3/21/08 - 00704.

Responses to EPA Comments
Draft Remedial Investigation Report for Site 21
St. Juliens Creek Annex
Chesapeake, Virginia

EPA Comment 1. Please insert data on MCL's, Region 3 RBC's, or other risk action levels as appropriate on all tables.

Response to EPA Comment 1. MCLs and background upper tolerance limits (UTLs) were used for screening in Sections 1 through 5, where relevant, and are included on the tables where used. Comparison to risk-based screening criteria (RBCs and other risk action levels) is only performed in the risk assessment sections, and the screening is included on the risk assessment tables, as appropriate. Because performing a direct comparison of the sample results to the RBCs does not accurately represent risks, RBCs will not be incorporated into tables outside of the risk assessment section.

EPA Comment 2. The RI Report does not include a well-defined presentation of source areas, which may be contributing to or may have contributed to the volatile organic compound (VOC) contamination in groundwater. Of greatest concern is the general lack of soil analytical data to better define potential source areas. Section 2.3 describes previous investigations at the site; however, it appears that only limited surface soil sampling was conducted. According to Table 2-4, only six surface soil samples were collected within the Site 21 area. Although some subsurface samples were collected during this RI, their locations and the analyses conducted on these samples were also limited. Section 5.2, Refinement of Potential TCE Source Areas, describes three areas at which trichloroethylene (TCE) concentrations were reported, yet there were no historical records indicating use of TCE in the nearby buildings. Soil data are also lacking at these areas. These areas are identified as follows: 1) North of Building 47; 2) South of Demolished Building 54; and 3) Building 46 Area. Therefore, additional soil sampling may be necessary. Please revise the RI Report to provide plans to further investigate these potential source areas.

Response to EPA Comment 2. Although only six soil samples have been collected across what is now considered Site 21, sample locations and analyses were selected based on review of historical site information for identification of potential CERCLA releases at Sites 9/14, 10, 11, 12, 13, and 18. The investigation results for Sites 10, 11, 12, 13, and 18 were presented and evaluated, along with the potential risk to human health and the environment in the SSA (CH2M HILL, 2002). The SSA concluded that the sites were fully characterized and recommended no further action for soil, and was reviewed and approved by the team. Although Site 9 was not evaluated in the SSA, it was closed with no further action in the Federal Facilities Agreement on the basis of the soil removal conducted during construction of Building 1556 (DoD, 2004). Soil is not discussed in detail in the RI report because investigation of the nature and extent of contamination in soil was not an objective the RI as no further action team consensus was previously reached on soil.

Soil samples may appear to be limited based on the current size of Site 21. However, the site was originally identified to be much smaller, and has grown significantly over the years as a result of the CVOC groundwater plume delineation. The extent of contamination in groundwater appears consistent with CERCLA releases, as small amounts of contamination can impact large areas of groundwater through advection and dispersion. In soil, contaminant transport is generally downward into the saturated zone (into the groundwater). No additional sources to potential soil contamination have been identified to lead to further investigation of soil, and because the only site-related COCs identified in groundwater are VOCs, there is no reason to believe that additional contaminants are present in the soil to warrant additional investigation.

RI soil samples were only collected to support evaluation of remedial alternatives and determine the presence or absence of DNAPL. These samples were collected in the saturated zone at the top of the confining unit, and would not be used for determining the nature and extent of contamination or soil risk evaluation (only soil above the water table is evaluated as soil). Therefore, they were analyzed for limited constituents to achieve these objectives. Based on saturated soil samples collected during the RI, it is believed that residual DNAPL may be present in the soil at the bottom of the aquifer in some areas, providing a continual source of contamination to the aquifer. The remedial action chosen to address the groundwater contamination will take that into consideration. Therefore, soil sampling would not provide any additional information needed to aid in site remediation. Regarding soil above the water table, approximately 25 MIP points were advanced that show no VOC contamination in the unsaturated zone based on ECD readings.

Although there are no specific documented uses of TCE north of Building 47, south of Building 54, and in the vicinity of Building 46, a primary source of contamination is believed to be historical dumping of chemicals along railways and fences as weed control throughout the site. Therefore, the potential exists for undocumented source areas, including those identified in the comment. As indicated in Section 6.2.1 of the RI report, following surface releases, contaminants most likely moved downward by gravity as porous media flow through the unsaturated zone above the water table. Some CVOCs most likely volatilized in the unsaturated zone before reaching the water table. Based on the unsaturated zone migration, it is unlikely that contaminants are still present in soil and further sampling isn't warranted.

EPA Comment 3. Several sections of the RI Report, including Table 2-1, mention a soil removal action for former Building 249 (IR Site 9/14) prior to construction of Building 1556. Very few details on this removal action have been provided. The volume of soil removed and the depth of the excavation are not described (although the boundaries of the removal excavation appear to be shown on Figure 2-3). It is also noted that no soil samples were collected during this removal action (Page 2-3). Without post-excavation confirmatory soil sampling, it is not clear how effective the removal action was at removing site contaminants. To aid in the interpretation of the existing data, please revise the RI Report to provide further details on the soil removal action for former Building 249 (IR Site 9/14). Also, describe the basis for the no further action status for this site, referencing supporting documents as appropriate. At a minimum, the collection of soil samples may be necessary to define residual soil contamination levels and ensure that source areas do not remain.

Response to EPA Comment 3. The Navy attempted to locate additional records regarding the removal conducted at IR Sites 9/14, but because the soil removal was conducted in association with the MILCON project and not under CERCLA, records associated with the removal were maintained with the contract files associated with the building construction contract. The Navy determined that these records were archived in 1995 and subsequently destroyed in 2001. The Navy spoke with the ROICC representative, who subsequently conferred with prime contractor's project manager for the MILCON; both recall that the petroleum contaminated soils were removed and disposed of off-site in a landfill, and that confirmation samples were collected; however, records cannot be located. The Navy is checking other potential sources for specific site information. Following excavation and disposal of the petroleum contaminated soil during construction of Building 1556, the team reached consensus for no further action during the June 1999 meeting. The consensus is further documented in the FFA (DoD, 2004). The site is currently located under a building and/or paved area where no VOC contamination has been identified. No additional soil sampling is therefore necessary.

EPA Comment 4. Field reports for the storm water, surface water, and groundwater sampling and temporary well installations have not been appended to the RI Report. These field reports may contain information that is not necessarily described in the RI Report, but may aid in interpretation of the data. Please revise the RI Report to include the field reports for all sampling and temporary well installation activities.

Response to EPA Comment 4. The field reports will be provided electronically as an appendix to the RI report.

EPA Comment 5. The boundaries of the TCE plume appear to be delineated, in part, by groundwater data collected from temporary wells. For example, no permanent monitoring wells exist southwest of monitoring well MW13S. Additionally, there are no permanent wells in the vicinity of temporary well TW122, located in the southeast portion of the site, or upgradient of the plume, north of permanent wells MW17S and MW18S. Additional data will be necessary from permanent monitoring wells so that the plume can be evaluated over time since groundwater samples from temporary wells are not of sufficient data quality for making final remedial decisions, as they have not been sufficiently developed nor are they reproducible data points. Additionally, data from permanent well points can be used to evaluate degradation processes and rates of degradation for volatile constituents. Please revise the RI Report to address how the boundaries of the plume will continue to be monitored via permanent wells. Additionally, please provide the proposed locations of permanent wells to be installed in those locations that will require ongoing monitoring.

Response to EPA Comment 5. The team previously agreed that temporary wells could be used to delineate the groundwater CVOC plume, particularly for upgradient areas and areas of non-detection. Monitoring well locations were jointly scoped with the team and were chosen with consideration of future long term monitoring. Wells are located throughout the plume in areas of varying concentrations, which should be sufficient in evaluating the effectiveness of the selected remedial action. If the need for additional monitoring well

locations is identified during the FS or remedial design, then additional monitoring wells may be installed at that time.

EPA Comment 6. Several monitoring wells have been sampled multiple times. However, the RI Report does not include a discussion of observed contaminant trends nor does it include isoconcentration maps depicting contaminant concentrations over time. This type of discussion/evaluation may help refine the conceptual site model, assist in the placement of permanent wells to be used to monitor the groundwater in the future, and aid in the development of potential remedies for the site. Please revise the RI Report to include a discussion of observed contaminant trends over time for those wells for which data are available. Also, please describe what data needs will be necessary to develop a more thorough understanding of the temporal variations in the contaminant plumes.

Response to EPA Comment 6. Data has not been collected to evaluate trends, and sufficient data has not been collected to incorporate a discussion of trends into the RI report. The objective of the RI was to determine the nature and extent of contamination and assess long-term risks, which the RI has met. Monitoring well locations were jointly scoped with the team and were chosen with consideration of future long term monitoring. Wells are located throughout the plume in areas of varying concentrations, which should be sufficient in evaluating the effectiveness of the selected remedial action. While temporal variation data is valuable in evaluating MNA, an active remedy is currently planned for Site 21 and collection of data to evaluate temporal variations is not planned. Additionally, the rate of degradation of the contaminants in the CVOC plume will be affected by implementation of any active remedy, so temporal variation data collected now would no longer be useful. If the need for additional data or monitoring well locations is identified during the FS or remedial design, then the need will be addressed at that time.

EPA Comment 7. The RI Report discusses the use of three sampling approaches implemented for collection of depth specific groundwater samples, but does not include a discussion of the results, or a recommendation for the proposed approach for collection of depth specific groundwater samples in the future. Please revise the RI Report to include an assessment of these data.

Response to EPA Comment 7. Depth-specific groundwater samples were collected at 5 locations in the northern area of the plume to further refine the nature and extent and determine whether or not an additional source area was present. During planning, Color-Tec groundwater test kits were selected to perform in-field preliminary screening of data for use in the selection of temporary well locations. However, it was determined that the Color-Tec results were not accurate, and additional temporary well locations were added. Because of limited materials on site, the team was consulted and some locations were revised from temporary wells to grab groundwater samples (i.e., there was not enough screen to install temporary wells at all proposed sample locations). The grab groundwater samples were collected at the bottom of the aquifer (where contaminants would be expected at the highest concentrations) in areas thought to be outside of the plume. In grab sample locations where TCE was detected, a permanent monitoring well was installed and a groundwater sample was

collected. The Color-Tec discussion is included in Section 3.2.7. The sample IDs for these locations have been added to the text for clarification.

Depth-specific groundwater samples were collected at three monitoring wells (SJS21-MW07S, MW12S, and MW13S) to confirm the presence or absence of DNAPL. The results were initially reported with the rest of the groundwater results in order to present a comprehensive evaluation of the data in Section 5.1.4. Additionally, the results were discussed in relation to NAPLs in Section 6.2.

The nature and extent of contamination of groundwater at the site has been adequately defined and no additional depth-specific groundwater samples are needed at this time.

EPA Comment 8. The RI Report only includes data for one deep monitoring well. Based on the lack of contaminant trend data, the need for additional deep monitoring wells needs to be addressed as a data gap within the RI Report. Please revise the RI Report to allow for the installation of additional deep groundwater wells, or provide adequate justification for why additional deep groundwater wells are unnecessary.

Response to EPA Comment 8. Based upon results from monitoring well MW01D, in which organics were not detected, the deep groundwater does not appear to have been impacted by Site 21 activities. This reasoning is further substantiated by inorganic data from the site. Arsenic and vanadium were detected sporadically in the Yorktown aquifer but were not identified in the Columbia aquifer within the same area of the site. Additionally, a laterally extensive hydraulic clay aquitard (Yorktown confining unit) that is approximately 17-ft thick is present in which there is very low vertical permeability in clay, preventing downward migration of COPCs. Deep groundwater was considered in the scoping of additional sample locations, and the team did not identify the need for additional deep groundwater data. Based on the experience at Site 2 where contamination was carried down from the shallow aquifer to the deep aquifer, the team was comfortable with the data and confining unit presence and did not want to risk a similar occurrence of carry down.

EPA Comment 9. The RI Report discusses the collection of groundwater samples via a peristaltic pump. Please revise the RI Report to clarify what sampling technique was used for collection of groundwater samples via a peristaltic pump. In the future, EPA recommends using the "Straw Technique" or the glove thumb over the tubing and draining technique as described in EPA Region 4 *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual* (EI SOP QAM, November 2001) Section 7.3.3 to collect VOC samples, and the semi-volatile organic compounds (SVOCs) and metals should be collected using a vacuum jug assembly as described in EPA Region 4 EI SOP QAM Section 7.3.3.

Response to EPA Comment 9. Groundwater samples have consistently been collected following the Low Flow (Minimal Drawdown) Groundwater Sampling Procedures (EPA, April 1996), as referenced in the RI report. This comment will be considered during development of future work plans.

EPA Comment 10. It is not clear why there are two separate tables to select COPCs for shallow groundwater under the "Construction Excavation and Tap Water" exposure point scenario presented in Table 2.4, and the "Construction Excavation and Shower" exposure point scenario presented in Table 2.5. Both tables compare contaminant concentrations in shallow groundwater to Region 3 tapwater risk-based screening concentrations. It appears that this disconnect could be addressed by a brief summary of anticipated exposure scenarios and a discussion of the exposure assumptions that were considered in the derivation of the risk based screening criteria that are being used. For clarity, this discussion should be included in the section on the identification of COPCs. This may also eliminate the need to have two tables to screen COPCs for the "Construction Excavation and Tap Water" exposure point scenario and the "Construction Excavation and Shower." Please revise the HHRA to address the above concerns.

Response to EPA Comment 10. Two separate tables were used to select COPCs for the shallow groundwater for direct exposure to groundwater and for exposure to air due to groundwater following the RAGS D table formatting, as the exposure medium is different for each of the scenarios. The use of the two separate tables with the same screening criteria will be discussed under 7.1.2, first bullet.

EPA Comment 11. The COPC selection tables, included in Appendix H as Tables 2.1 through 2.5, appear to include background concentrations for several volatile contaminants, including acetone, TCE, cis-1,2-dichloroethylene (DCE), and others. A note included on these tables indicates that background values are for the Columbia aquifer, and that the upper tolerance limit (UTL) detected results were used for total metals. A complete source for these background values is not provided in the tables. Furthermore, the HHRA has not provided any information on the calculation of background for these organic constituents. Please revise the HHRA to include a complete reference for the Appendix H tables for the background values referenced. Additionally, please further describe the process by which background values for organic constituents were calculated.

Response to EPA Comment 11. The background UTL values used in the HHRA were established in the Final Background Investigation Report Addendum for Groundwater, St. Juliens Creek Annex, Chesapeake, Virginia (CH2M HILL, August 2004), which presents the calculations. Although background UTLs were calculated for VOCs in the Final Background Investigation Report Addendum, they should not be used since VOCs are not anthropogenic. The HHRA tables will be amended to include a reference for the background UTL values and to remove the VOC background UTLs.

EPA Comment 12. Indoor air concentrations used in the risk assessment were modeled from groundwater concentrations using the Johnson and Ettinger Model (1991); however, it was previously noted that EPA does not find the model applicable to Site 21. EPA originally expressed concern with use of this model in the comments on the *Draft Indoor Air Vapor Evaluation Addendum to Work Plan for Additional Groundwater Delineation Activities at Site 21*. EPA's original comment summarized the following points:

- The shallow groundwater depth at Site 21 (typically between 1 and 7 feet below ground surface (bgs)) limits the validity of the J&E model at this site. Although

the EPA user's guide for evaluating vapor intrusion (*OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*, November 2002) does not set a specific depth to groundwater limit for use of the model, it does state that "the model is a one dimensional analytical solution to diffusive and convective transport of vapors formulated as an attenuation factor that relates the vapor concentration in the indoor space to the vapor concentration at the source". It further states that "factors that, in our judgment, typically make the use of semi-site specific attenuation factors inappropriate include: very shallow groundwater sources (e.g., depths to water less than 5 ft below foundation level" (Page 24).

- Shallow groundwater coupled with buildings with significant openings to the subsurface (e.g., sumps, unlined crawlspaces, earthen floors) also limit use of the generic groundwater attenuation factors of the J&E model (Page 24). EPA originally noted that Building 1556 has sumps and foundational joints that would qualify as such significant openings (these factors are currently under investigation).

- Dense non-aqueous phase liquid (DNAPL) is suspected at Site 21. Although DNAPL test kits did not confirm the presence of DNAPL, Page 6-5 of the RI Report states that "the maximum concentrations of TCE detected in shallow groundwater at Site 21 are 16,000 µg/L at SJS21-MW15S and 13,000 µg/L at SJS21-MW16S, likely indicating the presence of DNAPL." The *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings*, dated February 2004, states that the presence of residual or free-product nonaqueous phase liquids in the subsurface precludes use of the J&E model (Page 69).

Although this HHRA does acknowledge some of the uncertainties associated with modeling air concentrations, use of the J&E model at Site 21 does not appear to be the most protective approach for evaluating the potential for vapor intrusion into indoor air at this site, given the limitations of the model and the site-specific conditions encountered at this site. Please revise the RI Report to address these concerns.

Response to EPA Comment 12. Although recent questions have been raised as to the validity of modeling at Site 21, its planned use has been discussed by the team during scoping of investigation activities. Due to the presence of VOCs underneath Building 1556 identified in the 2005 investigation, the potential for vapor intrusion using the J&E model was evaluated, and the results were presented to the team in partnering meetings and the Draft SSI report. The results concluded that there was no potential for vapor intrusion into Building 1556 and no further action was warranted to protect workers. Although the report was not finalized, no comments were received regarding the applicability of the model. During planning of additional investigations, the team discussed the planned use of the same approach (use of the J&E model) for additional buildings, and therefore scoped the investigations to include only collection of groundwater data. The data and the preliminary results of the J&E model evaluation were presented at partnering meetings during development of the RI report. However, based on the concerns expressed over the applicability of modeling during the review of the draft work plan for indoor air vapor evaluation at Site 21, this comment will be addressed separately in conjunction with the resolution of comments on the Site 21 air vapor evaluation work plan.

EPA Comment 13. Surface water, soil, and groundwater samples have been collected from Site 21 yet this HHRA only quantifies risk associated with groundwater. Section 2 of the RI Report describes various risk screenings that were conducted for soil results, but none of these results have been presented. The exposure pathways evaluated in these previous risk screenings also have not been described. Furthermore, this HHRA has not presented a total site risk and total hazard index for all exposure pathways at the site. Since cancer risks from various exposure pathways are assumed to be additive, total site risk from all exposure pathways should be calculated. Please revise the HHRA to include a calculation of risk from all exposure pathways, including those associated with surface water and soil. Additional information from the previous risk screenings for soil should be provided.

Response to EPA Comment 13. The only remaining media of concern during the RI was groundwater based on previous investigations and team decisions. The specifics of the risk screenings conducted on the soil samples discussed in Section 2 are documented in the Final Site Screening Assessment Report, St. Juliens Creek Annex, Chesapeake, Virginia (CH2M HILL, 2002). No surface water bodies exist within Site 21, the surface water samples collected as part of the Site 21 RI were collected at IR Site 2, downgradient of Site 21 to assess whether Site 21 was contributing to Site 2. The CVOCs in surface water within the Site 2 inlet will be evaluated and addressed as part of Site 2.

EPA Comment 14. Section 9.5 only recommends additional investigation at Building 54, based on the potential risk of vapor intrusion into this building. However, potential risk associated with inhalation of vapors from shallow groundwater for current industrial receptors exceeded EPA's recommended point of departure for carcinogenic risk (1E-06) at several of the buildings evaluated, including Building 54 (1.6E-04), Building 13 (1.3E-5), Building 47 (2.9E-5), and Building 1556 (5.8E-5) under the reasonable maximum exposure (RME) scenario (Table 7-4). Under the central tendency exposure (CTE) scenario, Building 1556 (1.8E-05) exceeded the point of departure along with Building 54 (5.1E-05). Given the uncertainties associated with the J&E model used in the evaluation as well as the CSFs used in the assessment for TCE, additional investigation of the buildings noted above may be warranted to gather site-specific data on which to refine site risks.

Response to EPA Comment 14. This comment will be addressed separately in conjunction with the resolution of comments on the Site 21 air vapor evaluation work plan/team establishment of a path forward regarding air vapor. However, note that the potential risk associated with inhalation of vapors from shallow groundwater was evaluated in comparison to EPA's target risk range of 10^{-4} to 10^{-6}.

SPECIFIC COMMENTS

EPA Comment 15. Table 5-4, page 3 of 9. There is an asterisk next to sample identification number SJS21-DW105-06D* although there is no asterisk definition within the legend. Please explain the relevance of the asterisk next to this sample identification.

Response to EPA Comment 15. The asterisk represents sample locations where a duplicate sample was collected, and the most conservative result between the samples is shown in the

table. The asterisk should have been footnoted with the number 2, which will be corrected in the table.

EPA Comment 16. Section 7.2.2, Identification of Exposure Pathways, Future Exposure Routes. A bullet should be added indicating shallow groundwater (ingestion, dermal, and inhalation from showering) were evaluated for the resident (adult and child), since this scenario is included within the assessment.

Response to EPA Comment 16. The last two bullets in Section 7.2.2 mistakenly said deep aquifer groundwater for the dermal and inhalation routes, but did say shallow aquifer groundwater for the ingestion route. These bullets will be corrected to indicate shallow aquifer groundwater for the dermal and inhalation routes, instead of deep aquifer groundwater.

EPA Comment 17. Section 7.2.2, Identification of Exposure Pathways, Current Exposure Routes. See previous comment.

Response to EPA Comment 17. The response in the current exposure routes is correct, evaluating vapor intrusion from shallow groundwater, and will not be changed.

EPA Comment 18. Section 2.3.1, Relative Risk Ranking System Data Collection Report (CH2M HILL, 1996), Page 2-3: The RI Report indicates that the data included in Table 2-2 has not been validated. Please revise the RI Report by either validating the currently unvalidated data or providing adequate justification for why the data cannot be validated at this time.

Response to EPA Comment 18. The appropriate QA/QC samples were not collected in order to perform data validation. The samples were considered adequate for determining a path forward at the site by the team.

EPA Comment 19. Section 2.3.2, Site Screening Assessment (CH2M HILL, 2002), Page 2-3: The human health risk screening (HHRS) for Site 10 concluded that "groundwater should not be considered for further evaluation and that surface soil does not pose a concern to human health." A more detailed description of this health risk screening is necessary in order to evaluate the older data in context with the newer data presented in this RI Report. For example, the exposure scenarios that were considered during the HHRS should be described to assure that current and future receptors will be adequately protected. Additionally, the screening criteria that were utilized should be presented. Please revise the RI Report to present a more thorough description of the previously conducted HHRS for Site 10 as well as any other sites for which this screening was conducted. Site risks/hazards should be documented, and considered in the calculation of total site risks for Site 21.

Response to EPA Comment 19. The groundwater and soil data used in the HHRS is not included in the HHRA because it was not validated. The HHRSs for Sites 10, 11, 18, and 21 are provided in the Final Site Screening Assessment Report, St. Juliens Creek Annex,

Chesapeake, Virginia (CH2M HILL, April 2002). On the basis that no unacceptable risks were identified, the HHRS recommended NFA for both soil and groundwater. However, as the Site 21 boundary has expanded, additional groundwater data has been collected within the vicinity of former Site 10, and is sufficient to characterize risk from to exposure groundwater. As investigation and evaluation of the nature and extent of groundwater was the objective of the RI, groundwater is the focus of the RI report.

EPA Comment 20. Section 2.3.2, Site Screening Assessment (CH2M HILL, 2002), Page 2-3: It is noted that the "HHRS concluded that surface soil does not pose a concern to human health" at Site 11. However, since a detailed description of this HHRS has not been presented, it is not apparent how this conclusion was drawn. Based on the limited data presented in this RI Report, it appears that only two surface soil samples were collected in the vicinity of Site 11 (11SS01 and 18SS01). Table 2-4 shows that several polycyclic aromatic hydrocarbons (PAHs), pesticides, polychlorinated biphenyls (PCBs), and metals were detected in the two samples. Several of these constituents were detected well above the Region 3 Risk Based Concentrations (RBCs) (October 2007). For example, benzo(a)pyrene was detected in both samples above the current RBC for this constituent (22 ug/kg) under a residential land use assumption. Aroclor-1260 was also detected an order of magnitude above the RBC (319 ug/kg) in sample 11SS01 (6,100 ug/kg – which exceeded the calibration range of the sample). Additionally, lead was detected in both surface soil samples above EPA's recommended action level for residential use of 400 parts per million (ppm). It does not appear that further horizontal or vertical delineation of this contamination was conducted. Please revise the RI Report to elaborate on why further soil assessment is unnecessary for Site 11, given the contaminants detected above current RBCs. A detailed discussion of the risk screening process and data included in the risk screening is necessary.

Response to EPA Comment 20. The groundwater and soil data used in the HHRS is not included in the HHRA because it was not validated. The HHRS for Sites 11 is provided in the Final Site Screening Assessment Report, St. Juliens Creek Annex, Chesapeake, Virginia (CH2M HILL, April 2002). On the basis that no unacceptable risks were identified for soil, the HHRS concluded NFA for soil and incorporation of groundwater into Site 21. Therefore, the RI report focuses on the nature and extent of contamination in groundwater. Additional groundwater data has been collected within the vicinity of former Site 11, and is sufficient to characterize risk to exposure from groundwater.

EPA Comment 21. Table 2-1, Historical Activities: It is noted that hydraulic fluid waste was reportedly dumped outside of Building 46 for the purpose of weed and dust control. However, Figure 2-4, Site 21 Sample Locations, appears to show that no soil samples were collected in the vicinity of this building to evaluate the potential for contamination from this historical activity. Given the identification of TCE contamination in groundwater in temporary well TW122, an investigation of this potential source area appears warranted. Please revise the RI Report to address the lack of soil analytical results in the vicinity of Building 46, and indicate how this data gap will be addressed.

Response to EPA Comment 21. No CERCLA site was identified in the vicinity of Building 46, and the exact location of disposal is unknown. TCE is not a typical component of

hydraulic fluid, and no indication of hydraulic fluid-related contamination in groundwater indicating a source area in soil has been identified. TCE was only detected at a low concentration (27 ppb) at TW122. Because TCE is a volatile contaminant, concentrations in soil are likely to be significantly lower in groundwater due to volatilization; therefore, no significant source area in soil is likely in the vicinity of TW122, and soil sampling is not warranted.

EPA Comment 22. Table 2-1, Historical Activities: The description of Building 47 (IR Site 18) mentions that acid waste was taken to a burning ground for disposal. The location of this burning ground in relation to Building 47 and Site 21 has not been described. For clarity, please revise the RI Report to describe the location of the burning ground, and indicate whether this area has been investigation or is undergoing investigation. Furthermore, Section 2.3.2, Site Screening Assessment (CH2M HILL, 2002), Site 18-Blasting Grit and Air Compressor at Building 47, indicates that surface soil contamination was detected, but no groundwater samples were collected. This would appear to be a data gap. Please revise the RI Report to address this apparent groundwater data gap at Building 47.

Response to EPA Comment 22. The burning ground referred to in Table 2-1 is IR Site 5, the former burning grounds, which is currently in the RI/FS stage of investigation under CERCLA. The table will be revised to identify the burning grounds as IR Site 5. Groundwater at Site 18 is currently being addressed with Site 21 based on the SSA conclusion to address groundwater from all sites in the vicinity of Site 21 as one site. Although no groundwater samples were taken during the RRR for evaluation in the SSA, several groundwater samples have been collected within 100 ft of Building 47 during the RI, including downgradient of the soil sample locations. Therefore, groundwater in this area has been adequately assessed.

EPA Comment 23. Table 2-1, Historical Activities: The description of Building 68 indicates that waste oil was poured down a storm drain adjacent to the building. Figure 2-3 appears to show that Building 68 is located in the far southeastern corner of Site 21. Figure 2-4 shows that Building 68 is located in an area that has not been investigated (with the exception of one temporary well, TW119, approximately 90 feet north of the building). Given the historical activities at Building 68, please revise the RI Report to clarify how the Building 68 area will be adequately assessed.

Response to EPA Comment 23. Based on the historical practices mentioned in the comment, the only media to investigate would be storm water. However, storm water is transient and current conditions would no longer reflect historical conditions. The contamination would have been transported by the storm water system. The area was considered during the RRR planning by the team, and no investigation need for this historical release was identified as it was not identified as an IR site.

EPA Comment 24. Table 2-1, Historical Activities: The description of Building 187 (IR Site 21) indicates that the ground around Building 187 was saturated with oil during the 1981

IAS. The current state of the ground surrounding Building 187 has not been described. Also, it is not clear whether the two surface soil samples collected in the vicinity of this building (21SS01 and 21SS02) were collected within the oil-saturated area. Please revise the RI Report to clarify the status of the stained soil surrounding Building 187, and indicate whether surface soil sampling was targeted for that area.

Response to EPA Comment 24. The ground surface around former Building 187 is currently covered by an asphalt paved parking lot. No documentation has been made as to the location of the soil samples in relation to the oil-saturated area, although it is assumed that they were collected in the oil-saturated area since the site was identified based on the area. The Navy's RRR system is used to determine which sites may require further investigation and to prioritize those sites where further investigation work is needed. It therefore focuses on the areas of greatest concern (e.g., visible contamination) to serve as a conservative screen to determine whether or not additional investigation is necessary.

EPA Comment 25. Table 2-1, Historical Activities: The description of Building 249 (IR Site 9/14) indicates that herbicide tanks were rinsed in a wash pad that drained into the storm sewer adjacent to the building. However, according to the Sample Summary in Table 2-2, it does not appear that any surface soil, storm water, or groundwater samples were analyzed for herbicides. The lack of herbicide data may represent a data gap. Please revise the RI Report to clarify whether any samples were analyzed for herbicides in the Building 249 area. Also, if samples have not been analyzed for herbicides, describe plans to address this data gap.

Response to EPA Comment 25. The sampling plan was jointly scoped by the team based on evaluation of historical data and no additional data was deemed necessary. Additionally, storm water is transient and current conditions would no longer reflect historical conditions. No additional investigation is planned.

EPA Comment 26. Table 2-1, Historical Activities: The description of Building 46 indicates that smokeless powder was loaded into cartridges as well as having explosives present. Hydraulic fluid was also dumped outside of the building for weed and dust control. Given the detection of RDX in MW04S (down gradient of MW04S) and the historical uses of this building, EPA believes that a further investigation of the soils in and around building 46 is warranted. Please revise the RI to address this area or provide justification why it has not been addressed.

Response to EPA Comment 26. Although cartridges were loaded in Building 46, there is no historical record of disposal of smokeless powder or explosives in the vicinity of Building 46. The sampling plans for all investigation activities were jointly scoped by the team based on evaluation of historical activities and review of data, and no soil data was deemed necessary. RDX was detected at a low concentration in the shallow groundwater sample collected from MW04S in 2003; however, it was not detected in the sample collected in 2004 to confirm its presence.

EPA Comment 27. Section 3.2.5, Temporary Monitoring Well Installation and Sampling, Page 3-3: It is noted that the temporary wells were driven to depths of 17 to 22

feet (ft) below ground surface (bgs). The rationale for these depths is not described, and it is not immediately evident since field logs for the temporary well installations have not been provided. If the wells were installed to the top of the Yorktown confining unit, this information should be provided.

Response to EPA Comment 25. The temporary monitoring wells were installed to the top of the Yorktown confining unit. This clarification will be added to Section 3.2.5. The field logs will be added electronically as an appendix to the RI report.

EPA Comment 28. Section 4.3.2, Site-Specific Geologic and Hydrogeologic Framework, Page 4-4: It is noted that the potentiometric surface at Site 21 is influenced by the storm sewer line in the center of the site, but the extent of this influence is not completely apparent based on the information provided. The RI Report includes a discussion on horizontal flow, but the vertical flow of groundwater has not been described, and vertical gradients do not appear to have been calculated. Also, it is not clear that the storm sewer line's influence is as great on the eastern side of the site, particularly near wells MW06S, MW07S, and MW05S, but there does not appear to be enough data in this area to refine the groundwater flow direction (particularly southeast of MW07S). Please revise the RI Report to further describe the extent of the influence of the storm sewer system on groundwater flow. Vertical flow across the site and in the immediate vicinity of the storm sewer line should be described. If flow rates near the storm sewer line can be calculated (rather than a site-wide flow rate), this information may also be useful when developing potential remedies for the site.

Response to EPA Comment 28. More specific details of the influence of the storm sewer system on groundwater flow are not available. Potential vertical gradient near the storm sewer line can be assumed; however, there is not sufficient data to calculate a vertical gradient and because there is no anticipated significant impact on future remedies, the calculation of flow rates is not necessary.

Based on the water level data and the plume delineation it appears that groundwater flow on the eastern side of the site is predominately to the west/southwest. There is sufficient data to provide a reasonable level of certainty for the groundwater flow direction within the plume. Although water level data is not available immediately north/northeast of the site to further evaluate the flow direction in that area, it is unnecessary as the plume is bounded on all side by non-detect sample results. Future monitoring plans will consider the vicinity of MW06S to ensure that contamination is not migrating northward, if necessary.

EPA Comment 29. Table 4-2, Groundwater Elevations, Page 1 of 1: A depth to groundwater measurement was not collected from monitoring well MW04S during the February 2007 monitoring event. The RI Report does not elaborate on why a groundwater level measurement was not collected from this well. Data from this well may help to refine the groundwater flow direction at the site, particularly since Figure 4-8 appears to show a lack of data in the center of the site (i.e., approximately midway between wells MW14S and MW16S). Please revise the RI Report to explain why a depth to groundwater measurement was not collected from monitoring well MW04S during the February 2007 event.

Response to EPA Comment 29. A depth to groundwater measurement was not collected form monitoring well MW04S during the February 2007 sampling event; a vehicle was parked on top of it and the monitoring well could not be accessed. The RI report will be amended to include this explanation.

EPA Comment 30. Section 5.1.4, Shallow Groundwater Results, Semivolatile Organic Compounds, Page 5-4: The RI Report states that bis(2-ethyl-hexyl)phthalate is a common laboratory contaminant, but the detection in question is an order of magnitude greater than the maximum contaminant level (MCL). The magnitude of the detection makes this statement inaccurate, especially since it was not qualified as being in the blanks. The fact that bis(2-ethyl-hexyl)phthalate is a common laboratory contaminant does not rule our the possibility that this contamination is site-related. Please revise the RI Report to remove this statement and address this potential localized contamination.

Response to EPA Comment 30. Bis(2-ethyl-hexyl)phthalate was only detected and exceeded the MCL once at one well. Because detection of this constituent is isolated, it is believed to not be site-related. The text will be amended to delete discussion of the constituent being a common laboratory contaminant.

EPA Comment 31. Figure 5-2, Shallow Groundwater Exceedances, VOCs: Several of the groundwater results are shown in bold blue text, but the meaning of this blue text has not been defined in the legend of the figure. Additionally, "NE" is listed as a result for several wells (MW01S, MW09S, MW02S), but the meaning of "NE" has not been defined in the legend. For clarity, please revise Figure 5-2 to properly define the meanings of all symbols, acronyms, and color-coding that is used throughout the figure.

Response to EPA Comment 31. The bold blue text represents MCL exceedances and "NE" stands for "not exceeded" and represents constituents that were detected but did not exceed the MCLs. Figure 5-2 will be revised to include the meaning of the bold blue text and "NE" designation.

EPA Comment 32. Figure 5-3, Shallow Groundwater TCE Plume: Figure 5-3 does not specify which data were used to create the contour map. Several of the permanent monitoring wells depicted have been sampled multiple times, so it is unclear whether the figure depicts maximum concentrations or concentrations from a specific date in time. Please revise the RI Report to clarify which data are depicted on Figure 5-3.

Response to EPA Comment 32. Section 5.1.3 and Figure 5-3 of the RI report will be revised to clarify the data used in the figure. The most recent results from each sample location were used to create the TCE plume shown on Figure 5-3. In cases where a contaminant was previously detected, but not detected in the most recent rounds and in which the reporting limit is above the MCL for the most recent round, the previous detection will be used. Results from the depth specific DPT samples collected at the bottom of the Columbia aquifer were not used to create the plume.

EPA Comment 33. Figure 5-5, Vinyl Chloride (VC) Plume: An asterisk in the legend notes that data from wells identified with this symbol (MW14S, MW15S, and MW16S) were not used in the figure since anomalous results with high detected limits were reported for these wells. The description of the VC plume, presented in the last paragraph on Page 5-3, does not describe these anomalous results, and the anticipated effect they may have on delineation of VC plume. Please revise the RI Report to describe the "anomalous" results that were noted on Figure 5-5, and elaborate on the anticipated effect on the delineation of the VC plume.

Response to EPA Comment 33. Refer to Response to Comment 46. Figure 5-5 and Section 5.1.4 of the RI report will be revised to clarify the anomalous results. Results at the wells noted with an asterisk were considered anomalous and not used to delineate the VC plume because they were nondetects.

EPA Comment 34. Section 6.0, Contaminant Fate and Transport, Page 6-1: The last sentence of the first paragraph indicates that "soil is not a media of concern" at Site 21. However, it has not been adequately demonstrated that soil should not be further assessed. Previous HHRSs appear to have been based on a limited number of surface soil samples collected from a limited number of areas. Several areas where the potential for soil contamination may exist have not been fully evaluated (i.e., post-excavation area in Site 9/Site 14, Site 11, Building 46 area as well as areas where contaminant concentrations in groundwater are elevated, such as near MW16S, MW19S, MW15S). While the delineation of the groundwater plume is a major component of this RI Report, definition of any and all source areas contributing to this contamination is also a concern. Please revise the RI Report to remove the sentence that states that "soil is not a media of concern" until additional data or information can otherwise support this statement.

Response to EPA Comment 34. See response to Comment #2. Because NFA was concluded in previous documents, no additional soil investigation was planned, and the RI report focuses solely on groundwater. RI investigation activities were jointly scoped by the team and additional soil investigation was deemed unnecessary.

EPA Comment 35. Section 6.3, Summary of Migration Pathways, Page 6-6: A major pathway of concern at Site 21 is the volatilization of contaminants, coinciding with potential vapor intrusion into indoor air. However, this migration pathway is not identified as a current primary migration pathway in Section 6.3. Please revise the RI Report to identify the volatilization of contaminants and potential vapor intrusion into indoor air as a primary migration pathway at Site 21.

Response to EPA Comment 35. The RI report will be amended to include potential vapor intrusion into indoor air as a primary migration pathway.

EPA Comment 36. Figure 6-1, Conceptual Site Model (CSM): The CSM figure does not include a figure number or title. Also, inhalation of groundwater vapors to indoor air is noted as a potential concern for the current/future industrial receptor on the figure yet volatilization into indoor air is not depicted or otherwise mentioned on the figure (although mechanisms

such as infiltration and biodegradation are). Please revise the CSM figure so that it includes a figure number and title. Volatilization should also be shown as a contaminant fate process.

Response to EPA Comment 36. The CSM will be revised to include a figure number and title. Volatilization will be added to the CSM as a potential transport mechanism.

EPA Comment 37. Section 7.2.3, Estimation of Exposure Point Concentrations, Page 7-7: It is stated that ProUCL, Version 3.0 was used to calculate the reasonable maximum exposure (RME) exposure point concentrations (EPC). A newer version of this program is available (Version 4.00.02) and should be used in subsequent revisions to this HHRA.

Response to EPA Comment 37. Comment noted. More recent risk assessments have used and future risk assessments will use ProUCL Version 4.00.02. As use of the newer version of the program is not expected to change the results, this risk assessment will not be rerun using ProUCL Version 4.00.02.

EPA Comment 38. Section 7.2.3, Estimation of Exposure Point Concentrations, Page 7-9: The parameters used for the Foster and Chrostowski shower model are presented in Table 7.2 RME Supplement C and 7.6 RME Supplement B in Appendix H, but the HHRA should provide justification for selection of the specific exposure assumptions. For example, the rationale for selection of a 30 minute shower duration, 60 minute total duration in shower room, and a 10 liter per minute (l/min) shower water flow rate have not been provided. If the exposure assumptions are conservative default exposure assumptions of the model, please specify this information on the tables, and indicate why the default exposure assumptions are applicable to the site. Please revise the HHRA to provide the rationale for selection of the exposure assumptions used in the Foster and Chrostowski shower model.

Response to EPA Comment 38. A footnote will be added to Tables 7.2.RME Supplement C and 7.6.RME Supplement B in Appendix H indicating the values used in the Foster and Chrostowski shower model are default EPA Region III values that EPA Region III has directed us to use in the past. These values are applicable to the site, as this is not a current exposure pathway, and the risk assessment evaluated a future RME default residential groundwater use pathway.

EPA Comment 39. Appendix H, Table 1, Selection of Exposure Pathways, Page 1 of 1: For exposure to tap water (deep groundwater) by a resident, dermal contact and ingestion are listed twice for the off-site child and adult receptor. The same appears to be true for exposure to tap water from shallow groundwater. Additionally, an on-site resident does not appear to have been included for these exposure scenarios. Please revise Table 1 to address why dermal contact and ingestion of shallow and deep groundwater are listed twice for both the off-site child and adult receptor and on-site receptors are not identified for these exposure pathways.

Response to EPA Comment 39. A footnote will be added to the table to indicate that the adult and child are evaluated for noncarcinogenic hazard only, and the adult/child are evaluated for carcinogenic risk.

EPA Comment 40. Appendix H, Table 2.1, Occurrence, Distribution, and Selection of Chemicals of Potential Concern (COPC): Under the Screening Toxicity Value column, "NA" is listed for both cyclohexane and acenaphthene. However, the meaning of "NA" has not been defined in the notes of the table. Please revise Table 2-1 of Appendix H to define the meaning of "NA" and any other acronyms used in the table.

Response to EPA Comment 40. A footnote will be added to all of the Table 2s in Appendix H, indicating NA = not available.

EPA Comment 41. Appendix H, Table 2.3, Occurrence, Distribution, and Selection of COPC: Table 2-3 does not specify the medium for which the selection process was conducted. Based on the monitoring well mentioned in the "Location of Maximum Concentration" column (MW01D), it appears that deep groundwater concentrations are being evaluated. Please revise Table 2.3 to indicate whether shallow or deep groundwater concentrations were evaluated.

Response to EPA Comment 41. The exposure medium box will be revised on Table 2.3 from "Air" to "Air (deep groundwater)".

EPA Comment 42. Appendix H, Table 2.4, Occurrence, Distribution, and Selection of COPC, Page 2 of 2: It appears that the concentration used for screening of iron (2.6E+04 mg/kg) exceeded the screening toxicity value (2.6E+03 mg/kg); however, iron was not selected as a COPC. Instead, the rationale for contaminant deletion or selection indicates that the contaminant was below the background level (BBL). However, this approach appears to contradict that which is stated in Section 7.1.1, Data Evaluation and Selection. The first full paragraph on Page 7-3 states "A comparison of site data to background data was not used to select COPCs." Eliminating potential constituents prior to risk characterization also deviates from the approach summarized in EPA's guidance document, "Role of Background in the CERCLA Cleanup Program" (Page 6 of 13, April 26, 2002), in which the following summary is provided: "In [Risk Assessment Guidance for Superfund] RAGS, EPA cautioned that eliminating COPCs based on background…could result in the loss of important risk information for those potentially exposed, even though cleanup may or may not eliminate a source of risks caused by background levels…this policy recommends a baseline risk assessment approach that retains constituents that exceed risk-based screening concentrations. This approach involves addressing site-specific background issues at the end of the risk assessment, in the risk characterization. Specifically, the COPCs with high background concentrations should be discussed in the risk characterization, and if data are available, the contribution of background to site concentrations should be distinguished." Please revise the HHRA to include iron as a COPC based on the approach outlined in the site HHRA and EPA guidance.

Response to EPA Comment 42. Iron was mistakenly eliminated from the risk assessment during the COPC screening. Iron will be included as a COPC for shallow groundwater and carried through the risk assessment.

EPA Comment 43. Appendix H, Tables 3.2 through 3.5, Exposure Point Concentration Summaries: The first note on each of these tables states that the full statistics for the data are included in an appendix. This information does not appear to be appended to the document. The outputs from the ProUCL software, and any other statistical data should be appended to the RI Report as supporting documentation. Please revise the RI Report to include the outputs from the ProUCL EPC calculations, and any other statistical data calculations.

Response to EPA Comment 43. The ProUCL output for the COPCs will be included in Appendix H.

EPA Comment 44. Table 7-2, Summary of Chemicals of Potential Concern for the Baseline Risk Assessment, Page 1 of 1: COPCs for the potential volatilization of contaminants in shallow groundwater to indoor air (industrial) are segregated by building number. The COPC selection process tables (Tables 2.1 through 2.5 in Appendix H) did not segregate COPCs by building number so it is not clear how this information was obtained. Further description of this segregation process has also not been provided in the text of the document. Additionally, considering the migratory nature of groundwater, it also does not appear appropriate to select data from specific wells for this assessment. High concentrations of groundwater may not be located in the vicinity of a particular building at present, but it may in the future. For clarity and defensibility, please revise the HHRA to document the process for selecting specific COPCs based on building numbers. The dataset which was included for each building should be identified (i.e., each sample point should be documented), and the rationale for its selection described, considering the migratory nature of groundwater.

Response to EPA Comment 44. This comment will be addressed separately in conjunction with the resolution of comments on the Site 21 air vapor evaluation work plan/team establishment of a path forward regarding air vapor.

EPA Comment 45. Appendix E, Soil Boring Log and Monitoring Well Construction Diagrams: The boring log for boring number SJS21-MW14S indicates that a strong petroleum odor was observed in the 0.6 to 2.0 ft interval yet a soil sample was not collected from this location for laboratory analysis. Furthermore, it is not clear whether a photoionization detector (PID) reading was collected from this interval. The PID reading listed on the log appears to be for either the first 0-0.6 foot interval or the breathing zone. Please revise the RI Report to address why a soil sample was not collected from the interval at which a petroleum odor was observed. Additionally, please clarify the PID readings for this boring. It should be noted that additional investigation of soil in this area may be necessary.

Response to EPA Comment 45. Petroleum odors are often mistaken for TCE odors. No petroleum related constituents were detected in the sample collected from the well, although TCE was detected at an elevated concentration. Based on the field logs, the PID reading recorded on the boring log for MW14S is for the breathing zone .

EPA Comment 46. Section 5. Nature and Extent of Contamination. VOC's: It is noted in the RI that, "TCE concentrations appear to follow groundwater flow, moving from apparent source areas to the southeast and southwest toward the storm sewer system and the Site 2 inlet."

This notation does not account for the northward extensions of the plume. All plumes seem to be migrating somewhat northward. In particular, the vinyl chloride plume seems to migrate northward with no easily identifiable source. EPA feels that there needs to be a further investigation of potential sources contributing to the northern part of the plumes or an explanation of what may account for this. Furthermore, at the northern-most part of the plume (TW217, TW207, TW210, TW211, TW215, TW214) are listed as 5U. The RRR sample 16GW02 was analyzed at 10U ug/l. The U indicates a non-detect, but the MCL for TCE is 5 ug/L. Along the same lines, Figure 5.5 (VC Plume) shows the northern most portion of the plume and eastern portions of the plume are analyzed at MCL's, or in some cases, 5 times above MCL's (GW103). EPA is concerned with detection limits that were set above MCL's. Please revise the RI to address these concerns.

Please update the VC plume to extend from MW18S to MW19S (including TW201 with a detection of 10 ug/L).

Response to EPA Comment 46. Water level data indicates the groundwater flow direction is south/southwest. The northern extending "fingers" of the plumes are not necessarily indicative of advective groundwater flow and likely represent contaminant migration via dispersion. Additionally, for TCE breakdown products, VC and cis-1,2-DCE, the plume shape is more dependant on rate of degradation of parent compounds (i.e., TCE) than contaminant migration; therefore, the daughter product plume shapes does not indicate a northward groundwater flow.

After detecting CVOCs in the northern portion of the site, the team jointly developed a sampling plan to delineate those areas, including analysis of samples by an on-site laboratory to ensure no data gaps remained after the investigation. The team agreed that the areas were adequately delineated, and therefore further delineation will not be incorporated into the RI report. The contamination in the northern portion of the groundwater plume appears to have been from an undocumented release source, most likely from the site-wide dumping of chemicals along railways.

The reporting limit for VC is above the MCL in several samples as a result of dilution of the samples which occurred because of elevated TCE concentrations in the wells. The CLP method was selected based on the expected concentrations of contaminants (OLM04 for medium/high concentration or OLC03 for low concentration). Reporting limits are dictated by the CLP analytical method, and labs are unable to analyze high concentration samples using a low concentration method without risking instrumentation damage (e.g., the highest contaminant concentration will dictate the method). It is not appropriate to use the low concentration method for samples with expected concentrations greater than 25 µg/L. Since average concentrations exceed 25 µg/L within the CVOC plume, the low concentration method was not be used with the exception of for delineation of the perimeter of the plume where concentrations were expected to be low. The reporting limit for the medium/high concentration method is 10 µg/L, which exceeds the MCL for some of the CVOCs. However, per the CLP methodology detects above the MDL but below the reporting limit are reported with a J qualifier (e.g., at MW16S, where the reporting limit was 670 µg/L for cis-1,2-DCE

and a result of 460 J μg/L was reported; and at TW122, where the reporting limit was 10 μg/L for VC and a result of 4 J μg/L was reported).

There is an error in the VC plume in the northern portion of the site, and the figure will be corrected.

EPA Comment 47. Appendix H, Table 3.0: Please see comment 12 addressing the Johnson and Ettinger Model.

Response to EPA Comment 47. Please see response to comment 12.

EPA Comment 48. Depth-Specific Groundwater Sampling 3.2.7: The RI states that "Groundwater samples were initially collected in 40ml unpreserved glass vials filled to 70% capacity and analyzed for chlorinated compounds using Color-Tec groundwater test kits." Please provide more details on the sampling techniques that were used to collect the samples that were sent to the lab for analysis. As is, the RI describes the process in that 70% unpreserved samples were sent to the lab to be analyzed. EPA would be concerned with samples that were sent to the lab unpreserved at 70% capacity and analyzed for VOC due to the potential for volatilization

Response to EPA Comment 48. The text will be revised to clarify the sampling technique used. All groundwater samples sent to the offsite laboratory for analysis were collected into laboratory-preserved 40 ml glass vials filled to capacity with no headspace. Samples collected following use of the Color-Tec test kits were collected using DPT and a peristaltic pump, and followed low-flow sampling procedures.

EPA Comment 49. Tables 2.1 and 3.1, Vapors from Shallow Groundwater. This table incorrectly reports the data summary statistics since the data used to report the maximum detected and exposure point concentrations, (presented within Table 3.1, RME), can not be verified. According to footnotes "a and b" (within Table 3.1), shallow groundwater data sets were selected for the industrial and residential scenarios. Since this is the case, Table 2.1 should be divided and presented as such. In other words, Table 2.1 should be labeled, Table 2.1a which should contain all the data that was used for the shallow groundwater industrial scenario, Building 90. Table 2.1b should contain all the data that was used for the shallow groundwater industrial scenario Building 1556, Table 2.1c . . . Building 13, and so on until each exposure building scenario has its data set presented, separately, within Tables 2.1. In addition, Table 3.1 should report the maximum and exposure point concentrations in regards to the scenario that is being evaluated. The presented tables, Table 2.1 and 3.1, are confusing, difficult to follow, and does not properly present the data as it was used for the shallow groundwater vapor evaluation. Please revise these tables to reflect how the data was used in this assessment.

Once data sets have been appropriately segregated according to the building being evaluated, each data set must be approved by the site assigned Hydrogeologist to determine if the data sets are appropriate.

Please keep in mind, the current method of indoor air data evaluation (e.g., segregated according to industrial and residential building scenarios) primarily focuses on the current indoor air risk and not necessarily future exposures. For example, the current indoor air evaluations are based on a current "snap-shot" of the groundwater contamination plume and does not consider the plume moving (as groundwater does) causing concentrations to change base on groundwater movement. Therefore, EPA highly recommends residential evaluation for all potential "future" scenarios involving indoor vapor intrusion.

Response to EPA Comment 49. All of the shallow groundwater data were conservatively used to select the COPCs for the vapor intrusion pathway. If a COPC was detected in the data set for a particular building or the residential scenario (highest detected concentration of each COPC, regardless of the well it was detected in), it was evaluated as a COPC for that data set. The wells used to evaluate each of the data groupings will be identified on Table 3.1, Appendix H, and Table 7-1. As the highest detected concentrations of each of the COPCs were used for the residential scenario, regardless of the well in which it was detected, this is the most conservative estimate of exposure concentration possible, without guessing or modeling what future maximum concentrations might be.

EPA Comment 50. The inhalation toxicity values for TCE should be updated to include the USEPA recommended California EPA inhalation unit risk values of IUR of 2.06 $(mcg/m3)^{-1}$ and oral cancer slope factor of $0.013(mg/kg\text{-}day)^{-1}$. Please revise the RI to account for this.

Response to EPA Comment 50. The TCE inhalation toxicity values will be changed to the Cal-EPA values as requested. The revision will not impact the outcome of the HHRA.

EPA Comment 51. Section 7.4.2, Risk Assessment Results, Current/Future Industrial Worker-Shallow Groundwater. The report indicates, "However, the modeled indoor air concentration for TCE, based on RME assumptions, is less than the Agency for Toxic Substances and Disease Registry (ATSDR) acute Minimal Risk Level . . ." Please keep in mind the ATSDR Minimal Risk Level is not an EPA acceptable benchmark regulatory criteria.

Response to EPA Comment 51. Comment noted. The ATSDR MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse noncancer health effects over a specified duration of exposure. These substance specific estimates, which are intended to serve as screening levels, are used by ATSDR health assessors and other responders to identify contaminants and potential health effects that may be of concern at hazardous waste sites. An MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse noncancer health effects over a specified duration of exposure. Therefore, the MRLs were presented as another line of evidence in the determination of potential risk associated with vapor intrusion at the site.

EPA Comment 52. Table 3.1RME. The Exposure Point Concentrations could not be verified since the data was incorrectly grouped and presented. See comment #50.

Response to EPA Comment 52. See response to Comment #50.

EPA Comment 53. Table 4.1RME, Industrial Worker. The selected, light activity, inhalation rate of 1.0 m^3/hour for the industrial worker is low. EPA recommends using a moderate activity rate of 1.6 m^3/hour.

Response to EPA Comment 53. The RME inhalation rate will be updated to the moderate activity rate of 1.6 m^3/hour.

EPA Comment 54. Table 4.4RME, Construction Worker. An Event Time (t event) of 4 hours per event is low and does not agree with EPA's recommend t event of 8 hours/day. In addition, an Exposure Frequency (EF) of 125 days/year is also low and does not agree with EPA's recommended EF of 180 days (6 months).

Response to EPA Comment 54. The assumptions recommended above are based on exposure to soil. The assumptions used on Table 4.4.RME have been adjusted from the soil assumptions to be more realistic for exposure to groundwater in an open excavation. It is expected that if groundwater would be present in an excavation, it would be pumped out during construction activities so it would not impact the work. It is also expected that water would not fill the complete footprint of the construction site. Therefore, it is assumed that the construction worker would not be exposed to the groundwater the full exposure day or duration of exposure for construction activities, but only part of that exposure period.

EPA Comment 55. Table 4.5RME, Construction Worker. An Exposure Time (ET) of 4 hours/day is low. EPA recommends an ET of 8 hours/day.

Response to EPA Comment 55. See response to Comment #54.

EPA Comment 56. Table 6.2, Cancer Toxicity-Inhalation. Please include the California inhalation cancer slope factor for TCE within this table. See comment #50.

Response to EPA Comment 56. See response to Comment 50.

EPA Comment 57. Table 7.6, 7.7, 7.8RME. The exposure point concentrations (EPC) provided within the table could not be verified since the corresponding Table 3 was not included for the shallow groundwater. Please include the corresponding Table 3 that can be used to verify EPCs within this table.

Response to EPA Comment 57. Table 3.4 includes the shallow groundwater EPCs for ingestion and dermal contact. As footnoted on Table 7.6, the shower exposure is presented on Table 7.6.RME Supplement B. The indoor air concentrations are included on Table 3.1.RME.

EPA Comment 58. Table 10.5RME. The non-carcinogenic inhalation (showering) results do not agree with the results within Table 9.6RME.

Response to EPA Comment 58. Table 10.5.RME will be updated to agree with Table 9.6.RME.