COMMENTS ON DRAFT FEASIBILITY STUDY FOR SITES 2, 8, 18 AND SITE SCREENING FOR SITE 14 NWS YORKTOWN VA
3/22/1999
U S EPA REGION III

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

March 22, 1999

Mr. Scott Park
Atlantic Division, NAVFACENGCOM
Environmental Quality Division
Code 1822
Building N 26, Room 54
1510 Gilbert St.
Norfolk, VA 23511-2699

Re: EPA review of the draft FS for sites 2, 8, 18 and SSA 14

Dear Mr. Park:

The U.S. Environmental Protection Agency (EPA) has reviewed Yorktown's draft Feasibility report for sites 2, 8, 18, and SSA 14 dated October 1998. There is a general review and a review conducted by the EPA's Biological Technical Assistance Group (BTAG). If you have any questions regarding these review comments please contact me at (215) 814-3366, or via e-mail at STROUD.ROBERT@EPAMAIL.EPA.GOV.

Sincerely,

Robert W. Stroud

Robert W. Stroud, RPM
(3HS50)

cc: Steve Mihalko, VDEQ
Peter Knight, NOAA
Jeff Harlow, WPNSTA

Technical Review of the Draft Feasibility Study for Sites 2, 8, 18 and Site Screening Area 14 Naval Weapons Station Yorktown, Yorktown, Virginia

GENERAL COMMENTS:

1. Site 2, the Turkey Road Landfill, by name and description, is a landfill. However the site is treated more like an area of contaminated soil than a landfill with respect to Applicable or Relevant and Appropriate Requirements (ARARs), closure, and the screening of remedies. If the area was operated by the installation as a landfill, then Virginia solid waste management regulations regarding the closure of landfills would appear to be applicable. Furthermore, the screening of remedies should account for the proper closure of the landfill with respect to State requirements including capping and groundwater monitoring. Additionally, the applicability of the containment presumptive remedy to the subject landfill should be evaluated and included in the FS. If sufficient evidence is available to document that the subject area should not be treated as a landfill, then this information should be presented in the FS. Otherwise the FS should be revised to more appropriately consider typical landfill requirements.

2. With respect to thermal treatment options, incineration was the selected process option over low, medium and high temperature thermal desorption. Given the high capital costs associated with incineration, it is not evident why this process option was selected. As can be seen in Table 4-3 Low Temperature Thermal Desorption was eliminated because of issues with PAH boiling points. Based on information provided in the report, Low Temperature Thermal Desorption can achieve temperatures near 600° F which would treat most if not all the PAH chemicals of concern. Additionally, High Temperature Thermal Desorption was eliminated because it is not effective against explosives. Site 2 accounts for approximately 88% of the soil requiring treatment (Site 2: 785 cubic yards; Site 8: 30 cubic yards; SSA 14: 70 cubic yards). Explosives are not a chemical of concern at Site 2. It seems premature to rule out High Temperature Thermal Desorption (HTTD) considering that HTTD costs are low to moderate, versus incineration which costs are considered high. It is recommended that both low and high temperature thermal desorption be evaluated in more detail.

3. The subject sites are located in or near sensitive environments (i.e., Felgates Creek, wetland areas). Considering that Site 2 is also governed under the Chesapeake Bay Program which restricts usage near the site and requires the re-establishment of certain vegetative communities (i.e, riparian), it is unclear why phytoremediation alternatives were not considered. Recent efforts/studies in phytoremediation has shown promise with respect to the contaminants of concern at the site, with many field demonstrations ongoing or completed. This type of alternative, while remediating the contaminants of concern at the site, may prove to be an added benefit to the surrounding ecological communities as well. It is recommended that phytoremediation be evaluated and considered as potential alternatives to remediating the sites.

4. Numerous unit cost discrepancies were noted between Site 2, and Site 8 and SSA 14 for the same remedial action. It is assumed that these variations may be related to volume discounts. If so, volume discount assumptions should be specified in the cost summaries so that independent verification of the costs can be performed.

SPECIFIC COMMENTS on the DRAFT FEASIBILITY STUDY REPORT:

5. Section 2.1.1.3, Hydrogeology of Site 2, Page 2-2. The second paragraph of this section discusses shallow groundwater flow at the site and monitoring well placement. The paragraph references Figure 2-4 which is a groundwater contour map of the site. As indicated on the map, aside from the upgradient monitoring well (2GW01) located to the south, all three remaining wells are located along the northern portion of the landfill. However, the map clearly indicates a radial flow from the center of the landfill. Based on the locations of the three wells, only a small portion of the groundwater at the landfill is being monitored. There is minimal coverage along the eastern and western perimeters of the landfill. Justification should be provided as to why the monitoring wells were concentrated along the northern perimeter. Given the radial flow, consideration should be given to placing additional monitoring points along the eastern and western perimeter to better characterize the extent of contamination. This may provide useful information with respect to the selection of a remedy for the site.

6. Section 2.1.2.1, Site Description and History of Site 8, Page 2-3. The second paragraph states that a carbon adsorption tower was constructed in 1974. Prior to 1981 this carbon adsorption tower discharged directly to the drainage area. Information concerning this discharge should be included in the report. For example, specifics concerning the exact location of this discharge should be specified and depicted on the site figures.

7. Section 2.2.8.4, SSA 14 Round Two RI Results Summary, Page 2-27. As can be seen from the data presented, only one groundwater sample was collected which indicated significant VOC contamination. No further attempt was made to either delineate, or further characterize groundwater. Soil sampling downgradient of this well indicated isolated hotspots of explosive compounds. Risk assessment evaluations of the groundwater were performed on the one groundwater sample. There is no assurance that these concentrations represent the maximum concentrations within the plume, or whether there are additional contaminants in other areas of the site. Further characterization of the groundwater is warranted to ensure that the groundwater is fully characterized in terms of contaminants and concentrations detected to accurately evaluate the risks posed by the site.

8. Section 2.3.4.1, Site 2 Round One RI Results, Page 2-13. This page details sediment sampling results from the Round One RI. This section states that several organic contaminants including toluene are considered "common laboratory contaminants". Toluene is not considered by EPA to be a "common laboratory contaminant". Site specific QA/QC data such as laboratory blanks would be required to support the assertion that toluene is a laboratory contaminant. Specific QA/QC data should be provided or this section modified accordingly.

9. Figure 2-35. Sample results for Sample No. A14SD01-01 appears to be depicted with the wrong sample location (A14GW01) which is a monitoring well. This discrepancy should be corrected.

10. Section 3.1.1, Media and Contaminants of Concern Determined by the Human Health Risk Assessment, Page 3-1. This section documents the contaminants of concern based on results of the Human Health Risk Assessment. Numerous concerns/comments which may affect COC selection were identified in the review of the Draft Round Two Remedial Investigation report for the subject sites. Those comments should be addressed and the feasibility modified accordingly.

11. Section 3.1.2, Media and Contaminants of Concern Determined by the Ecological Risk Assessment, Page 3-2. This section documents the contaminants of concern based on results of the Ecological Risk Assessment. Numerous concerns/comments which may affect COC selection were identified in the review of the Draft Round Two Remedial Investigation report for the subject sites. Those comments should be addressed and the feasibility modified accordingly

12. Section 3.1.2.4, SSA 14 - Building 537 Discharge to Felgates Creek, Page 3-5. Relatively high concentrations of VOC were detected in the one monitoring well located at this site. It appears that the potential for groundwater to migrate and discharge to surface water was not evaluated as a potential exposure route. Given the close proximity of the site to the surface water body and based on the elevation of the groundwater, it is reasonable to assume that the groundwater at SSA 14 discharges to Felgates Creek. The extent of groundwater contamination at this site has not been determined, so it is not clear how close the VOC contamination may be to potentially discharging to the surface water and sediment near Felgates Creek. It is recommended that this exposure route be considered when evaluating impacts to ecological receptors. Further consideration should be considered to either performing fate and transport modeling to predict expected discharge concentrations, or conducting further investigation to delineate extent of contamination.

13. Section 3.6.1, Site 2 Areas of Concern, Page 3-16. This section details the estimated area of impacted soils exceeding FRGs. These areas are based exclusively on samples that were collected along the perimeter of the landfill. Minimal samples were taken within the interior of landfill. While the extent of contamination parallel to the landfill perimeter was performed, no attempt to characterize the extent of contamination from the perimeter of the landfill toward the interior. Given that one of the remedial options includes excavation of the contaminated material, it is recommended that delineation of these areas inward toward the interior be considered, or further documentation provided supporting the argument that the contamination inward is not anticipated to extend inward to any significant extent. The volume of the waste would have a direct bearing on the cost of excavation, treatment and removal of the waste.

14. Section 3.6.2, Site 8 Area of Concern, Page 3-16. This section indicates that groundwater at Site 8 would be addressed in a separate FS. This is the only reference in the report that indicates that groundwater is not being addressed in this FS. Previous sections evaluated risks to this pathway and established FRGs. It is recommended that the fact that this FS will not address groundwater at Site 8 be stated clearly in the beginning of the document and emphasized throughout.

15. Section 3.6.4, SSA 14 Areas of Concern, Page 3-17. Three surface soil samples were collected from this area, all of which have contaminants which exceed respective FRGs. The extent of contamination subject to remediation at this site has not been delineated. It is recommended that further delineation be considered so that decisions within the FS could be based on the extent of contamination.

16. Tables 3-27 through 3-30. These figures include a column listed as "Final Remediation Goals". It is recommended that this column be changed to "Remediation Goals" as the final remediation goals are presented in Tables 3-31 through 3-34, both in terms of contaminants selected and remediation levels.

17. Table 4-2. This table indicates that stabilization/solidification was eliminated from further consideration because it "may hinder future use of site" but capping was not. The meaning of this statement is not clear. With respect to future use of the site, it is not evident the difference between solidification/stabilization and capping technologies. Clarification should be provided.

18. Table 4-3. This table indicates that the capping technology was eliminated from consideration for Site 2 because of the location of the contaminants at the site. Consideration should be given to excavation of the contaminated material and replacement on to other areas of the landfill. By relocating the contaminated material to other portions of the landfill, capping at Site 2 may be a viable option. It should be noted that given that this site is designated a landfill, state requirements may necessitate the proper closure of the landfill, which may include the application of a soil cap for the landfill proper. It is recommended Virginia DEQ requirements be evaluated as well as excavation and relocation of the contaminated soils.

19. Table 4-3. This table indicates that land farming was retained for consideration while composting was eliminated. It is not clear from this table why composting was eliminated yet land farming retained. As seen from the table, estimated costs are lower for composting compared to land farming. Additionally, it is noted that land farming may take considerable amount of time due to slow degradation rates. Composting, compared to land farming likely has much faster degradation rates since a more aggressive approach to stimulating the microbes is performed. For these reasons, it is recommended that composting be considered at this site.

20. Table 4-3. This table indicates that Low Temperature Thermal Desorption technology was eliminated from further consideration because PAHs that require treatment have boiling points higher than 450° F. According to Section 4.2.7 of the report, Low Temperature Thermal Desorption technology can achieve temperatures up to 600° F. This appears adequate to treat the carcinogenic PAHs of concern. The specific boiling points of the PAHs should be checked against the 600° F upper limit of the technology to see if this technology can effectively treat the contaminants of concern. As seen from this table, Low Temperature Thermal Desorption appears to be significantly less costly than incineration, the technology retained in this process category. If it is determined that Low Temperature Thermal Desorption can remediate the PAH COCs, it is recommended that this technology be retained for further consideration.

21. Section 5.1.1, Site 2 RAAs, Pages 5-1 through 5-5. This section and accompanying subsections discuss remedial action alternatives for the Site 2 landfill. RAAs 3, 4, 5, and 6 employ either treatment and or removal and disposal of the contaminated media at the site. The RAAs focus efforts to remediate contaminated soil located along the fringe of the landfill which has been characterized to be above Final Remedial Goals. Most of the characterization has taken place along the periphery of the landfill with minimal efforts expended within the landfill proper. While RAAs 3,4,5, and 6 address the contamination currently above FRGs, waste will remain at the site with the potential to act as a continuing source of groundwater contamination. Therefore, a component of all of these RAA should include continued long term monitoring to ensure the remaining waste is not reintroducing contamination to the surrounding environment. This component and associated costs should be incorporated into the FS.

22. Section 5.1.1.3, Site 2 RAA 3: Soil Washing, Page 5-2. This section indicates that the concentrated contaminant wastestream generated by the soil washing technology would be transported offsite for further treatment. No further detail is provided concerning the treatment to be employed. It is recommended that detail concerning potential treatment options for treatment of the contaminated fines and waste water be provided. This may impact costs associated with the remedial alternative. Likewise, as soil washing is an alternative at the other sites, costs for offsite treatment for those sites should be factored into the FS.

23. Section 5.1.1.4, Site 2 RAA 4: On-Site Biological Treatment, Page 5-3. This section discusses a remedial alternative which combines biological treatment with chemical treatment for inorganics. Part of the treatment includes the addition of a chelating agent to promote the extraction of the inorganics from the soil. However, according to Appendix D, in a phone call report between Ellen Bjerlie (Baker Environmental) and Maggie Thomas (Doe Run Company), Ms. Thomas indicated that the leaching process has "not been successful" on mercury. Mercury is a COC at Site 2. This process is also proposed for Site 8 and SSA 14 where mercury is a COC. Additional means may be required to address mercury concentrations at Site 2.

24. Section 5.1.2.7 Site 8 RAA 7: Capping and Drainage Diversion, Page 5-9. This alternative states that runoff will be diverted away from the capped area. The runoff to be diverted is from the storm sewer, which will be relocated. It does not address surface runoff from the steep slopes on both sides of the drainage ditch. Given the contours of the surrounding topography, Site 8 is located in a natural drainage pathway which may require significant effort to effectively divert runoff from this area over time. The effort required to divert surface runoff from the side slopes should be evaluated and factored into the Feasibility Study.

25. Section 5.1.2.7, Site 8 RAA 7: Capping and Drainage Diversion, Page 5-10. This section states that this alternative may not be protective of groundwater at the site. This section states that groundwater issues are a concern for a separate FS. The evaluation of soil remedies can not ignore issues with groundwater simply because groundwater is being addressed separately. While this FS does not have to develop remedies to meet specific groundwater remedial goals, one goal of a remedy of soil would be to minimize or prevent migration to groundwater. This alternative does not achieve this goal. It is recommended that for this reason and concerns about the ability to effectively minimize surface runoff, this alternative be eliminated from consideration.

26. Section 5.1.2.7, Site 8 RAA 7: Capping and Drainage Diversion, Page 5-9. This section details RAA 7 for Site 8 which consists of placing a cap on the area of concern. Any RAA which leaves waste in place at a site should include as part of the RAA, long term monitoring to ensure that contaminants are not migrating from the area, either through surface runoff, groundwater, or groundwater to surface water discharge. It is recommended that long-term sampling be built into this alternative.

27. Section 5.1.4.3, SSA 14 RAA 3: Soil Washing, Page 5-11. This section states that 70 cubic yards of contaminated soil is estimated to require treatment at this SSA. The actual area subject to remediation can not be adequately determined at this site because of the limited number of samples collected to delineate the contamination. According to Figure 3-4, three soil samples were collected from this area, all of which exhibit contamination above remedial goals. It is recommended that further sampling be performed to refine estimates of soil requiring remediation. This may significantly affect the remedy selected.

28. Section 5.1.4.7, SAA 14 RAA 7: Capping and Drainage Diversion, Page 5-14. This section details RAA 7 for SSA 14 which consists of placing a cap on the area of concern and incudes surface runoff diversion. Any RAA which leaves waste in place at a site should include as part of the RAA, long term monitoring to ensure that contaminants are not migrating from the area, either through surface runoff, groundwater, or groundwater to surface water discharge. It is recommended that long-term sampling be build into this alternative.

29. Section 7.1.3.7 Costs, Page 7-7. This section provides the costs for soil washing at Site 2. It is not evident from the cost spreadsheets, or the description of the technology presented, what type of wastewater treatment is to be employed on the wastewater generated from the process. It does not appear that the cost of treating the wastewater was factored into the cost estimate. The difference between the amount generated between Site 2 and the other two sites should be substantial, yet the same dollar amount for wastewater treatment ($6,490) was used for all three sites (2, 8, and SSA 14). The wastewater treatment costs should be reanalyzed and modified if necessary.

30. Section 7.1.5.7, Costs, Page 7-13. This section provides the cost estimates for incineration at the three sites. The detailed cost breakdown is provided in Appendix E. With offsite incineration, the percentage of characterized "hazardous waste" significantly affects overall costs both in terms of treatment and transportation. Its not evident what assumption was used for factoring in hazardous waste handling and disposal. Based on Appendix E (Table E.1-4), at the top of the second page the first column indicates in

parentheses "(assuming hazardous)". It is not clear what is meant by this, however it could be construed to mean that the entire waste stream was considered hazardous. If the entire waste material was assumed to be RCRA hazardous waste, this may significantly overestimate costs. The primary contaminants at these sites are PAHs and inorganics. No PAHs have RCRA "characteristic" waste codes, and the inorganics do not appear to be sufficiently high enough throughout the site to support this conclusion. It is recommended that the assumptions used to derive these estimates be included. The basis for such a determination should be clearly stated.

31. Section 7.1.6.7, Costs, Page 7-15. This section provides the cost estimates for excavation and offsite disposal alternative at the three sites. The detailed cost breakdown is provided in Appendix E. With offsite disposal, the percentage of characterized "hazardous waste" significantly affects overall costs both in terms of disposal and transportation. The detailed estimate provided in Appendix E provides two estimates, one assuming no (0%) hazardous waste, the second assuming 100% hazardous waste. While this estimate provides the maximum range of costs which may be encountered, it appears that more accurate information to base a remedy selection could be obtained with the collection and analysis of selected soil samples and subsequent TCLP analysis. This data would indicate which of these two scenarios is more realistic and would provide better estimates for decisions to be based.

32. Appendix E. The unit costs for sampling parameters differs for the soil washing alternatives between Site 2, and both Site 8 and SSA 14. For the "Treatment Process Sampling Analysis" line items, the following sampling unit costs are noted:

Analysis	Site 2	Site 8	SSA 14
SVOCs	$440	$220	-
PCBs	$200	$100	-
Inorganics	$200	$100	$100

The difference in these unit costs should be reconciled.

33. Section 7.1.3.7 Costs, Page 7-7. This section details costs associated with soil washing at Sites 2 and 8, and SSA 14. Site 2 costs should incorporate costs for long-term monitoring given that wastes will remain at the site.

34. Section 7.1.4.7 Costs, Page 7-10. This section details costs associated with onsite biological treatment at Sites 2 and 8, and SSA 14. Site 2 costs should incorporate costs for long-term monitoring given that wastes will remain at the site.

35. Section 7.1.5.7 Costs, Page 7-13. This section details costs associated with offsite incineration at Sites 2 and 8, and SSA 14. Site 2 costs should incorporate costs for long-term monitoring given that wastes will remain at the site.

36. Section 7.1.6.7 Costs, Page 7-15. This section details costs associated with offsite disposal at Sites 2 and 8, and SSA 14. Site 2 costs should incorporate costs for long-term monitoring given that wastes will remain at the site.

BTAG COMMENTS

Page 2-7, section 2.1.4.4: The statement is made that "The drainage area at SSA-14 is generally inaccessible because of topographic relief." This statement should clarify if this area is inaccessible to humans, ecological receptors, or both.

Page 2-14, section 2.2.4.2: The statement is made that "The concentrations of inorganics were comparable to those found in Round One site-specific background surface soil samples." This statement is too generalized. The term "comparable" should be discussed more fully. Specifics, where available, should be quantified and included in the text.

Page 2-18, section 2.2.4: The statement is made that "The inorganic concentrations in sediment were similar to those found in previous investigations." The meaning of this statement is not clear. The term "similar" is too general and should be clarified. The use of the phrase "similar to" extends to other sections of this document and should also be clarified.

Page 2-18, section 2.2.5: The statement is made that "Although SSA-14 was not specifically included in the Habitat Evaluation, it is located immediately upstream of Site 8." Again, this statement is not clear. Is this the reason that the habitat evaluation report can be applied to SSA-14? Because of this close proximity, is the habitat at SSA-14 "similar" to the habitat at Site 8? This statement should be clarified.

Under the relative risk ranking for SSA-14 (page 2-22, section 2.2.7), the statement is made that surface soil, surface water, and sediment "...samples were analyzed for nitramine compounds." Are these the only contaminants included in the analysis? The text should more clearly indicate that VOCs, SVOCs, pesticides, PCBs, and inorganics were not included in the analysis.

In this same section one sentence indicates that "Migration pathways were found to be evident (utilized pathways were clearly present) for groundwater, soils (human health), surface water (human health and ecological - freshwater), and sediment (human health and ecological - freshwater)." The next sentence says, "Migration pathways were found to be confined (pathway is not possible under existing site conditions) for surface water (ecological - marsh) and sediment (ecological - marsh)." The text should clearly indicate how the qualifiers "ecological - freshwater" and "ecological - marsh" are different as they relate to sediment and surface water.

Page 2-29, section 2.3.2: The statement is made that "Soil contamination appears to be confined to surface intervals at Site 8." The term "surface intervals" should be more carefully defined in the text.

In this same section, the statement is made that "Based on these results organic contaminants from Site 4 (and SSA 14) do not appear to be affecting Felgates Creek." Just because contaminants were not detected in a particular media (i.e. surface water or sediment) does not mean they are not "affecting" a habitat. The detection limits should be compared to the ecologically sensitive screening values to help determine this. Conversely, just because inorganic contaminants were found at concentrations above detection limits does not mean that adverse impacts or risk to ecological receptors will result. This section should be clarified.

Page 2-30, section 2.3.3: The statement is made that "...thallium was detected in the sediment samples collected from the deeper interval." The term "deeper interval" should be quantified.

Page 2-32, section 2.4.1: The last paragraph in this section indicates that surface water concentrations at Site 2 were not compared to benchmark values because they did not exist. However, there is a list of contaminants identified as potential risk to the aquatic environment. The text should clarify if the list contains those contaminants for which no benchmark existed. This same comment applies to the other sites and should be clarified also.

Page 2-34, section 2.4.3: The statement is made that "...only one concentration of mercury was detected slightly above the range of background concentrations." The range of background concentrations as well as the one Hg concentration that exceeded background should be given in the text. A summary of the background data should also be given in a section of the FS.

Figure 2-17 does not contain the units ((g/kg?) for the concentrations of soil contaminants. This should be added to this figure and the other figures should be checked to be sure all of the data are accurately presented.

Page 3-2, section 3.1.2: The statement is made that "Only contaminants detected over benchmark toxicity values or generating risk in the receptor models are discussed." This statement should be changed to: "Those contaminants detected over benchmark toxicity values, generating risk in the receptor models, or did not have a benchmark value are discussed."

Page 3-3, section 3.1.2.1: The ERA summary in the FS was difficult to follow and did not present a succinct description of the ecological risks identified Based on the discussion of the aquatic environment in this section, the authors do not clearly indicate the differences between direct (acute and chronic) toxicity and toxicity associated with bioaccumulation (food chain). This document should clearly indicate that these types of toxicity are not mutually exclusive and therefore, both need to be addressed in the ecological risk assessment. This same concern exists in other sections of this document, so text changes in more than one section should be made.

Page 3-12, section 3.4: The statement is made that "The ecological PRGs selected are presented in Tables 3-20 through 3-26. The models upon which these goals are based are presented in Appendix A." The selection of the PRGs should be more clearly documented and discussed in the text of this FS. For example, the PRGs selected for sediment at Site 18 were the respective ER-M values; however, the PRGs for surface soil at SSA-14 were the concentrations derived from the models for no risk. There does not appear to be consistency in the choice of PRGs. There also does not appear to be weight given to the differences between the direct toxicity values (BTAG screening level) and the concentrations derived from the food chain models (indirect toxicity). Both of these need to be considered in selection of the PRGs. This section should be expanded to address these concerns.

The discussion of final remediation goals is presented in section 3.5 (page 3-12). The first stage of RG selection involved a comparison of human health and ecological PRGs. The RG was selected that would "...reasonably protect human health and the environment." According to Tables 3-27 through 3-30, the most conservative (ecological) of these two PRGs was not selected in eight cases (surface soil) where both an ecological and human health PRGs were given. In 23 cases for surface soil and 9 cases for groundwater only a human health value was in the table and was selected by default. These instances demonstrate that the most conservative value was not always selected (for surface soil) and may not have been selected for groundwater. This first stage of RG selection should discuss these issues more adequately.

The second stage consists of comparing actual concentrations COPCs/ECECs against background concentrations. The tables (3-16 to 3-26) containing the background data indicate that background concentrations can span an order of magnitude or more. When background data are this variable, using the maximum background value may not be appropriate. Calculating a coefficient of variability on the background data for each contaminant would help to determine how tight the data set is and thereby give more certainty to the selection of a representative background value. It may be more appropriate to show the list of COPCs/ECOCs concentrations when compared to both the low and the high background concentrations.

The draft FS indicates the fourth stage (page 3-14, section 3.5) of final remediation goal selection involves comparison of the RG for the COPCs/ECOCs that remain against the "...anthropogenic background concentrations for WPNSTA Yorktown." The definition of anthropogenic background concentrations and a list of these values should be presented in the FS. The FS should discuss those contaminants for which an anthropogenic background concentration would be reasonable. The use of anthropogenic background data is questionable based on the information that is contained in the FS. The authors need to supply sufficient supporting documentation for the use of anthropogenic background data.

Also, on page 3-14 (section 3.5), the statement is made that "Some contaminants had PRG values that were below the corresponding anthropogenic background level instead of the selected PRG." The meaning of this sentence is not clear. Does this sentence mean that the selected PRG is less than the PRG which is less than the anthropogenic background level? The use of the anthropogenic background values is being questioned

Page 3-14, last paragraph: This paragraph indicates that copper was detected in only the duplicate surface water sample at Site 18 and therefore, copper is not being considered a COC. This line of logic should be much more specifically supported than by just making the statement. If there are only two samples and one contains the contaminant and the other does not and the copper concentration exceeded the final RG, then copper should be retained as a COC in surface water at Site 18.

Page 3-15, section 3.5: The statement is made that "The maximum concentration of iron in sediment at Site 18 is on the same order of magnitude as, and is not statistically greater than the FRG." A more complete discussion on the reasonableness of statistically comparing two numbers (a maximum concentration and the FRG) should be given in this section. In addition, the uncertainty associated with deriving and ecological PRG for iron from the Apparent Effects Threshold (AET) value should be more completely described in this section.

The tables in section 3 should clearly indicate what the double hyphen (--) means.

As a result of these comments, the areas of concern associated with each of these sites may change from the descriptions given in sections 3.6.1 through 3.6.4.

With the exception of the no action alternative, the other Remedial Action Alternatives should help to reduce contamination at the remediation sites, depending upon the COC. Soil washing, biological treatment, incineration, and soil washing can be effective in reducing organic contamination but will not be effective in treating trace element contamination. Off-site landfill disposal and capping with drainage diversion would be effective in treating both organic and inorganic contamination, with off-site landfill disposal probably being the most protective of both human and ecological receptors.

The draft FS did not address NOAA's previous comments regarding the Draft Round Two Remedial Investigation Report for Sites 2, 8, 18, and SSA 14, particularly those concerning the ecological risk assessment conducted for these sites. In general, these comments are reiterated here. In its present form, the ERA does not present a strong supporting case for the conclusions that it draws regarding potential risks to environmental receptors at the sites. The assessment and measurement endpoints listed in the ERA are too broad and general. The ERA would present a much stronger case if specific assessment endpoints were selected, such as maintain abundance and diversity of benthic macroinvertebrate fauna. This could be directly measured by collecting benthic invertebrate samples. There appears to be a loss of data when going from the screening risk assessment phase to the food chain modeling phase. The food chain models do not contain a component that includes benthic organisms and vegetation. Therefore, the risk data from the screen for these two assessment endpoints needs to be carried forward with the food chain modeling data.

DRAFT

Technical Review of the Draft Remedial Investigation Report for Site 23, 24, 25 and 26 Naval Weapons Station Yorktown, Yorktown, Virginia

In partial fulfillment of Subtask 0601 of the above cited work assignment, Dynamac performed a technical review of the *Draft Remedial Investigation Report for Site 23, 24, 25 and 26 Naval Weapons Station Yorktown, Yorktown, Virginia,* dated January 1999. The documents were prepared by , under contract with the United States Navy (Navy) for the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract at the Naval Weapons Station Yorktown in Yorktown, Virginia.

GF/Dynamac performed these reviews under the U. S. Environmental Protection Agency (EPA) Regional Oversight Contract (ROC), Contract No. 68-W6-0009, Work Assignment 23-50. As directed by EPA, GF/Dynamac performed a technical review of the above cited documents. The review focused on the technical adequacy of the documents with respect to the intent of the Interagency Agreement, applicable EPA regional guidance, and industry standards.

The following sections provide general and specific comments with respect to the technical review of the subject documents.

GENERAL COMMENTS:

1. In the Nature and Extent of Contamination Sections 7, 8, 9, and 10 the report discusses the results of positive detections. These sections include numerous maps which identify the positive detections of the contaminants. These sections do not discuss the detections with respect to contaminants which exceeded screening levels (ie. RBCs, ARARS, background, etc.). It is recommended that these sections be modified to include a discussion of contaminants which exceeded screening criteria, frequency of exceedence, and areal extent of contaminant exceedence of screening levels to allow for a qualitative evaluation as to the significance of the contamination.

2. In the Nature and Extent of Contamination Sections 7, 8, 9, and 10 the report discusses the results of positive detections. These section often cite the highest detected concentration for a specific contaminant. In instances where the maximum detected concentration is cited, the corresponding sample location for that sample should be cited.

3. In Sections 7, 8, 9, and 10 the report discusses investigations previous to the Round One Remedial Investigation. These sections discuss the samples that were collected, the analyses performed, and the results of the analyses, in general terms. In some instances figures would be provided, which depict the sample locations. In most instances, no data summary tables for these studies referred to as "Previous Investigations" were provided to allow for correlation of sample data to specific areas of the sites. The following examples highlights these deficiencies:

    - Section 7 discusses effort related to the Site Characterization Investigation. No figure documenting sample locations, or table summarizing sample results to

sample locations were provided.

- Section 8 discusses the results of the SSP investigation and cites Figure 8-4 as reference to the sample locations. No data summary tables were provided to correlate contamination to the sample locations.

- Section 9 summarizes the results of the SSP investigation and references Figure 9-3 for sample locations. No data summary table was provided to correlate contamination to the sample locations.

- Section 10 summarizes the results of the three phases of the Contamination Assessment and an SSP Investigation. For the Contamination Assessment, no figures depicting sample locations, or data summary tables were provided. For the SSP Investigation, while a figure was provided detailing sample locations, no data summary table was provided correlating contamination with each sample location.

It is recommended that the RI be revised to provide data summary tables and sample location maps (where needed) for previous investigations to allow for a complete evaluation of the RI data to previous investigative efforts.

4. For Section 7, 8, 9, and 10 the report should include a summary table which details monitoring well construction specifics such as depth, screen interval, elevations, groundwater elevations, etc.

SPECIFIC COMMENTS on the DRAFT FEASIBILITY STUDY REPORT:

5. Section 4.2.1.2, Type III Monitoring Well Installation, Page 4-5. This section provides detail as to the construction of Type III monitoring wells at the site. This section indicates that 10 inch casing was installed utilizing an 8-1/4 inch auger. Clarification should be provided.

6. Section 4.2.1.2, Type III Monitoring Well Installation, Page 4-5. This section should provide detail as to how far the steel casing was set into the confining unit.

7. Section 7.2.2, Removal Action, Page 7-2. This section describes the events of the removal action including the amount and types of material removed, the number of confirmation soil samples collected, and results of the confirmation samples. This section should specify the cleanup criteria used for the removal action.

8. Section 7.2.2, Removal Action, Page 7-3. This section states that the one sample which had detectable concentrations of nitramines (sample A01SS38) was located in the western portion of the site. Sample A01SS38 is located in the eastern section of the site. The text should be modified accordingly.

9. Section 7.3.2.2, Round One RI Groundwater Investigation Activities, Page 7-10. This

section states that groundwater flow direction is to the northwest. According to Figure 7-10, groundwater flow is toward the northeast. This section should be modified accordingly.

10. Section 7.4.1.1, Nature of Surface Soil Contamination at Site 23, Page 7-12. This section and subsequent sections detailing the nature of contamination specifies the maximum value of specific contaminants, but does not identify the sample where the maximum concentration was documented. It is recommended in the discussions of the results of "Nature of . . . Contamination at Site 23" the sample location containing the maximum concentration be identified for reference purposes.

11. Section 7.4.1.2, Extent of Surface Soil Contamination at Site 23, Page 7-13. Paragraph 2 indicates that no patterns or hot spots of VOC contamination were identified in the surface soil. This section should specify what screening criteria/mechanism (e.g RBCs, background, etc.) were used to conclude that no hot spots were identified.

12. Section 7.5.2, Potential Contaminant Transport Pathways at Site 23, Page 7-27. This section discusses potential contaminant transport pathways for Site 23. While six potential pathways were identified, one pathway with potential implications at the site was not. Groundwater to surface water discharge was not identified as a contaminant pathway. Given the close proximity of this site to the York River, this potential pathway should be discussed.

13. Section 7.5.2.5, Leaching of Soil Contaminants to Groundwater, Page 7-29. The last paragraph of this section indicates that although VOCs and explosives were detected in both Site 23 surface soils and groundwater, "there is no correlation linking the leaching of surface soil contaminants to groundwater". While the VOC detected in both groundwater and site soils may be the result of laboratory contamination, the explosives appear to offer direct confirmation of soil to groundwater migrationunless it is presumed that the explosives contamination is the result of poor monitoring well construction. Explosives in the site soils generally were concentrated in the northeast portion of the site. The groundwater sample for which explosives were detected is located northeast of the site. This well is downgradient of the area where explosives contamination was identified, and where explosives contaminated soils were removed. The conclusion that no correlation linking leaching of soils to groundwater requires further clarification and supporting documentation. If the explosives in the groundwater are not a result of the explosives contamination from the site, speculation as to the source of the explosives in the groundwater should be provided.

14. Section 7.6.4, Sources of Uncertainty in the Site 23 Human Health RA, Page 7-42. This section states that 2,2'-oxybis(1-chloropropane) and mercury were not quantitatively evaluated due to a lack of promulgated toxicological indices. While this may be true for 2,2'-oxybis(1-chloropropane), this is not accurate for mercury. While there is no RBC for mercury, there are RBCs for methylmercury and mercuric chloride which can be used for comparison purposes. Additionally, there is also numerous toxicological data that can be

used as screening criteria for mercury. For conservativism methylmercury RBCs could be used with the conservative nature of this approach documented in the uncertainty analysis.

15. Section 8.1, Site Description and History, Page 8-1. This section indicates that munitions were stored in underground caches. Further information regarding these caches should be provided such as are these caches equivalent to underground vaults? Are these caches still present? How deep underground were these caches located?

16. Section 8.2.2, SSP Investigation, Page 8-2. Paragraph 2 of this section indicates one sample location had three pesticides and one PCB detected above USEPA Region III RBC (report actually states above Region III "COCs", this should be changed to RBCs). The sample location should be identified in the report.

17. Section 8.2.2, SSP Investigation, Page 8-3. Paragraph four on this page indicates that a groundwater investigation was conducted as part of the SSP. Groundwater as well as soil summary tables similar to Table 8-4 should be included within this report for SSP investigative data. This will allow an evaluation of all sample locations identified on Figure 8-4.

18. Section 8.4.1.2, Extent of Surface Soil Contamination at Site 24, Page 8-6. Paragraph 2 indicates that the detected inorganic concentrations were "similar" to one another. Clarification of the phrase "similar" should be provided.

19. Section 9.2.2, Removal Action, Page 9-4. Paragraph 3 on this page indicates that total nitramines ranged from non-detect to 8,530 ug/kg. According to Table 9-7 (page 4 of 5), HMX was detected in a duplicate sample at 20,600 ug/kg. If this is accurate, this statement within the report should be modified.

20. Section 9.3.2.2, Round One RI Groundwater Investigation Activities, Page 9-7. This section discusses the results of groundwater measurements taken during three dates; October 25, 1997, March 19, 1998, and July 16, 1998. Groundwater contour maps for these dates are depicted in Figures 9-10, 9-11, and 9-12 respectively. Groundwater contours depicted in Figure 9-10 show groundwater flowing east-southeast, while Figures 9-11 and 9-12 show groundwater flowing toward the south-southwest. Figure 9-10 appears to show groundwater flow direction opposite what would be expected, given Felgates Creek close proximity immediately west of the site. Given the sites close proximity to Felgates Creek, which is tidally influenced, the concern is that the contours depicted on the figures may be tidally influenced, which may explain groundwater appearing to flow east away from Felgates Creek. The tidal affects on groundwater should be investigated, and the groundwater flow direction in Figure 9-10 should be explained.

21. Section 9.4.1.2, Extent of Surface Soil Contamination at Site 25, Page 9-10. The first sentence on this page indicates that surface soil contamination would not be anticipated, given the history of the site. The site history, as specified in Section 9.1 indicates that

prior to the 1960s wastewater was discharged to settling tanks within the building to settle out suspended solids. The wastewater was then discharged to Felgates Creek. This line was plugged in the early 1960s. Figure 9-3 indicates a former discharge line leading from Building 373. While extensive sampling was conducted in Felgates Creek, limited sampling was conducted on the slope of this hill, with only one hand auger (A07HA06) located near the discharge line. This discharge line, presumably would be a source of surface soil contamination. The potential for surficial and subsurface contamination along the former area of the discharge line should be evaluated.

22. Section 9.4.2.1, Nature of Subsurface Soil Contamination at Site 25, Page 9-10. Paragraph 5 of this section indicates that the maximum detected concentration for HMX was 20.6 mg/kg. This concentration was not depicted on Figure 9-15. The Figure should be revised to include this result.

23. Section 9.4.2.2, Extent of Subsurface Soil Contamination at Site 25, Page 9-11. Paragraph 1 of this section indicates that the explosive contamination identified "did not appear to warrant concern". Maximum detected concentrations for HMX were 20.6 mg/kg. Cleanup criteria for HMX at another site (Site 6) have a cleanup goal for HMX of 5.7 mg/kg. The statement that the explosive contamination does not warrant concern should be justified.

24. Section 9.4.3.1, Nature of Groundwater Contamination at Site 25, Page 9-11. Paragraph 4 discusses the results of total inorganic analyses in groundwater samples at the site. No discussion of the results with respect to background or appropriate screening criteria (MCLs) were provided. Several inorganic analytes were detected at concentration significantly above their corresponding MCLs or drinking water standard such as arsenic (10x MCL), cadmium (4.5x MCL), chromium (8.5x MCL) and lead (9x drinking water standard). These contaminants exceeded their respective screening level in multiple wells. It is recommended that this section be revised to discuss results compared to screening criteria.

25. Section 9.5.3.1, Fate and Transport of Site 25 Detected Volatile Organic Compounds, Page 9-21. This section indicates that the VOC contamination at the site would "biodegrade" slowly over time. Supporting documentation to justify this statement should be provided.

26. Section 10.3.2.2, Round One RI Groundwater Investigation Activities, Page 10-8. This section discusses the groundwater activities conducted during the Round One RI. The section discusses the results of groundwater contouring for the shallow and deep aquifers. Figure 10-11 was developed depicting groundwater flow in the deep aquifer. As seen from Figure 10-11, based on groundwater flow direction for the deep aquifer, no deep monitoring wells exist downgradient of the suspected source area at this site. Additional wells are required to adequately evaluate the source area's impact to the deep aquifer at this site.

27. Section 10.4, Nature and Extent of Contamination at Site 26, Page 10-9. This section states that the nature and extent of contamination evaluation for the site was to be based only on the Round One RI data. Additionally, human health and ecological RAs were based solely on data collected during the Round One RI. Several serious concerns are identified with only utilizing Round One RI data in the evaluation of the nature and extent of contamination and evaluating human health and ecological risks. These concerns are as follows:

- Round One RI soil samples were collected along the perimeter of the site. All soil samples evaluated were collected 250 feet or more away from the suspected source area. Therefore contaminant concentrations would be expected to be significantly lower or non-existent compared to source area soils. Previous investigations collected soil samples in the suspected area of the source. Contaminants such as VOCs and expected source contaminants such as propylene glycol dinitrate (PGDN) were detected in these samples. By not including soil results from previous investigations and only including soil samples collected along the perimeter of the site, chemicals of potential concern (COPCs) were likely eliminated.

- Monitoring well 20GW01, located in the source area was sampled during previous investigations. Subsequently the well was destroyed inadvertently by base activities. This well in previous studies had the highest detections of contamination. Additionally, site related contaminants such as PGDN were detected in this well, but not in the periphery wells. Likewise, by not including groundwater results from previous investigations and only including groundwater results collected along the perimeter of the site, chemicals of potential concern (COPCs) were likely eliminated.

- By not including results from previous investigations which were focused closer to the source area, human health and ecological risks were likely underestimated, due to the elimination of COCs as well as the likelihood that the concentrations used in the Risk Assessment were lower than those detected in previous investigations near the source area.

- Source area data should be used in the risk assessment because of the potential for construction activities at the site.

Based on the above reasons cited, it is recommended that previous investigative data be incorporated into the nature and extent of contamination evaluation and additionally be incorporated into the human health and ecological risk evaluations.

28. Section 10.4.3.2 Extent of Groundwater Contamination at Site 26, Page 10-14. This section details groundwater results with respect to the deep aquifer. The section states that based on the observation that three VOCs (1,1-DCE, 1,1,1-TCA, and 1,1-DCA) detected in the shallow aquifer were not detected in the deep aquifer, that this indicates

that the "confining unit beneath the site is currently restricting the downward migration of VOCs". Any conclusions with respect to extent of groundwater contamination and the integrity of the confining unit based on contaminant data should be removed or qualified based on the fact that groundwater contours for the deep aquifer (Figure 10-11) depict a groundwater flow direction to the east-northeast. No deep aquifer wells downgradient of the source area exist. Therefore, basing conclusions with respect to the integrity of the confining layer on contaminant data in the absence of monitoring wells capable of monitoring the deep aquifer downgradient of the source is not appropriate. Additional wells are required in the deep aquifer to fully evaluate the impacts to the site to the lower aquifer.