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

**SUBJECT: Draft Background Investigation Report; Naval Weapons Station Yorktown
Cheatham Annex Site; Williamsburg, Virginia; Cheatham Annex Site; July
2002**

**EPA, NOAA, and FWS members of the BTAG offer the following comments for the above
referenced document.**

General Comments

1. One of the primary objectives of this background data investigation should have been to determine statistically whether or not the data from each of the four soil associations could be combined into a single data set. However, the report does not perform such an evaluation. In fact, Table 8-6 provides an overall mean with all soil types combined, without any documentation to support that the concentrations in the different soil types are similar and can be combined into a single data set.

Response: Agreed. A multivariate analysis of variance (MANOVA) was performed on the soil and groundwater data sets to determine statistically whether or not the data from each of the four soil associations could be combined into a single data set. The results of the analysis indicate that the data (from each of the four soil associations of surface soil, subsurface soil and groundwater) cannot be combined and should be treated separately. As a result, Table 8-6 has been eliminated from the report. Furthermore, discussion of the MANOVA tests and corresponding results has been added to the report.

2. There are a number of tables with data, both in the text and the appendices; but there is limited to no analysis of these data presented in this document. The results of any data analyses need to be summarized in this report and meaningful conclusions based on these analyses should be presented in the report.

Response: Agreed. Text has been added to the Section 7.0, Analytical Results, and Section 8.0, Statistical Evaluation of Background Data, that discusses such topics as the data presented in the tables, results of the statistical analyses, and environmental data (e.g., TOC, pH, etc.).

Specific Comments

3. Section 3.9, Threatened and Endangered Species, on page 3-9 presents information on threatened and endangered species that occur at Cheatham Annex. The section states that no bald eagles (*Haliaeetus leucocephalus*) are currently nesting at the site. Based on recent surveys, a new bald eagle nest was discovered on the east side of Jones Millpond in 2002, that was active and produced two chicks. Information in this and future documents on threatened and endangered species should be updated to reflect this new information.

Response: Agreed. The updated information concerning the bald eagle nest discovered on the east side of Jones Millpond in 2002 that was active and produced two chicks has been added to Section 3.9.

4. Section 7.4, Background Surface Soil Sample Results, on page 7-6 lists chemical constituents that were detected at least once in each soil association. The following paragraph lists the maximum detected concentrations for soil association 1. There are four inorganics (antimony, beryllium, mercury, and sodium) in this second list which are not identified in the first list. It is not clear from this information if the first list is accurate; it should be rechecked.

Response: Both lists are correct. The first list (second paragraph on page 7-6) is meant to present only those detected constituents that all soil associations have in common. The second list (third paragraph on page 7-6) presents those constituents with maximum concentrations detected Soil Association 1. The paragraph is meant to demonstrate that Soil Association 1 contains the majority of maximum detections. The text has been revised to more accurately reflect this observation.

5. Section 5.3, Soil Investigation, on page 5-4 states that TOC was taken for surface soil only. Section 7.4, Background Surface Soil Sample Results, on page 7-5 does not list TOC as an analyte. However, Table 7-1, Summary of Analytical Constituents Detected in Surface Soil does not contain TOC data, but Table 7-2, for subsurface soils, does contain TOC data. It is not clear where TOC data was collected; this should be clarified in the report.

Response: TOC was analyzed for subsurface soil only. In an email correspondence between former Baker Activity Manager, Rich Hoff, and Peter Knight dated June 15, 2001, it is stated that surface soil would not be analyzed for TOC because it would not help with soil association identification. Therefore, the text in Section 5.3 on page 5-4 has been revised to delete TOC from the list of analyses for surface soil and add it to the list of analyses for subsurface soil. Tables 7-1 and 7-2 are correct.

6. Section 6.4.1.3, pH, on page 6-5 states, "In most groundwater, pH ranges from 6 to 8.5. The pH values for the groundwater sample collected from the background monitoring wells ranged from approximately 4.64 to 7.3..." It is not clear what the interpretation of

these pH data should be. Because this pH range is more acidic than “most groundwater,” this may suggest non-background conditions. The level of uncertainty associated with this potential non-background condition should be discussed.

Response: The following discussion has been added to Section 6.4.1.3, page 6-5:

Twelve monitoring wells were sampled as part of the background study. According to Table 6-1, samples from only two of the 12 wells exhibited a pH outside the 6 to 8.5 standard units (SU) range. Thus, low pH appears to be isolated and localized in the background.

The pH of groundwater is naturally controlled by geochemistry and biology. It is recognized that pH values below 6.0 SU can occur naturally. While there is no direct evidence for naturally occurring low pH values, there are examples from literature and professional experience. For example, low pH values can be a result of the oxidation of sulfur species and ferrous iron (Hem, 1992). The pH can also be impacted by the presence of naturally occurring organic acids (e.g., humic acid) generated from the presence of accumulated organic matter such as peat. Well CXBG1-MW03 is located in a wetland area, an environment suitable for the accumulation of organic matter.

Reference:

Hem, 1992 J.D. Hem, Study and Interpretation of the Chemical Characteristics of Natural Waters. United States Geological Survey Water-Supply Paper 2254. 1992.

7. Section 8.2.1, Surface Soil, on page 8-3 states, “Four duplicates were also included in the statistical summary to account for potential analytical and/or collection uncertainty.” It seems that the reason for collecting duplicate samples is to determine if the analytical techniques are accurately measuring chemical concentrations in the sample. This information is not included in this report. The four duplicate samples should not be included in the data sets for statistical analysis as shown in this document; but rather the highest of the two duplicate values should be included in the data set.

Response: Agreed. Discussion regarding duplicate sample results and the precision of the analytical techniques has been added to Section 8.2.1. Duplicates as independent samples have been removed from data sets. As is done in Human Health and Ecological Risk Assessments, duplicates are now combined with corresponding environmental samples and the higher result is used. Statistics have been rerun with combined duplicates.