UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

Ref: 4WD-SRB ~~ 0 ~ 2014

Via Delivery as Email-attachment to (Prashant.gupta@honeywell.com) and U.S. Mail

Mr. Prashant K. Gupta
Honeywell, Inc.
4101 Bermuda Hundred Road
Chester, Virginia 23836

Re: LCP Chemicals Superfund Site Feasibility Study Report, Brunswick, Glynn County, Georgia

Dear Mr. Gupta:

The purpose of this letter is to notify Honeywell International, Inc. (Honeywell) that the U.S. Environmental Protection Agency has reviewed the company's October 2013 revised draft Feasibility Study (FS) Report for the LCP Chemicals Estuary, Operable Unit 1 (OU1). Pursuant to Section VIII of the Administrative Order by Consent for Remedial Investigation/Feasibility Study, Docket No. 95-17-C (RI/FS AOC), the EPA is directing Honeywell to cure the deficiencies, as presented below, and resubmit the FS to the EPA for approval within 30 business days of receipt of this letter.

The following general and specific comments identify the deficiencies the EPA and the Georgia Environmental Protection Division (GAEPD) have identified in the October 2013 draft of the FS. Below each of the specific comments, the EPA has highlighted the modified text Honeywell needs to incorporate to cure the deficiencies identified by the comment. Only the portions of the paragraphs requiring revision are shown.

The comments in this letter refer to concepts or statements that appear in numerous places in the revised draft of the FS. This letter does not attempt to list each instance in which a particular concept or statement needs to be changed; revisions should be made to the document globally. The comments in this letter do not imply approval of any portion of the draft FS not specifically mentioned in this comment package.

Attachment A contains mainly editorial comments on the October 2013 draft of the FS which require correction. A review of Appendices B and J was conducted independently by the U.S. Army Corps of Engineers (Corps) at the recommendation of the EPA National Remedy Review Board, to assess the engineering feasibility of thin layer cover in an environment such as the LCP Chemicals estuary. Attachment B contains the Corp's comments on Appendix B (Hydrodynamic Modeling) and Appendix J (Effectiveness Evaluation for Thin Cover and Chemical Isolation Cap), which should be addressed.

The EPA will be sending an expanded Applicable or Relevant and Appropriate table under separate cover.

General Comments

1. Monitoring Strategy – Review of the FS, particularly Table 6-3 and the recommended remedial alternatives presented in Section 7.3.4, shows that the responsible parties' preferred alternative (Alternative 6) leaves in-place 94% of the lead, 80% of the mercury, 75% of the polynuclear aromatic hydrocarbons and 26% of the Aroclor-1268 identified through the surface-weighted average concentration (SWAC) evaluation. Needless to say, leaving such significant quantities of the contaminants of concern brings into question the effectiveness and permanence of the preferred remedies. Should this alternative ultimately be chosen, a robust monitoring program will be required to demonstrate effectiveness and permanence. We have reviewed the case studies presented in Magar _et al_ 2009 and have identified 10 different programs applied to 13 sites in varying combinations. In order of applicability, they are: sediment chemistry (10); biota sampling (9); bathymetric survey (4); sediment coring, modeling, toxicity testing and surface water chemistry (2 ea.); pore water chemistry, radioisotope analysis and population study (1 ea.). Sediment coring (due to low sedimentation rate) and radioisotope analysis are not applicable to this Site. Bathymetric surveys of the LCP Chemicals Estuary (OU1) have been undertaken. Pore water and other parameters have been modeled, and most others have been baselined through the extensive sampling regime undertaken prior to development of the FS. GAEPD and the EPA expect that a robust monitoring program, based on the baseline (pre-remedial) biologic sampling, including toxicity testing, surface water testing, bathymetric surveying and population studies, will be specified in the Record of Decision and further detailed in the remedial design. This strategy will enable the EPA and GAEPD to determine when the LCP Chemicals Estuary has returned to baseline conditions after the implementation of the active portions of the remedial measures and the effectiveness of the remedy in achieving the Remedial Action Objectives.

2. Timeframes – No timeframes for attaining remedial goals have been presented in the FS. The statement on page 8 of the response to comments ignores the body of literature which suggests that PCB degradation/dissipation is likely to occur extremely slowly in this marsh environment. This omission compromises our ability to adequately consider this factor when evaluating the pros and cons of the alternatives which leave residual PCB and mercury in place. Timeframes based on best professional judgment should be provided.

3. In the revised draft of the FS, it is frequently repeated that "each alternative results in SWACs that meet the RGOs." These statements should be clarified to state that Alternatives 2 and 3 (SMA-1) achieve the low end of the RGO range, while Alternatives 4 and 5 (SMA-2) only meet the high end of the RGO range. The sentences should be modified to state that each alternative results in SWACs that lie within the RGO range and that some creek SWACs (i.e., Domain 3 Creek and the Western Creek Complex) do not meet the upper SWAC RGO for mercury. Specific comments refer to this.

4. The FS should adequately describe how Alternatives 4 - 6 achieve Remedial Action Objective (RAO) 4, which reads "*Reduce ecological risks to benthic organisms exposed to contaminated sediment to levels that will result in self-sustaining benthic communities with diversity and structure comparable to that in appropriate reference areas.*" Based on the RGO correspondence contained in Appendix G of the revised draft FS, use of the upper RGO

range for benthic invertebrates was approved for the purposes of developing and screening alternatives. Such EPA and EPD approval does not imply Agency agreement that the high end RGOs are as protective as the low end of the range, a conclusion which is contrary to the conclusions of the BERA. Although the Honeywell 2012 memorandum provided alternative explanations for using higher sediment effect concentrations (SECs) from the BERA, there are no adequate discussions in the revised FS regarding the reliability of the toxicity data. Regardless of the relatively poor predictive power of the SECs, the toxicity results remain as site-specific fact. For example, from Honeywell's 2006 AET study, in the Western Creek Complex (WCC) 78% of the samples (39/50) were toxic for the reproductive response endpoint and 68% were considered toxic for survival to amphipods. Similarly, most of the grass shrimp toxicity tests conducted in WCC and Purvis Creek were toxic to at least one endpoint (BERA Table 4-21). In general, the higher the concentration above the lower RGO, the greater the potential residual risk. The RGO range is an uncertainty range where cleanup within the range is protective with differing levels of certitude. The revised FS should discuss the consequence of the 30-acre difference in residual benthic community risks between SMA-1 and SMA-2. This 30-acre difference is not trivial and the alternatives cannot be assumed to be similarly protective. Several of the specific comments below address this deficiency.

Specific Comments

1. **Section 2.2.1, page 6**, the fourth paragraph of the section, characterizes the "uppermost layer of the Coosawhatchie" as a "…cemented sandstone…confining layer…" between the Satilla and the Coosawhatchie A/B. This should be changed to"…*variably* cemented sandstone…*aquitard*…" for consistency with the documents submitted (and approved) in support of the CO_2 sparging groundwater action currently being performed by the responsible parties. Additionally, although commented on previously, this second draft of the FS repeats that an on-site pump test verified the effectiveness of the sandstone layer as a confining layer. This is in conflict with the text in the 1997 unapproved groundwater remedial investigation, which reads, "The sandstone layer is considered a leaky confining unit based upon visual observations of ground-water color contrasts from well clusters(Figure 4.4-6), pumping test response, and distinct chemical concentration contrasts between wells screened above and below this confining layer (Figure 4.4-6)." The basis for the conclusion that the sandstone layer is leaky is, in part, the responses observed in the MW-108 well cluster (Figure 4-4.8 of the 1997 RI). The figure shows water level response in the well installed above the sandstone when the well completed below the sandstone was pumped. This response is cited in the 1997 document as evidence of hydraulic communication.

<u>*Specific comment #1 text revision*</u>

The Coosawhatchie Formation is Miocene in age and is approximately 180 feet (55 meters) thick. It can be divided roughly into two water-bearing units and two confining layers. The uppermost layer of the Coosawhatchie is approximately 3 to 15 feet (1 to 4.5 meters) of variably cemented sandstone, which acts as a semi-confining layer between the Satilla sand and the Coosawhatchie A/B aquifers (Figure 2-2). The cemented sandstone has an approximate hydraulic conductivity of 10-5 cm/sec. The Coosawhatchie A/ B aquifers are approximately 50 feet (15 meters) thick and have an approximate hydraulic conductivity of

10-2 cm/sec. ~~On-site pump tests conducted across the cemented sandstone have verified that the cemented sandstone is an effective confining layer hydraulically separating the two water-bearing units.~~ The Coosawhatchie C consists of an approximately 30-foot (9-meter)-thick dolomitic marlstone and acts as a confining layer between the Coosawhatchie A/B aquifers and the Coosawhatchie D aquifer.

2. **Section 2.4.3, page 29**, second to the last bullet, near the end of the page. Results of the sediment toxicity tests indicated extensive toxicity in the majority of over 200 samples. This is not uncertainty, but fact. The uncertainty associated with the lack of a clear dose-response relationship is what is reflected in the development of an RGO range, not any uncertainty in the actual toxicity results.

   The upper end of the RGO range for the benthic community is the apparent effects threshold (AET) for mercury (11 mg/kg) and Aroclor-1268 (16 mg/kg). There is little uncertainty that the sediments with concentrations above the upper end of the RGO range are toxic to the benthic community. The text should be modified as indicated below.

   Specific comment #2 text revision

   - *The evaluation of potential adverse effects to the benthic invertebrate community relied on hundreds of site-specific acute and chronic toxicity test measurements using both indigenous and laboratory-cultured organisms. The OU1 BERA notes that the development of RGOs for the protection of benthic invertebrates is "highly uncertain with poor accuracies" and that "only conservative assumptions were used" for this purpose. Although the absence of a clear dose-response relationship resulted in ~~uncertainty in developing the~~ RGOs, there was extensive toxicity in the majority of sediment samples.*

3. **Section 2.5.4, page 37**. In the paragraph that begins, "*The BERA used measured methylmercury. . .*" clarify that the BERA did not simply *assume* that the fraction of total mercury present as methylmercury was 0.75%, etc., rather the fractions were based on actual measurements of ratios in sediment and biological tissues.

   Specific comment #3 text revision

   The BERA used measured methylmercury tissue data for a variety of dietary food items that each receptor group consumes. Based on Site methylmercury and total mercury analyses, the BERA calculated the fraction of total mercury present as methylmercury is 0.75% in sediment and from 10% (Spartina) to 100% (spotted seatrout) in tissue.[5] These percentages were used to establish remedial goals that would be protective of wildlife exposures through the bioaccumulation of mercury.

4. **Section 2.5.4, page 39, 1st paragraph**. Delete the first part of the first sentence, regarding the five measurement endpoints as they are out of context here.

~~*NOAEL*~~ *preliminary RGOs established in the BERA, and for several species, the range falls below the preliminary NOAEL RGO value.*

7. **Section 6.2.1, page 102, 3rd whole paragraph.** Change the 3rd and 4th sentences to read "Each alternative result in SWACs that lie within the RGO ranges. Therefore, the SWAC reductions achieved by each alternative result in commensurate reductions of mercury and Aroclor 1268 in fish and shellfish that is expected to lead to reductions…"

Specific comment #7 text revision

Alternatives 2 and 3 (SMA-1), 4 and 5 (SMA-2), and 6 (SMA-3)

Alternatives 2 through 6 are protective of human health and environment, as these alternatives are designed to comply with ARARs, RAOs, and RGOs set forth in Section 3. Therefore, these remedy alternatives meet the threshold criteria of protectiveness for human health. Each alternative results in SWACs that lie within the RGO ranges. ~~*meet the RGOs.*~~ *Therefore, the SWAC reductions achieved by each alternative will result*~~*s*~~ ~~*in*~~ *commensurate reductions of mercury and Aroclor 1268 in fish and shellfish concentrations are expected to* ~~*that eventually will*~~ *lead to reductions in fish and shellfish consumption advisories within the TRBE. Table 6-1A identifies the SWACs for each of the SMAs and demonstrates that post-remedy SWACs generally fall within the range of RGOs identified in Section 3.*

8. **Section 6.2.1, page 103, 2nd paragraph.** The FS addresses finfish exposures inconsistently in discussions about the smaller creeks. The SWAC hazard calculations for finfish assume full utilization of creek habitat for exposure. However, a footnote to Table 6-1B states "*The Domain 3 Creek and Western Creek Complex are very small and cannot support significant exposures to finfish. Therefore, in consideration of protectiveness of human health and finfish, the Total Creeks are most relevant (i.e., current conditions SWAC vs. Total Creek SWAC).*" In the 2nd paragraph on page 103 the document states "*However, because the Domain 3 Creek is not large enough to support finfish, risks to finfish from the Domain 3 Creek are not significant. Domain 3 Creek is only inches deep for much of the tidal cycle.*" Even though exposures may be small, there are no data to suggest they are insignificant. In addition, other receptors in the small creeks such as mummichogs and crabs that comprise the diets of finfish and herons will contribute to residual risks. The table footnote and text paragraph should be modified.

Specific Comment #8 text revision for footnote (a) on Table 6-1B
The Domain 3 Creek and Western Creek Complex ~~*are very small and cannot support significant exposures to finfish.*~~ *represent a relatively small portion of the total creek area. Hence, these creeks have a relatively small contribution to the SWAC. Therefore, in consideration of protectiveness of human health and finfish, the Total Creeks are most relevant (i.e., current conditions SWAC vs. Total Creek SWAC).*

Specific Comment #8 text revision in 2nd paragraph on page 103

Alternatives 2 through 6 also achieve the SWAC RGOs for individual areas within the SWAC RGO range, except in Domain 3 Creek. ~~*However, because the Domain 3 Creek is not large*~~

Specific comment #4 text revision

~~Based on an overall evaluation of these five measurement endpoints,~~ The OU1 BERA concluded that there is no risk to fish in the Site from direct exposure to COCs in the water column. However, the bioaccumulation modeling and field data for finfish suggest that chronic risk from mercury and Aroclor 1268 to viability of finfish indigenous to the Site is of concern.

5. **Section 6.2.1. Figures 6-5, 6-7A, 6-7B, and 6-8.** There are inconsistencies between the subject figures and the Section 3 figures. These inconsistencies affect the color coding for sampling areas in the Western Creek Complex (WCC) and Purvis Creek.

   Figure 3-1B shows the western limb of the WWC to have three boxes in the limb to have average mercury concentrations between 4-11 mg/kg (purple). Figure 3-2B shows the western and middle limbs of the WCC to have average Aroclor-1268 of between 6-16 mg/kg (also purple). According to the legend on figures 6-5, 6-7A and B, and 6-8, these colored boxes should be changed from gray to yellow (within the range of the benthic community RGOs).

   For Purvis Creek, Figure 3-2A (Aroclor-1268) shows one box in Purvis Creek west of the WCC, with an orange symbol (>16 mg/kg). Similarly, Figure 3-4A shows one box west of the WCC with a PAH concentration of >6 mg/kg. According to the legend on figures 6-5, 6-7A and B, and 6-8, these two boxes should be shown in black (exceeds the range of the benthic community RGOs).

   The revised FS should include revisions to these figures in order to accurately portray remedy effectiveness and potential residual risks that would remain.

6. **Section 3.3.3, page 44, 1st paragraph**. "*SWAC RGOs are not a bright line above which adverse impacts will definitively occur. Rather, for example, Table 3-4 shows the range of preliminary SWAC RGOs identified in the BERA for mercury and Aroclor 1268, for birds, mammals, and fish; this range extends between the NOAEL and the LOAEL for each ecological receptor.*" This sentence is misleading and should be modified because the BERA did not characterize risks or develop RGOs based on SWACs.

   Specific comment #6 text revision

   The technical basis and protectiveness of the SWAC and benthic community RGOs is described in the BERA and the RGO correspondence letters described in Section 3.3.1. ~~SWAC RGOs are not a bright line above which adverse impacts will definitively occur. Rather, for example,~~ Table 3-4 shows the range of preliminary ~~SWAC~~ RGOs identified in the BERA for mercury and Aroclor 1268, for birds, mammals, and fish; this range extends between the NOAEL and the LOAEL for each ecological receptor. Both NOAEL-based and LOAEL-based RGOs can be used to inform risk management decisions that meet the threshold criteria of protection of fish, mammal, and bird populations. Shading on Table 3-4 illustrates where the OU1 FS SWAC RGOs fall along the NOAEL and LOAEL range identified in the BERA. In all cases, the SWAC RGOs are at or below the respective LOAEL

~~enough to support finfish, risks to finfish from the Domain 3 Creek are not significant. Domain 3 Creek is only inches deep for much of the tidal cycle. Therefore~~However, as illustrated in Figure 6-2A and 6-2B, when the ~~average~~ conditions of ~~the~~ Domain 3 Creek, Domain 3, and Purvis Creek are ~~considered~~ averaged, the post remedy SWAC conditions for Alternatives 2 through 6 are similarly protective even for species with a small home range, like the green heron.

9. **Section 6.2.1, page 103**. The sentence near the bottom of the page that reads "*Furthermore, because the RGOs were developed using the most sensitive among species and while these RGOs provide insight about the potential for toxicity, the actual injury to the benthic community associated with these exceedances is expected to be insignificant,*" should be removed. Specifically, there is no basis to support that actual injury is expected to be insignificant. The toxicity test results clearly demonstrate otherwise.

   Specific comment #9 text revision

   The residual risks in Domain 4 would not adversely impact the entire sediment-dwelling community. The RGO exceedances in Domain 4 are small and represent isolated samples surrounded by much lower COC concentrations throughout the remainder of Domain 4. ~~Furthermore, because the RGOs were developed using the most sensitive among species and while these RGOs provide insight about the potential for toxicity, the actual injury to the benthic community associated with these exceedances is expected to be insignificant. As such,~~ The overall community in this Domain as a whole would not be adversely impacted. Therefore, Alternatives 2 and 3 are protective of the sediment-dwelling community.

10. **Section 6.2.1, page 104, last paragraph continuing on page 105**. There are several issues with the discussion on these two pages that require clarification. First, the statement from the BERA regarding the lack of a discernible dose-response relationship refers to the uncertainty in the lower end of the RGO range for the benthic community, which was derived from the SECs that statistically evaluated measurable differences. The low end of the RGO range is less reliable since it was not readily apparent but was derived by statistics. However, there were many observed discernible differences in the response of organisms in the toxicity tests below the AET levels. The text appears to imply that there was no toxicity observed to the benthic community up until the AET. This is simply not true. The toxicity tests results presented in the BERA (e.g., Tables 4-14, 4-15, 4-21, and 4-23) indicate toxic effects in the majority of tests. The text should be modified to include other SECs rather than strictly focus on mercury AETs.

    Second, the discussions on page 105, in Appendix L, and in the response to comments regarding grass shrimp toxicity and exposure that are misleading and should be clarified. The laboratory-raised and indigenous grass shrimp toxicity tests endorsed by Honeywell and its contractor were considered to be representative of exposure because the tests covered a range of sediment concentrations that the shrimp would be exposed to. The longer (2-month) exposure duration in the test on laboratory-raised grass shrimp was necessary to measure the sensitive reproductive endpoint, embryo development, which was used to help establish the benthic RGO. While the toxicity tests run in the laboratory on field-collected (indigenous) grass shrimp observed toxicity only in the LCP Ditch and the Eastern Creek, these tests were stopped early because the field-collected grass shrimp endpoint measured the percent of embryos hatched, which is a less sensitive test relative to the embryo development endpoint. Although most of the toxicity to field-collected grass shrimp was observed in some of the highest sediment concentrations (up to 88 mg/kg of Aroclor 1268 and 8.5 mg/kg mercury), toxicity to the indigenous shrimp was also observed at concentrations of 1.7 mg/kg Aroclor 1268 and 1.2 mg/kg mercury. Revise the text to differentiate between the laboratory-raised and indigenous grass shrimp toxicity studies.

The drifting movement of grass shrimp in response to the tides over a range of differing sediment concentrations is captured by the range of sediment concentrations in the tests. Moreover, the contaminants in creek sediments were averaged over 50 meter segments before they were compared to the benthic RGO ranges. The first paragraph on page 105 should clarify the uncertainty associated with laboratory and field-collected grass shrimp exposure to sediment.

The same paragraph mentions grass shrimp populations. There were no grass shrimp population studies conducted in the estuary. The sentence should refer to the toxicity tests. In addition, the text should include discussion of the amphipod toxicity studies since the benthic RGOs were also based on those test results as well.

Furthermore, Alternatives 4 and 5 are not comparatively protective to the benthic community, relative to Alternatives 2 and 3. Since there is an approximately 30-acre difference between the footprints for Alternatives 2 and 3 compared with Alternatives 4 and 5, which is not trivial, the alternatives cannot be assumed to be similarly "protective." Delete the last sentence in this paragraph and replace with brief sentences noting the general differences between the Alternatives.

<u>Specific comment #10 text revision</u>

Appendix L summarizes indigenous grass shrimp and sediment-dwelling community studies, and provides a brief overview of extensive sediment toxicity testing that was identified in the BERA. The indigenous shrimp toxicity tests ~~study monitored~~ evaluated stations within OU1 during six events from 2000 to 2007 (Appendix L; Figure L-5A). Benthic community assessments were conducted from only four stations within OU1 during one event in 1995 (Horne et al, 1999) and one event in 2000 (as cited in Black & Veatch (2011). Extensive sediment toxicity testing (i.e., more than 200 tests on two species using multiple endpoints) was also conducted using sediments from OU1 from 2000 to 2007 (Appendix L). Results of the laboratory sediment testing were used in the BERA to derive several COC-specific sediment effects concentrations, such as probable effect levels and apparent effects thresholds (AETs). ~~of 11 mg/kg for mercury.~~

The indigenous and laboratory-raised grass shrimp toxicity tests, benthic community, and amphipod sediment toxicity studies, collectively suggest that the RGOs are not thresholds above which adverse effects are definitive and absolute. For example, the BERA indicates that ~~all~~ locations with residual mercury concentrations above the AET of 11 mg/kg are expected to be toxic to grass shrimp, based on testing that continuously exposed developing shrimp to sediment for two months, which ~~is an exposure that is far greater than~~ is conservative and may not necessarily be representative of how grass shrimp are exposed in

OU1 in-situ. Nevertheless, Alternatives 2 and 3~~through 6~~ address locations with mercury and Aroclor 1268 that exceed their ~~mercury~~ respective AETs. ~~Furthermore, in-situ impacts~~

Although toxicity to laboratory-raised grass shrimp was evident at many stations in the estuary, toxicity to indigenous grass shrimp were observed only in LCP Ditch and Eastern Creek, where OU1 COC concentrations are highest. ~~n~~No significant differences in indigenous grass shrimp ~~populations~~ toxicity were seen in other areas, even in areas where in situ COC concentrations were above the RGO range (Appendix L; Figure L-5A). Similarly, benthic community impacts were observed in Eastern Creek, also where COC concentrations were well above the RGO range (Appendix L; Figure L-6). Alternatives 2 and 3 ~~through 6 all~~ capture the areas where differences were observed in grass shrimp, amphipods, and the benthic community, and the ~~vast majority of~~ areas that ~~are above~~exceed the lower end of the RGO range developed using the site specific toxicity testing data. ~~Hence, all of these alternatives (Alternatives 2 through 6) are protective against levels where measurable differences have been observed.~~ Alternatives 4 and 5 capture the majority of areas above the RGO range except in the Western Creek Complex, upper Domain 3 Creek, and in Purvis Creek. Alternative 6 captures the majority of areas in Purvis Creek above the RGO range.

11. **Section 6.2.3, page 108**, last sentence of the second paragraph. Modify the sentence to read that each alternative provides varying degrees of risk reduction and residual risks.

<u>*Specific comment #11 text revision*</u>

In Alternatives 2 through 6, sediments contributing to RGO exceedances would be targeted for removal, capping, and/or thin-cover placement, thus ~~eliminating~~ reducing potential risk of exposure to contaminated material. Sediment removal permanently removes contaminated material; backfilling addresses dredge residuals that otherwise pose risks. Capping and thin-cover placement leave contaminants in place. Capping isolates COCs and reduces bioavailability through burial with clean material; caps are armored against erosion, and thus can be placed in relatively high-energy areas. Thin-cover placement creates a clean sediment surface in low risk, low-energy areas; the clean sediment surface allows for the colonization of plants and animals that are then exposed to lower COC levels ~~below RGOs~~. Alternatives 2 through 6 ~~are each protective with regard to~~ have varying degrees of risk reduction and residual risks.

12. **Section 6.2.4, page 110, 2nd whole paragraph**. Change "RGOs" to RAOs because the alternatives only achieve a selected range of RGOs.

<u>*Specific comment #12 text revision*</u>

Alternatives 3 (SMA-1), 5 (SMA-2), and 6 (SMA-3)

Alternatives 3, 5, and 6 achieve ~~RGOs~~ RAOs through a combination of sediment removal, sediment capping, and thin-cover placement within SMA-1, SMA-2, and SMA-3 respectively. Removal of sediment with the highest concentrations of COCs from the SMAs reduces the volume of COCs in OU1, thereby reducing COC toxicity and mobility.

13. **Section 7.1, page 120**. The first two sentences of this section should be clarified to indicate that the upper range of the benthic RGOs was designed for use in developing and screening remedial alternatives in the FS. They were not designed to have equal acceptability in managing benthic invertebrate risks.

Also, in the first paragraph it is stated that "*All five alternatives reduce surface sediment concentrations to levels at or below the site-specific RGO range . . .*" Similar to comment #10, the problem with the sentence is that it implies that there were no adverse effects observed on the benthic community until the concentrations were above the AETs (beyond the RGO range). The RGO range for the benthic community represents an uncertainty range around the unknown true threshold of adverse effects to the benthic community. The text in this section should be clarified to reflect varying degrees of benthic protection between each alternative.

In addition, the first sentence of the second paragraph should be deleted because "...insignificant residual risks...," is not supported by the analysis in Section 6 or in Appendix L.

Specific comment #13 text revision

With the exception of the No Action alternative, all remedies considered in the FS are expected to significantly reduce risks to human health and the environment ~~to acceptable levels. USEPA defined acceptable risk-based levels as RGOs protective of human and ecological receptors (Section 3).~~ The SWAC RGOs were developed to be protective of receptors/pathways that integrate exposure over larger areas (e.g., fish and wildlife), while the benthic community RGOs were developed to ~~be~~ assess protectiveness ~~of~~ to receptors exposed over relatively small areas (e.g., benthic invertebrates). With the exception of a few isolated sample locations with elevated COC concentrations, all five active alternatives reduce surface sediment concentrations to levels at or below the site-specific RGO range that provide varying degrees of protectiveness. ~~which is well below mercury, Aroclor 1268, lead, and PAH concentrations at locations where adverse benthic effects were observed in the marsh.~~ Alternatives 2 through 6 also comply with ARARs~~. All of Alternatives 2 through 6~~ and achieve the threshold criteria of protection of human health and the environment. ~~and compliance with ARARs.~~

~~The analysis provided in Section 6 supports this conclusion, as each alternative meets the SWAC and benthic community RGOs leaving behind insignificant residual risks. All~~ Alternatives 2 and 3 capture the areas exceeding the low range of the RGOs but may result in more destructive impacts to the estuary from implementing their proposed remedies. Alternatives 4 and 5 capture the majority of areas above the RGO range except in the Western Creek Complex, upper Domain 3 Creek, and in Purvis Creek. Alternative 6 captures the majority of areas in Purvis Creek above the RGO range. Each of these alternatives provide for long-term human health and ecological risk reduction by decreasing surface sediment COC concentrations, which leads to reduced chemical bioavailability and chemical uptake by human and ecological receptors, which in turn leads to reduced risks to human health, mammals, birds, fish, and the benthic community. Long-term monitoring measures long-term remedy integrity and effectiveness.

14. **Section 7.1, page 121, third bullet, second paragraph.** Although most individual creeks and domain areas have concentrations within the RGO range, they are not equally protective for all human receptors. For example, in the November 2011 EPA letter regarding RGOs, EPA provided sediment RGOs for human health. For protection from 1E-04 cancer risk for the high finfish consumer, the sediment RGO is 2.7 and the narrative stated "The contaminant concentration RGOs of 3.0 for Aroclor 1268 and 1.0 for mercury are based on consumption of finfish." Alternatives 4 and 5 do not change the SWAC concentration of 3.6 mg/kg Aroclor 1268, which is above the 1E-04 cancer risk for the high finfish consumer. Clarify the text accordingly.

   Specific comment #14 text revision

   Alternatives 2 through 6 reduce human exposure to COCs through ingestion of fish and shellfish associated with Site contaminants. Each alternative results in total creek and total marsh SWACs that meet the SWAC RGOs, leading to reductions of mercury and Aroclor 1268 in fish and shellfish concentrations that ~~eventually will~~ is expected to reduce fish and shellfish consumption advisories within the TRBE. Moreover, the analysis provided in Section 5 shows that the individual areas ~~meet~~ lie within the SWAC RGOs, which were based on protection of human health, as well as ecological receptors. Sediment concentrations in Purvis Creek are not reduced by Alternatives 4 and 5 which may underestimate human health protection for the high finfish consumer. However, Alternatives 2, 3 and 6 are protective of this receptor group.

15. **Section 7.1, page 122.** The first two sentences relating to RAO #4 state "*...concentrations within the RGO range are considered protective of the sediment-dwelling community. Thus, all five alternatives are protective of the benthic communities.*" Delete these phrases as there are substantial differences in the levels of protection between alternatives that should be presented.

   Specific comment #15 text revision

   Alternatives 2 through 6 reduce ecological risks to benthic organisms exposed to contaminated sediment to levels that are consistent with the benthic community RGOs. The remedies address the areas containing the highest COC concentrations in the marsh and reduce surface sediment concentrations to levels at or below the site-specific RGO range. Alternatives 2 and 3 would result in the lowest residual risks to the benthic community; however disturbing the large areas for remediation may significantly impact not only the sediment- dwelling communities but the habitat structure for many other organisms. Alternatives 4 and 5 would result in greater residual risk, but would be the least destructive to the environment. Alternative 6 provides a blend, and targets some of the higher contaminated sediments in Purvis Creek. ~~through 6 vary little in terms of the residual risks related to locations where~~

~~COC concentrations exceed the RGO range. The alternatives differ in terms of the number of residual locations within the RGO range, but as noted in Section 3, concentrations within the RGO range are considered protective of the sediment-dwelling community. Thus, all five alternatives are protective of benthic communities.~~

16. **Section 7.3, page 126, second bullet**. Change "*There is not significantly greater improvement in risk . . .*" to "There may not be . . ."

    Specific comment #16 text revision

    - *Though residual COC concentrations in the estuary differ among the remedies, ~~all~~ most are within the benthic community RGO range. There ~~is~~ may not be significantly greater improvement in risk reduction to the benthic community when achieving the lower end of the RGO range, particularly given the adverse impacts from the remedy itself to the benthic community in efforts to address the larger footprints that correspond to the lower NTE values.*

17. **Section 7.3, page 126, third bullet**. The 2nd sentence of the bullet states: "*There is not significantly greater improvement in risk reduction to the benthic community when achieving the lower end of the RGO range, particularly given the adverse impacts from the remedy itself to the benthic community in efforts to address the larger footprints that correspond to the lower NTE values.*" The first part of the sentence regarding significance is not supported by the BERA or the draft FS.

    Specific comment #17 text revision

    There ~~is~~ may not be ~~significantly~~ greater improvement in risk reduction to the benthic community when achieving the lower end of the RGO range, particularly given the adverse impacts from the remedy itself to the benthic community in efforts to address the larger footprints that correspond to the lower NTE values.

18. **Section 7.3.1, page 127, fourth paragraph**. Modify the first three sentences because there are no supporting benthic community monitoring data that suggest the recovery would be protective under *all* the alternatives, especially given the fact that many of the toxicity test results suggest otherwise.

    Specific comment #18 text revision

    Except for the No Action alternative, each of the remedial alternatives addresses concentrations in various areas that are above the RGO range~~, so Alternatives 2 through 6 are protective of the benthic community. All five alternatives~~ and reduce ecological risks to benthic organisms exposed to contaminated sediment. ~~to achieve concentration levels that will result in self- sustaining benthic communities with diversity and structure comparable to reference areas. All five alternatives reduce surface sediment concentrations to levels within or below the site- specific RGO range.~~ Figures 6-6 through 6-8 identify differences among the footprints relative to the RGO range, and show where residual chemical risks may remain. ~~Section 3 explains why both ends of the range are considered protective.~~

19. **Section 7.3.2, page 128, fourth paragraph**. Please change the first sentence "*Because all alternatives except for the No Action alternative (Alternative 1), meet the ARARs, RAOs, and RGOs, . . .*" to "With the exception of a few isolated sample stations with elevated concentrations, Alternatives 2 through 6 meet the ARARs, RAOs, and are within the RGO ranges ."

<u>*Specific comment #19 text revision*</u>

~~Because all the alternatives, except for the No Action alternative (Alternative 1),~~ With the exception of a few isolated sample stations with elevated concentrations, Alternatives 2 through 6 meet the ARARs, RAOs, and are within the RGO ranges. Alternatives 4, 5 and 6 are most cost-effective in achieving goals while minimizing vegetated marsh disturbance and recovery. These alternatives will comply with project goals and limit vegetated marsh disturbance to approximately half of what would result from implementing Alternatives 2 or 3 (Figure 7-2).

20. **Section 7.3.4, page 129, last sentence.** Please replace the phrase ". . .*achieve the site-specific RGOs. . .*" with "are within the RGO ranges". Also, based on the above comments, Alternative 5 may be cost effective but not as environmentally protective as other alternatives.

<u>*Specific comment #20 text revision*</u>

Throughout the preparation of the FS, practices employed were well aligned with USEPA guidance and policy. Based on all the remedy selection criteria—including the ecosystem impact analysis, marsh recovery analysis, and cost-effectiveness analysis discussed above—Alternative~~s 5 and~~ 6 ~~are~~ appears to be the most effective remedial alternative~~s~~ for OU1. The~~se~~is alternative~~s~~ satisfies the site-specific RAOs, ~~achieve~~ is within the site-specific RGO ranges, and meets the NCP criteria of overall protectiveness, implementability, and permanence while limiting risks associated with disturbing sensitive habitat.

21. Appendix A – changes needed for clarity, accuracy, and consistency with other documents:
    a. <u>Background</u>
        i. First paragraph states that there is "cemented sandstone", but should state "partially cemented sandstone", and further states it is a "confining" layer, but should state "semi-confining" layer.

<u>*Specific comment #21 a (i) text revision*</u>

Slug tests conducted in the Upper and Lower Satilla sand indicate a horizontal hydraulic conductivity on the order of 10-2 centimeters per second (cm/sec). Beneath the Satilla formation is the partially cemented sandstone of the Coosawhatchie Formation (approximate hydraulic conductivityof 10-5 cm/sec [Geosyntec 2002]), which forms a semi-confining layer between the Satilla sands andunderlying aquifers *within the Coosawhatchie Formation. Figure A1 shows a conceptual cross-section of the site layering for the local flow system.*

ii. Second paragraph states that the groundwater and surface water interactions are "attenuated," should say "partially attenuated", then further that the sediments provide "confined" conditions, should say "semi-confined."

Specific comment #21 a (ii) text revision

Groundwater and surface water interactions at the Site are partially attenuated by the marsh sediments that overlie the Satilla formation and locally provide semi-confined conditions for groundwater flow. Measured hydraulic conductivities of the marsh clay are consistently low (1.3x10-7 to 1.8x10-8cm/sec) (GeoSyntec 1997) and texture is consistently fine-grained as well. The marsh sediments are typically 7–8 ft thick; locally, marsh sediment may be thicker, and near the uplands, it may be thinner.

iii. Fourth paragraph states "any transport is likely attenuated", should state "transport is likely partially attenuated..."

Specific comment #21 a (iii) text revision

Groundwater seepage to the surface water may occur as diffuse flow through the marsh sediments or as focused flow through seeps. It should be noted that, while groundwater seepage is a potential pathway into the upland fringe marsh areas, any transport is likely partially attenuated by the dense organic rich clay sediments along the marsh.

iv. Fifth paragraph states that "seepage events are typically brief and are observed to occur during high water table conditions following extended or intense rainfall events." The IR Study indicated that seeps are ongoing, are not brief, and did not provide evidence that these are related to rainfall events.

Specific comment #21 a (iv) text revision

Groundwater seeps were first noted (during the initial Site characterization studies in 1995) as occurring along the marsh edge, where the marsh clay was absent and the underlying sand was exposed. ~~Seepage events are typically brief (on the scale of a few days) and are observed to occur during high water table conditions following extended or intense rainfall events.~~ Depending upon the intensity and duration of the rainfall event, the seepage occurs mostly at isolated locations.

v. Sixth paragraph states that the IR study identified 14 areas of focused groundwater discharge. Actually, the IR study identified 1,000s of discharge areas, but only focused on the largest 14 areas.

vi. Sixth paragraph states that "The seeps in locations adjacent to contaminated upland wells are isolated and do not form a thermal trace…" There is no data presented that supports this statement. Please remove.

Specific comment #21 a (v and vi) text revision

In order to determine whether preferential groundwater pathways exist that could result in focused groundwater discharge in the marsh, a thermal IR study was conducted on June 15,2009 (Stockton Infrared Thermographic Services 2009). This study identified ~~14~~ areas of focused groundwater discharge or seeps at the marsh surface, near the marsh shoreline, and along the channel edges. Seeps identified in the thermal IR study show a low intensity of groundwater discharge. ~~The seeps in locations adjacent to contaminated upland wells are isolated and do not form a thermal trace that impacts the temperature in a marsh surface channel.~~

vii. Seventh paragraph, last two sentences discuss the peeper study and indicates the approach was "conservative." The approach was not conservative. It was not approved by GAEPD, and was strongly criticized as flawed because it had no ability to predict groundwater discharge flux to the marsh. Unless the study is thoroughly discussed and presented in full in this text, with the weaknesses of the study included, no discussion of this study should be included in the FS.

Specific comment #21 a (vii) text revision

The peeper investigation targeted locations where the IR imagery results showed the greatest potential for groundwater seepage into the marsh. Thus, the approach ~~was inherently conservative,~~ targeted~~ing~~ the greatest potential for contaminant migration into the marsh. The remedial investigation for OU1 presents that data acquired by the peeper investigation. The peeper results suggest that transport of mercury, Aroclor 1268, lead, and total PAHs via focused groundwater pathways in the marsh result in nominal concentrations at the point of discharge [1]

b. Conceptual Site Model

i. The CSM includes groundwater flow from the uplands to the marsh along four flow paths, moving from the uplands to the marsh. However, the flow paths are also tidally reversed, flowing from the marsh to the uplands. This must be explicitly shown on Figure A3.

Specific comment #21b

Please add a footnote on Figure A-3 noting the reversal of flow.

22. **Page ES-13, first whole paragraph**. The second sentence should be changed to reflect the varying degrees of protectiveness to the benthic community between Alternatives 2 and 3 relative to Alternatives 4 through 6, which is approximately a 30-acre difference.

In addition, delete the last sentence of this paragraph because there was no analysis in the FS regarding cost-effectiveness commensurate with benthic community protection. Alternatives 2 and 3 provide the most benthic protection even though costs and impacts to the existing estuarine habitat would be higher.

Specific comment #22 text revision for 2nd sentence

Except for the No Action alternative, all the alternatives reduce surface sediment concentrations to levels within or below the site-specific RGO ranges to varying levels of protectiveness.

Specific comment #22 text revision for last sentence:

~~Accordingly, Alternatives 5 and 6 are the most cost-effective remedies for the protection of benthic communities.~~

23. **Page ES-14, second and third paragraphs under Conclusions**. Modify the 2nd sentence because not *all* alternatives address exceedances of the upper benthic RGOs. In addition, delete the last sentence as it is contrary to the BERA and the data used to establish the RGOs.

    In the third paragraph, the 2nd sentence should be deleted because "…insignificant residual risks…," is not supported by the analysis in Section 6 or in Appendix L. Refer to comment #12.

    Specific comment #23 text revision for 2nd paragraph

    With the exception of the No Action Alternative, all remedies considered in the FS are expected to reduce risks to human health and the environment to acceptable levels. With the exception of a few isolated sample stations with elevated concentrations, all five active alternatives (Alternatives 2 through 6) reduce surface sediment concentrations to levels at or below the site-specific RGO ranges established for protection of human health and site-specific sensitive ecological receptors. ~~*The RGOs are protective of the benthic community because the benthic community RGOs are well below COC concentrations at locations where adverse benthic effects were observed in the marsh.*~~

    Specific comment #23 text revision for 3rd paragraph

    Alternatives 2 through 6 comply with ARARs. Hence, all achieve the threshold criteria of protection of human health and the environment and compliance with ARARs. ~~This conclusion is supported by the analysis provided in Section 6, as each alternative meets the SWAC and benthic community RGOs, leaving behind insignificant residual risks.~~ All active alternatives provide long-term human health and ecological risk reduction by decreasing surface sediment COC concentrations, leading to reduced chemical bioavailability and chemical uptake by human and ecological receptors. This, in turn, leads to reduced risks to human health, mammals, birds, fish, and the benthic community. Long-term monitoring ensures long-term remedy integrity and effectiveness.

24. **Page ES-14, last paragraph**. Replace the phrase ". . .*achieve the site-specific RGOs*. . ." with "are within the RGO ranges". Also, based on the above comments, Alternative 5 may

be cost effective but not as environmentally protective as other alternatives. Suggest modifying text accordingly. Refer to comment #19.

Specific comment #24 text revision

Based on all the remedy selection criteria, including the cost effectiveness and impact analysis summarized above, Alternatives ~~5 and~~ 6 ~~are~~ is the most effective remedial alternatives for OU1. Theseis alternatives satisfies the site-specific RAOs, ~~achieveis~~ is within the site-specific RGO ranges, and meet the NCP criteria of overall protectiveness, implementability, and permanence while limiting risks associated with disturbing sensitive habitat.

If you have any questions regarding the preceding, please contact me at (404) 562-8937.

Sincerely,

Galo Jackson, P.G.
Remedial Project Manager
Superfund Remedial Branch

cc: J. McNamara, EPD

Reference

Horne, M., Finley, N., and Sprenger, M. 1999. Polychlorinated biphenyl- and mercury-associated alterations on benthic invertebrate community structure in a contaminated salt marsh in southeast Georgia. *Arch. Environ. Contam. Toxicol.* 37: 317-325

Magar, VS, DB Chadwick, TS Bridges, PC Fuchsman, JM Conder, TJ Dekker, JA Steevens, KE Gustavson, and MA Mills. 2009. *Technical Guide: Monitored Natural Recovery at Contaminated Sediment Sites.* Published by the Environmental Security Testing and Certification Program (ESTCP). ESTCP-ER-0622. Virginia. Available at: http://www.epa.gov/superfund/health/conmedia/sediment/documents.htm.

ATTACHMENT A

Acronym not defined

Appendix L – page L-11 discusses BSAF. Please add biota sediment accumulation factor to the list of acronyms.

Typographic errors

Page 106 – First paragraph after bullets, second sentence; "*Troup*" Creek, not Troop.

Table 6-1C – There is something missing at the end of the explanation for the blue highlighting in the key.

Appendix B – page B-5, third paragraph, second sentence; "*ratio*", not ration.

Appendix F – page F-4, second paragraph; Appendix *F*, not K.

Appendix K – page K-4, fourth bullet, second sentence; data handling is presented in Appendix *E*, not D.

Appendix K – Figure K-1; should reference Figure *K-6* instead of J-5, and Figures *K-9A* through *K-13* instead of J-8A - J-13

Other

A column with the RGOs from the BERA should be added to the table on page ES-3.

Concerns relating to implementability of dredging options in the LCP Ditch due to debris should be removed. It is GAEPD's understanding that this debris, as shown in Figures 2-6 (M&N) and 6-9 (O&P), was placed there by the RPs.

Tables 3-1 and 3-3 still fail to incorporate previously-supplied GAEPD comments.

Figures 2-18 and 2-19 – The scale of the graph should be expanded at the lower concentrations so that the bars, which can barely be seen, may be seen.

Appendix B – page B-5, last sentence of third full paragraph; page A-13 states that 130 cfs is the tidally influenced effective surface water flow south of the causeway, not "...the peak groundwater flow entering the estuary." Correct the flow rate cited in Appendix B.

Table H-2 – If the dewatering area will be in/on OU3, the OU3 area of its footprint should be removed from the table.

Tables H-10 and H-11 – The capping and thin layer cover unit costs should be broken-down.

Appendix F – A complete key is not provided for/on all figures. In the F-3C through F-3W series, only the F3B and F-3C figure provide the key for the black and gray dashed lines. Please add similar keys for the remainder of the F-3 figures.

Appendix I – page I-9. Need a conversion factor from parts per thousand to practical salinity units (psu).

Appendix J still doesn't contain case studies regarding the long-term stability and effectiveness of thin layer caps. Specifically, Honeywell committed to providing these regarding cap stability after Sandy hit the northeast. These case studies should be added to the appendix.

ATTACHMENT B

APPENDIX B

General comment

The outcome of a mass balance study needs to be included in Appendix B to give the reader greater confidence in the outcome of the hydrodynamic modeling.

Specific Comments

Section 2.5. Quantitative measure of the degree of model calibration achieved should be added to this Appendix to support the statement shown below, regarding successful calibration.

The last sentence in this section, which states that, "successful calibration of the model indicates that the model can be used as a management tool to reliably evaluate remedial alternatives for a range of flow and tidal conditions". This is an overstatement since validation of the model is not presented in the Appendix.

Section 3.3. The modeling performed of the 100-year storm surge requires re-examination. The 6.8 feet found for the Fort Pulaski station should have been added to the spring tide instead of only adding a few feet so that the maximum water elevation during the simulation was 6.8 ft. This procedure should be corrected and the modeling performed again if the objective was to simulate the storm surge during a hurricane with a 100-year recurrence interval that would hit the Site area at the same time as the occurrence of a spring tide, as the language in the section is interpreted.

Figure B3-3 et al. In this figure as well as in other similar figures that show a color contour plot of the maximum predicted currents, the upper scale shown in the legend box should not be ' > 2'; it should be, for example, ' 2 – 2.5' so as to show what the maximum predicted current is not higher than 2.5 ft/s (or whatever the maximum current is).

Figure B3-7. The reviewer did not see any red colored areas/elements (that indicate the difference in maximum predicted currents is > 0.5 ft/s) in this figure. Assuming there are none, then it would be good to split the 0.1 – 0.5 ft/s range into two, i.e., one 0.1 – 0.3 interval and one 0.3 – 0.5 interval so as to depict in what areas velocity differences in the 0.3 – 0.5 ft/s range occur. This comment also applies to all other similar figures.

APPENDIX J

Specific Comments

Executive Summary. Improve the wording in the third bullet near the bottom of Page J-ES-1 for clarity.

Page J-3, Section 2.1, 2nd paragraph. The phrase "and contaminated sediment would only be retained near the bottom of the thin-cover layer", is not clear Please improve the wording for clarity.

Page J-3, Section 2.2, 1st paragraph. The phrase "due to bioturbation" should be added to the end of the third sentence. Other mechanisms, e.g., diffusion, might result in the movement of contaminants into the thin cover material. A reference should be given to support the statement made in the last sentence in this paragraph.

Page J-4, Section 2-3. Even with the fastest deposition rate given in the last sentence, it would take over four years for one inch of sediment to deposition. This slow rate needs to be quantitatively taken into account in the analysis performed later in this appendix.

Page J-4, Section 2.5. Please explain why the assumption that the thin cover material is instantly mixed with the underlying marsh sediment is a highly conservative approach?

In the fourth sentence in the first paragraph, define what is meant by 'long-term'. Also, state the mechanism(s) that would cause the long-term reductions in the surface concentrations.

The methodology or model that was used to calculate the reductions in the surface concentrations as a function of thin cover thickness needs to be referenced and described.

The qualitative results from this modeling are not unexpected, but the quantitative results cannot be properly evaluated until responses to the previous three comments are provided.

A reference is needed to support the statement in the first sentence of the 2nd paragraph (page J-5) that the rate of bioturbation below 6 inches is slow. Mention of the natural deposition processes needs to incorporate the maximum expected rate of less than ¼ inch per year (i.e., 6 mm/yr).

Delete the second "to reach these" in the 2nd sentence in the 2nd paragraph (page J-5). Referring to the shorter timescales mentioned in the last sentence of this paragraph, there are no time scales presented in Figure J-2.

Page J-7, Section 3.1.1. In the second bullet, the phrase "resulting from flow through the cap as well as tidal action" is unclear. Is the meaning that the concentration gradient generated by both groundwater discharge through the cap during low tides as well as the gradient produced by the advective flow of surface water into the top of the cap during the higher tide stages and the reverse flow out of the cap during the lower tide stages?
Page J-8, Section 3.1.3. In the 5th bullet, the third sentence should be reworded to more clearly express the meaning of "groundwater seepage flux at the Site would be much less due to tide ranges".

Page J-10, Section 3.1.3. In the 1st paragraph of the *Groundwater Seepage Velocity* section, is the 9 foot tide range mentioned in the 2nd sentence the mean or spring tide range?

Page J-11, Section 3.1.3. In the next to last sentence in the *Organic Carbon* section, were the sites where experience was gained, highly productive tidal marshes as at this Site? A value of 0.1 seems very low for a productive tidal marsh. At a minimum, a sensitivity study should have been performed on this parameter.

Page J-11, Section 3.2. Why was a vertical average of sorbed-phase concentrations over the bioturbation zone used in the modeling instead of using the actual vertical concentration gradient?

FEASIBILITY STUDY

Specific Comments

Section 2.2.4, page 9. Estuary Sediment Transport Processes: Because a formal sediment stability analysis was not performed, the statement regarding the depth of bed scour (1 to 2 mm) in the first paragraph should be qualified as being professional judgment, since a formal stability analysis was not performed.

Section 2.5.2, page 33. Surface Water-Sediment Flux and Sediment Stability: Since a formal sediment stability analysis was not performed, statements regarding erosion and bed scour in the first paragraph should be qualified using text along the lines of: "in our professional judgment, minimal erosion occurs", or "it is likely that only minimal erosion occurs".

Section 4.2.4. Appendix J should be cited for the modeling described in footnote 6

Identify which of the listed case studies, where thin-layer capping was used for sediment remediation, involved placement of the thin-layer cap in tidal marshes/wetlands as would be at this Site.

"Results of the modeling analysis show that thin-cover placement does not significantly impact marsh hydrology, so that wetting and drying cycles for marsh areas remain effectively unchanged." This is too definitive a statement and requires qualification, since only one component of marsh hydrology was modeled, that being the flooding and draining of marshes over the course of a tidal cycle. The flux of water, e.g., surface water – groundwater interaction and flow of water both horizontally and vertically through a thin-layer cap, was not modeled. In addition, the phrase "thin-cover placement does not significantly impact marsh hydrology" should be deleted, or explained.

7006 2760 0005 1008 4943

U.S. Postal Service™
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

For delivery information visit our website at www.usps.com®

OFFICIAL USE

Postage	$
Certified Fee	
Return Receipt Fee (Endorsement Required)	
Restricted Delivery Fee (Endorsement Required)	
Total Postage & Fees	$

Postmark Here

Sent To: P.K. Gupta, Honeywell

Street, Apt. No.; or PO Box No.: 4101 Bermuda Hundred Rd.

City, State, ZIP+4: Chester, VA 23836

PS Form 3800, August 2006 — See Reverse for Instructions