocarbon analysis (the Dexsil® PetroFLAG® Test System). The instructions for conducting the analyses are provided by the manufacturer with the test kit. If requested a copy of the procedure can be submitted to Virginia Department of Environmental Quality (VDEQ) prior to field mobilization. Hydrocarbons were selected as an indicator parameter because of the reported presence of a pit of "oily sludge". We are not concerned with biologicals, as there are no known reports of biological agents being disposed in Landfill C.

The decision of which four samples to send to the off-site laboratory for full analysis will be based on evidence of contamination. Samples of visually contaminated soil or waste will be selected first and samples of soil with the highest measurement of hydrocarbons in the field analysis will be selected second. If additional samples are required in order to submit 4 samples, soil with elevated PID headspace readings (above ambient) will be sent.

PetroFLAG® hydrocarbon analysis system is a broad spectrum field analytical tool for detection of hydrocarbons. The system uses a patent-pending chemical method and special analyzer. The extraction solvent used in the analysis has been developed to give consistent extraction efficiencies over a range of soil types. It is most sensitive to heavier hydrocarbons such as oils and greases and less sensitive to lighter, more volatile, hydrocarbons.

The proposed analysis for samples collected at Landfill C are presented in Table 3-2 of the Draft Supplemental Work Plan Addendum.

**Comment 2 Page 4, Section 3.3.2, Second Paragraph**

What happened to the 40 soil borings described in section 3.3.1?

Please describe the procedure to be followed in testing with the PID. Will the entire length of the soil boring cores be tested? Will sections be tested in the vapor space of a sealed jar at (4, 6, 12 inch?) intervals using the PID after the initial "sniff test" along the length of the core?

Section 3.3.1 states that soil borings will not extend into the groundwater and Section 3.3.2 states that soil borings will extend to the groundwater. Please describe the method being used to seal the borings so that an additional channel is not created for contaminants to enter groundwater. By-the-way, what is the depth to groundwater in the vicinity of Landfill C.

Please provide documentation to justify the selection of 0.25 to 2.0 ft bgs to be sampled for use in the BERA for burrowing animals. Some burrowing animals will go as deep as 7 feet, and it is common for a groundhog or rabbit to have burrows deeper than 2 ft.

**Response:** The forty borings are described in section 3.3.1 and are referenced in the second sentence of the first paragraph of section 3.3.2.

PID headspace screening of soil borings in the DPT lines will be as described in VDEQ Response to Comment #1. PID headspace screening of other soil borings will be performed for depth intervals below two (2) ft and above the water table. The interval above two (2) ft will not be screened because it will be sent to a laboratory for full analysis. The headspace screening technique will be as described in VDEQ Response to Comment #1.

Soil borings will be sealed filling them with granular bentonite and hydrating the bentonite with potable water. This will be added to the text; this revised text will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations. Depth to groundwater at Landfill C during the initial RI field investigation was approximately three (3) to five (5) ft bgs.

The initially proposed range of the composite samples of 0-3 feet, from ground surface to depth where soils would not be impacted by the water table, was thought to be most suitable for potential exposure to burrowing animals. Further scoping of this project identified concerns that the composite range of 0-3 feet may dilute contaminants in these samples; therefore, a composite depth of 0-2 feet was determined to be more appropriate for use in the initial screening in the ERA process. As burrowing animals may go deeper than the proposed 0-2 feet composite sampling interval, the interval may influence potential risk to error on the conservative side. Therefore, this information will be reviewed and discussed in the risk management steps built into the ERA process. The text for the work plan will be revised to provide the rationale in determining the composite soil sampling interval of 0-2 feet. The revised text will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

**Comment 3. Page 7, Section 3.3.3**

Please provide documentation to justify the selection of the top 3" of soil instead of the top 6" of soil to be sampled for the HHRA. Most gardens are tilled to depths exceeding 6".

**Response:** The intent of the supplemental sampling depths is to satisfy all of the needed data gaps from one location when possible. This will limit the number of sample locations resulting in decreased sample analysis providing as much data as possible using the funds available. Surface soil sample depths will be changed to 0-6 inches for this investigation as well as the supplemental field investigations at St. Juliens Creek sites. These data and the data from the previous sampling events will be used in determining both human health and ecological risk concerns.

**Comment 4. Page 7, Section 3.3.4**

Please indicate which wells were located in a perched water table. Please discuss how the determination was made that these wells are or could be located in a perched water table.

It would be helpful to have an 11 X 7 fold out diagram that had both Site 3 and Site 4 as well as the sampling and proposed sampling locations identified.

Is there sufficient data available to determine groundwater flow direction of the Yorktown Aquifer?

**Response:** The two wells that are potentially screened in a perched water table are MW2S and MW4S at Landfill C. The water level in both wells appear to be one (1) to three and one-half (3.5) ft higher than those in the other two wells, despite the fact that these wells are closer to the South Branch of the Elizabeth River. Both wells also were screened in sandy silt found above a clay lens. There is some uncertainty, however, as it appears that the bottom 0.5 ft of the screen in MW2S is below the clay, in a fine sand. If the water level in this well is from the true water table aquifer, the direction of groundwater flow would be away from the South Branch of the Elizabeth River. This may actually be the case, as the variation in the direction of groundwater flow with the change in tides has not yet been evaluated.

The direction of groundwater flow in the Yorktown Aquifer can be evaluated by using water level data collected (within a relatively short time interval) from all the Yorktown Aquifer monitoring wells installed in 1997 at Sites 2, 3, 4, and 5. Using the combined data, a site-wide potentiometric map for the aquifer can be made. During the initial field investigations it was demonstrated that the water levels in the Yorktown Aquifer monitoring wells are impacted by tides. The extent to which tides impact the direction of groundwater flow will be evaluated in the supplemental investigation.

An additional figure has been added which shows the locations of Landfill C and Landfill D relative to one another as well as the four (4) proposed soil sample locations between Landfill C and Landfill D. This figure will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

**Comment 5. Page 7, Section 3.3.5**

Though not absolutely required, I would appreciate being consulted regarding any field changes in sampling and monitoring well locations prior to it occurring. It is understood that I may not always be available via telephone or on site; however, please at least leave a message on the voice mail along with a cell phone number where you can be reached.

**Response:** Comment noted. If a significant field change is being considered, efforts will be made to contact VDEQ.

**Comment 6. Whole Document**

Please refer to the operating manual and sample testing procedures for all instrumentation used in the field such as the Horiba U-10 Water Quality meter. Another option would be to describe the procedures in the text or in an appendix of the document. For equipment such as the Horiba, include a copy of the relevant sections of the manuals or your customized procedures in the work plan.

**Response:** The standard operating procedures (SOPs) for field instruments are included as Appendix A to the Summary Work Plan Remedial Investigation and Feasibility Study, Landfill C (Site 3) and Landfill D (Site 4) (May, 1997). All work in this supplemental investigation will be conducted under the procedures specified in the work plan. Manufacturer's operating manuals will be available and used in the field to calibrate and operate all field instruments.

**Comment 7. Page 8, Section 3.4.1**

Why are subsurface soil samples being collected from around the perimeter of the landfill for the ecological risk assessment? The whole purpose is to determine the risk from the contaminated area, not areas which may have been impacted due to waste migration.

Again, I question the selection of 2 feet as the depth for burrowing animals. Please provide documentation supporting your choice of sample depth.

**Response:** An attempt will be made to collect four subsurface soil samples from within the landfill boundaries. There are two concerns with collecting samples within the boundaries. First is the difficulty in obtaining samples due to the large amount of concrete and large metal items which were disposed in the landfill. A limited ground-penetrating radar survey conducted over the surface of the landfill during the initial field work indicated numerous "reflectors". Secondly, the ecological risk assessment needs to consider the appropriateness of the landfill as a habitat, given the nature of the fill and concrete block.

To address these two issues, the subsurface soil samples will be collected toward the outside edges of the landfill. Two of the presently planned borings and two additional borings will be moved to the interior of the landfill. One location will be over the approximate location of the former trench (along the south edge of the landfill) The other three locations will likely be along the western side of the landfill.

The exact locations will be determined in the field based on the accessibility (ability to hand auger or drill through the material), and the presence of sufficient soil to provide a habitat for burrowing animals.

Regarding sample depths, please refer to VDEQ Response to Comment # 2 and USEPA Response to General Comment #7 above.

**Comment 8. Whole Document**

Please describe, in detail, the PID scanning procedure and subsequent decision making process. What is a high screening reading? I suggest that any screening reading above ambient should be considered a "hit".

**Response:** It is agreed that any screening reading above ambient will be regarded as a hit. However, PIDs can be sensitive to humidity, therefore, elevated readings from moist samples will be evaluated with this in mind. As noted in the text, other evidence (presence of layers of waste or other visual evidence) will also be considered. More detail will be added to the text; the revised text will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

**Comment 9. Page 8, Section 3.4.2**

Why are surface soil samples being collected from around the perimeter of the landfill for the human health risk assessment? The whole purpose is to determine the risk from the contaminated area, not areas which may only have been impacted due to waste migration.

Please indicate the proposed sampling locations on a combined Site 3 and Site 4 map which shows all sampling locations, including those to characterize the dredge spoil material that predominates the area.

**Response:** Perimeter samples will be used to confirm and define the site boundaries; those samples determined to be outside the boundaries of the landfill will not be used for the human health risk assessment purposes. The text will be revised and available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

An additional figure has been added which shows the locations of Landfill C and Landfill D relative to one another as well as the four (4) proposed soil sample locations between Landfill C and Landfill D. This figure will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

**Comment 10. General**

Samples used to determine the extent of the landfill boundaries and possible migration may be used to provide data for a model, but, are not suitable for either an ecological, or human health based risk assessment on-site. Models used to project contaminant concentrations throughout the life of the contaminants, can be used in the risk assessments. The intended use of the data is not always clear in the descriptions of the sampling point selection and associated text.

**Response:** The intended use(s) of the samples is listed in the "Objective" column of Table 3-2 (for Landfill C) and Table 3-4 (for Landfill D). For Landfill C samples collected on the "perimeter" (keeping in mind that the true site boundary is not known) will provide data for definition of the extent of contamination. In addition, if they are located within the site boundary, they will provide data for the ecological risk assessment. Sampling locations for BERA use may be changed in the field if the DPT borings identify areas of waste or contamination.

Also see VDEQ Response to Comment #7 above.

**Comment 11.** Please provide a detailed description of the slug testing procedure to test for hydraulic conductivity.

**Response:** An SOP for hydraulic conductivity measurement using the slug test method will be added to the Supplemental Work Plan. The SOP will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

**Comment 12. Page 11, Section 3.5**

In order to obtain comparable data, please describe what measures are being taken to account for tidal differences between this sampling round and the prior groundwater/surface water sampling round(s).

**Response:** During the initial RI field activities, surface water at Landfill D was sampled as close to outgoing low tide as possible. No surface water was available to sample at Landfill C. During the supplemental investigation a similar strategy will be used for Landfill D. None of the surface water samples at Landfill C are hydraulically connected to tidally influenced surface water bodies so the tide is not a consideration there.

Surface water samples collected from tidally influenced water bodies will be collected during outgoing low tide. At this time, no attempt is planned to coordinate groundwater sampling events with tidal phase.

**Comment 13. General**

How much time (minimum) will be allowed between well construction, well development, well slug testing, well tidal variation testing and well sampling.

**Response:** As specified in the approved Work Plan, the minimum time between well construction and well development will be 24 hours. Previous experience with the development and sampling of monitoring wells at the St. Juliens Creek Annex indicates that the monitoring wells generally recover quickly. All wells will be allowed to recover at least 12 hours prior to either slug testing or the tidal study. Additionally, all wells will be allowed to recover at least 12 hours between the slug testing and the tidal study. These time intervals may be increased if experience with newly installed wells indicates that more time is needed to recover. The text will be revised to indicate these minimum times, and will be available for review during the meeting to discuss the comments and responses to comments on this work plan and the work plans for the site specific supplemental field investigations.

**Comment 14. Reference to the Main Body Workplan for the RI May 1997**

There have been updates to the EPA Risk Assessment guidance documents as well as to the various ecological and human health risk screening tables. The RI Work Plan references a specific version of these documents. Please note, that for the final RI report, the most current revisions must be used.

**Response:** Comment noted. The most current revisions of the guidance documents will be used.