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MCRD PARRIS ISLAND
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LETTER AND THE U S EPA REGION IV COMMENTS ON THE DRAFT SUPPLEMENTAL
VAPOR INTRUSION WORK PLAN AT OPERABLE UNIT 4 (OU 4) SITE 45 FORMER DRY
CLEANER MCRD PARRIS ISLAND SC
05/23/2014
U S EPA REGION IV ATLANTA GA



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

May 23, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commanding Officer
Naval Facilities Engineering Command Southeast
Attn: Mr. Dan Owens (OPA6) Remedial Project Manager
P.O. Box 30
135 Ajax Street
Building 135
Naval Air Station, JAX
Jacksonville, FL. 32212-0030

AND

Commanding General
Marine Corps Recruit Depot
Natural Resources & Environmental Affairs Office
Attn: Mr. Tim Harrington
PO Box 5028
Parris Island, SC 29905-9001

Dear Mr. Owens and Mr. Harrington:

The U.S. Environmental Protection Agency (EPA) has reviewed the Draft Supplemental Vapor Intrusion Work Plan at OU4, Site 45, Former Dry Cleaner, Revision 0, dated January 2014, for the Marine Corps Recruit Depot (MCRD), Parris Island, South Carolina submitted by the Navy and MCRD, henceforth jointly referred to as the Navy, and generated the attached comments. The Draft Work Plan was reviewed for overall technical adequacy, completeness and consistency with the substantive requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and with previous agreements made by the Project Team. EPA looks forward to working with the Navy. Please feel free to call with any questions. I can be reached at 404-562-9969.

Sincerely,

A handwritten signature in cursive script that reads "Lila Llamas".

Lila Llamas
Senior RPM
Federal Facilities Branch
Superfund Division

cc: Meredith Amick, SCDHEC
Dave Warren, Ensaf

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**EPA TECHNICAL REVIEW OF THE
DRAFT SAMPLING AND ANALYSIS PLAN
SUPPLEMENTAL VAPOR INTRUSION STUDY — SITE 45
FORMER MORALE WELFARE AND RECREATION
DRY CLEANING FACILITY
REVISION 0
DATED JANUARY 2014**

**MARINE CORPS RECRUIT DEPOT
PARRIS ISLAND, SOUTH CAROLINA**

I. GENERAL COMMENTS

1. Section 10.4.1 (Nature and Extent of Contamination) of the Draft Sampling and Analysis Plan, Supplemental Vapor Intrusion Study – Site 45, Former Morale, Welfare, and Recreation Dry Cleaning Facility, Revision 0, dated January 2014 (Supplemental VI Study SAP), for the Marine Corps Recruit Depot Parris Island, South Carolina (MCRD Parris Island) speaks to what appears to be subsequent screening which occurred after the first vapor intrusion study but apparently has not been officially submitted for review and approval by EPA. The second bullet on page WS 10-9 indicates a screening has been conducted using EPA’s proposed attenuation factors from the OSWER Final Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air, External Review Draft (U.S. EPA, April 11, 2013) to evaluate PCE concentrations in sub-slab soil gas. Reportedly concentrations did not exceed screening values. Please clarify and reference the document containing this information. This information should be discussed by the Parris Island Partnering Team for consideration of alternative paths for the resolution of vapor intrusion issues at the Existing New Dry Cleaner and should be discussed prior to the attempted resolution of these comments. Significant changes to the current path forward as well as the Supplemental VI Study SAP could result 
2. Section 11.5 (Analytical Approach) of the Supplemental VI Study SAP presents three decision rules for the supplemental vapor intrusion study (Supplemental VI Study). Decision Rule 1 addresses the measurement of vapors emitted by garments and indicates if chlorinated volatile organic compounds (CVOCs) are not detected in the emitted vapors, Decision Rule 2 will be implemented. Decision Rule 2 presents paths forward for two cases: no measured analytes exceed the Project Action Levels (PALs) for indoor air; and one or more measured analytes exceed the PALs for indoor air. The path forward for both cases appears satisfactory as the PALs presented in Worksheet #15 for indoor air are based on EPA risk-based Regional Screening Levels (RSLs) for industrial air rather than occupational compliance standards promulgated under the Occupational Safety & Health Administration (OSHA) program.

EPA suggests that a more clear and concise manner of presenting decision rules for indoor air would be to reverse decision rules 1 and 2. Before sampling indoor air, EPA strongly suggests sampling be timed for a garment processing event predicted to be slow (fewer garments processed) and garments be removed from the building for some time immediately prior to sampling (perhaps temporary staging of clothes under outside tents). If no analytes are measured above appropriate PALs for indoor air, no VI risks exist at this time. If they do exceed PALs, then additional VI risk screening/management will be conducted. Decision rules would then move on to sampling of garment off-gassing. Determine if garments are a contributing source, along with sub-slab soil gas. If garments contribute, and if OSHA applies, then manage under OSHA and address potential future exposures under different operations and/or land uses and monitor. If garments do not contribute, then an action is necessary under CERCLA, such as soil gas and/or indoor air monitoring coupled with aggressive source removal and groundwater treatment.

Otherwise, Decision Rule 1 indicates that if CVOCs are detected, the garments will be considered a

confounding indoor source of CVOCs and exposures (which MCRD Parris Island considers occupational in nature) will be managed under OSHA protocols. However, this approach should be expanded to include documentation that OSHA applies at the new dry cleaner and is being implemented. Also, the approach should include estimates of carcinogenic and noncarcinogenic risk to determine if long-term health impacts could occur. Furthermore, in addition to addressing the potential exposures under OSHA, the rule indicates MCRD Parris Island will also develop land use controls (LUCs) that call for the reassessment of the VI pathway if operations or land use changes at the existing dry cleaning facility. LUCs are a remedy component and cannot be preselected. Rephrase the decision rule to indicate remedial actions to address potential future exposures under different operations and/or land uses will need to be addressed, such as LUCs to require reassessment of the VI Pathway.

Decision Rule 1 does not clearly address what happens with regard to Decision Rule 2 if CVOCs are detected in the vapors emitted by the garments. If Decision Rule 2 is not addressed, it is not clear how the first goal and objective of the Supplemental VI Study (confirm or refute previous results that indicate concentrations of CVOCs in indoor air do not present unacceptable risk at the existing dry cleaning facility) will be met. The decision rules should clearly indicate that, regardless of the outcome of the garment measurements, Decision Rule 2 will be addressed in the Supplemental VI Study so that all the study goals and objectives can be met.

Revise Decision Rule 1 to ensure that Decision Rule 2 will be implemented regardless of the outcome of the measurements made on the garments. In addition, ensure that carcinogenic and noncarcinogenic risk estimates are developed to assess the potential for long term health effects in potentially exposed workers.

Decision Rule 3 is acceptable as it reads, however, the soil gas PALs currently identified in WS#15 are not acceptable. See specific comments on WS#15 below.

Revise decision rules 1 and 2 one way or the other to address these concerns.

3. The Supplemental VI Study SAP includes sampling of garments to determine if off-gassing from these garments could be an external source of tetrachloroethene (PCE) in the existing dry cleaning facility. It is known that all garments are currently cleaned offsite using PCE before returning to the existing dry cleaning facility to await distribution. The sampling procedures are presented in various locations in the Supplemental VI Study SAP, primarily in Worksheet #17. However, the Supplemental VI Study SAP does not include a description of how the garments dry cleaned at the off-site facility are packaged, transported back to the existing dry cleaning facility, and managed/stored while awaiting distribution. Thus, it is unclear how the results of garment sampling will be used in determining if the garments serve as a source of PCE in the existing dry cleaning facility. Revise the Supplemental VI Study SAP to include a description of the handling and packaging of garments cleaned with PCE at the off-site dry cleaning facility. Also, describe how the garments are transported to the existing dry cleaning facility at MCRD Parris Island and how they are managed/stored while awaiting distribution. Specifically address the potential for off-gassing after cleaning, during transport, and during storage at the existing dry cleaning facility. In addition, revise the Supplemental VI Study SAP to explain how the results of garment sampling will be used to determine if off-gases from the garments are a source of PCE within the existing dry cleaning facility.

Alternatively, conduct sampling of garments upon their arrival at the MCRD facility and revise the Supplemental VI Study SAP to explain how the results of garment sampling will be used to determine if off-gases from the garments at the time they arrive are a source of PCE within the existing dry cleaning facility.

4. There is no dedicated list of target analytes in the Supplemental VI Study SAP. Worksheet #15 does list the levels for an Analytical Group comprised of six CVOCs. However, the Supplemental VI Study SAP does not address whether sample results for these CVOCs will be sufficient to meet the goals and objectives of the Supplemental VI Study. Revise the Supplemental VI Study SAP to include a comprehensive list of the

target analytes for the Study. See detailed comments on WS#15 regarding Naphthalene and BTEX. In addition, demonstrate that the list of analytes is sufficient to meet the goals and objectives of the Supplemental VI Study as well as support a thorough and robust estimate of carcinogenic and noncarcinogenic risks for workers at the existing dry cleaning facility.

II. SPECIFIC COMMENTS

5. Executive Summary, Page i

Please refrain from using text in the SAP that indicates CVOCs in indoor air “do not present unacceptable risk.” Since contaminants at Site 45 have already been determined to present an unacceptable risk prior to the assessment of the new drycleaner, new data was evaluated to determine whether or not the risk from vapor intrusion at the Existing New Dry Cleaner exceeds the point of compliance at 1×10^{-6} or an HI = 1, for inclusion in remedial decisions. Please conduct a search of the entire document and replace original text described above with language which indicates indoor air estimated risk at the new dry cleaner exceeded the point of compliance, however, the risk falls within the risk range of 1×10^{-6} and 1×10^{-4} , for which a risk management decision may be made.

As the search and replace is being implemented, consider if the change in turn necessitates additional modifications to be made to the subject paragraphs as a result.

6. Worksheet #2, Sampling and Analysis Plan Identifying Information, Page WS 2-1

Note: It appears the contract number and contract title are reversed in Worksheet #2.

7. Worksheet #3, Distribution List, Page WS 3-1

Neither the Naval Facilities Engineering Command (NAVFAC) Quality Assurance Officer nor the Navy Chemist is included in Worksheet #3. Please clarify if they have been provided a copy of the SAP and if they have reviewed and commented; if so, clarify if comments were addressed in this version of the SAP.

8. Worksheet #5, Project Organizational Chart, Page WS 5-1

The South Carolina Department of Health and Environmental Control (SCDHEC) is not included in the Project Organizational Chart. Revise Worksheet #5 to include SCDHEC.

9. Worksheet #6, Communications Pathways, Page WS 6-1 and 6-2

The procedure for addressing Field Corrective Actions does not provide for notification of the EPA Remedial Project Manager (RPM) and the SCDHEC RPM. It is not clear if “Field Corrective Actions” are intended to represent actions that do not impact project scope and/or the quality of field work. Note that the procedure for “Recommendations to stop work and initiate work upon corrective action” indicates that significant corrective actions will be communicated to the regulatory agencies. It is recommended that the procedures for Field Corrective Actions and Recommendations to stop work and initiate work upon corrective action be modified to indicate that field corrective actions that may impact project scope and/or the quality of field work require notification of the regulatory agencies as examples of “significant corrective actions” that require notification. Please revise these procedures accordingly.

10. Worksheet #6, Communications Pathways, Page WS 6-2

Responsible Entities for the action labeled Stop Work Due to Safety Issues lists Resolution Consultants project team members such as the “Resolution Consultants TOM, SSO, or QAO,” and “Health and Safety

Manager.” The NAVFAC SE RPM as well as the MCRD Environmental Affairs Officer and IR Program Manager are also listed. However, the procedure for this action does not call for notification of the Navy RPM, nor does it clarify what will happen if the Navy or MCRD are the responsible party for issuing the stop work order. Revise the procedure for Stop Work Due to Safety Issues to include procedures for all potential responsible parties.

11. **Worksheet #6, Communications Pathways, Page WS 6-2**

Note: The Procedure for SAP Changes in the Field indicates the TOM will obtain written approval from EPA and SCDHEC for scope changes issued by the Navy RPM. If the TOM wishes to expedite EPA approval after the Navy RPM has issued scope changes or changes to field work procedures, the EPA RPM may be contacted via phone, including personal cell phone, for EPA RPM approval, which would be followed by approval in writing. This should help avoid delays in field work and ensure field work does not have to be repeated or a second mobilization does not become necessary as a result of changes to work in the field, rather than waiting for written approval and/or proceeding at risk.

12. **Worksheet #6, Communications Pathways, Page WS 6-3**

The Procedure for Analytical Data Quality Issues includes notification of the Resolution Consultants Project Chemist/Quality Assurance Officer who, in turn, notifies the Resolution Consultants TOM. Please clarify if the Chemist/Quality Assurance Officer should also be identified as being the Data Validator as indicated in the last row last column on WS 6-3, Procedure for Reporting Data Validation Issues/Data Validation Corrective Actions, or should a separate individual be identified as data validator as in WS #3? The variation in use of the terms and titles causes confusion regarding who is responsible for communication in various communications and who is being notified. Please revise this procedure to include notification of the data validation staff or explain why the staff performing data validation need not be notified. Consider clarifications to the other procedures as well if necessary.

13. **Worksheet #6, Communications Pathways, Page WS 6-3**

Note: The Procedure for Reporting Data Validation Issues/Data Validation Corrective Actions does not include notification of the regulatory agencies. Please note that EPA expects to be informed of data validation issues, at least in the report if not before.

14. **Worksheet #9, Project Scoping Session Participants Sheet, Page WS 9-1**

The participant sheet is incomplete. Approximately 24 people were present at different times during the meeting. Others, in addition to those listed, were present for the subject agenda item discussion. Please correct the participant list (at least add Rachel, Mac, Claire, Tim S).

Also, EPA is not aware of minutes from this discussion being finalized. EPA noted discrepancies in the notes presented herein and comments as follows:

- First comment: Please modify to read ...“Resolution Consultants and the Navy stated the following: Based on the ...”.
- Second Comment: Please modify to read... “EPA understood the garments were treated with PCE off-site before coming to MCRD, and therefore it was likely that OSHA would not apply. EPA asked MCRD to clarify if the new dry cleaner was overseen by OSHA and subject to OSHA requirements specific to the use of PCE, if OSHA mandated training was required, and if employees participated in medical monitoring, etc. EPA stated that any decision that OSHA applies would need to be supported by specific MCRD information detailing the application of OSHA to the new dry cleaner.”

- Response: Please clarify where in the SAP the additional details on the specific ways OSHA applies to the new dry cleaner can be found.
- Third Comment: Please modify to read "... updated based on data generated during the GSI vapor study. EPA clarified that CERCLA site boundaries extend to where contaminants have migrated, including contaminated sub slab vapors and/or indoor air."
- Response: Please modify to read "...will obtain recent data from the GSI Vapor Study and update the CSM accordingly. The revised CSM will be presented in the SAP."

Figures 10-2, 10-3, and 10-4 of the SAP were not updated accordingly. Update all figures which indicate the site boundary such that the extent of sub-slab soil gas and indoor air samples containing site contaminants in the GSI vapor study are reflected as being within the site boundary as agreed to during scoping.

- Fourth Comment: Please modify to read "...the MCRD Parris Island Partnering Team previously agreed to soil gas sampling..."
- Response: Please add this sentence after the first sentence, "EPA stated the presence of a crawl space actually makes modeling from soil gas prohibited, in which case air in the crawl space and/or indoor air samples would be indicated if contaminated soil gas vapors are detected beneath or immediately adjacent to the building."
- Seventh Comment: Please modify to read "U.S. EPA stated that the use of radon attenuation factors to estimate or be used as a surrogate for PCE or related daughter product attenuation factors or generic attenuation factors from EPA guidance will not be acceptable to calculate contaminant concentrations."
- Response: Note: The External Review Draft version of OSWER final guidance referenced in the response does not support use of radon attenuation factors as surrogates for other contaminant attenuation factors or for direct measurement of other contaminants in indoor air. The guidance does recognize that radon can be useful to assess a building's susceptibility to vapor intrusion, which can be supported in a line of evidence approach. However, the Navy should be cautious using this evidence since Radon sources also include certain building materials such as granite, clay, bricks, marble, and sandstone, which could cause radon to be detected in indoor air from an internal source, rather than a soil gas source, skewing the susceptibility assessment, or falsely indicating susceptibility if the source is the building materials themselves. The guidance also recognizes that Radon mitigation systems are a good benchmark for appropriate mitigation systems for other soil gas contaminants.

However, the guidance indicates Radon should not be used as a proxy for quantitative measurement of other CVOCs or to establish an attenuation factor or used in other quantitative assessments for another contaminant which may behave differently, be distributed differently in the subsurface, and vary differently over time. EPA will not accept use of Radon as a surrogate for measuring or estimating or predicting indoor air concentrations of other contaminants at this time. (See more comments below.)

- Eighth Comment: Please modify the comment to read "...CVOC groundwater plume as committed to in previous CERCLA documents/meeting minutes for Site 45."
- Response: Note: Unless it can be determined that no vapors from the sub-slab soil gas are contributing to indoor air concentrations, this building is still to be considered as potentially impacted by a CERCLA release and risk should be assessed since indoor air presents an unacceptable risk. CERCLA sites that

contribute to an unacceptable risk must be addressed. Currently the Parris Island Partnering Team has determined that the risk from indoor air to building inhabitants exceeds the point of compliance at 1×10^{-6} , but falls within the risk range where risk management decisions can be made. As a risk management decision the Parris Island Partnering Team agreed the Navy could propose soil gas monitoring as a remedy component to address the potential site impacts if accompanied by aggressive source removal and groundwater treatment in the southern plume source area which should reduce soil gas concentrations beneath the building. While EPA is open to consider results from this investigation, the Navy should be prepared to address the site conditions as previously agreed to unless data supporting a change is obtained, soil gas is determined to not be at levels of concern, and/or risk is reassessed with different results indicating the point of compliance is not exceeded.

- Tenth Comment: Please modify to read “U.S. EPA stated that without confirmation that indoor air concentrations do not generate a risk greater than 1×10^{-6} as potentially impacted by sub-slab soil gas or the indoor air contaminants are being addressed by OSHA, additional investigation and risk assessment would be necessary.

15. **Figure 10-4**

Please briefly explain how the site-specific PCE Regional Screening Levels for Sub-Slab Soil Gas were derived. Explain if EPA’s Draft Vapor Intrusion Guidance was followed, and what site-specific assumptions were made. Additionally, consider if the OSWER final vapor intrusion guidance external review draft would call for any modifications to the process. Clarify if the site-specific screening levels used as PALs were developed using radon as a proxy. Use as such would be unacceptable at this time. Please update screening levels on the figure to use acceptable screening levels in accordance with EPA Guidance.

16. **Worksheet #10, Conceptual Site Model, Section 10.4.1, Nature and Extent of Contamination, Page WS 10-9, second bullet**

The text indicates a screening has been conducted using EPA’s proposed attenuation factors from the OSWER Vapor Intrusion Guidance, External Review Draft to evaluate PCE concentrations in sub-slab soil gas. Reportedly concentrations did not exceed screening values. Please clarify and reference the document containing this information. Additional comments may be necessary. This subject should be discussed by the Parris Island Partnering Team for consideration of alternative paths for the resolution of vapor intrusion issues at the Existing New Dry Cleaner.

17. **Worksheet #10, Conceptual Site Model, Section 10.4.3, Contamination Migration Pathways, Page WS 10-10**

The second paragraph of Section 10.4.3 closes with “It should be noted that substantial evidence exists that natural attenuation is functioning at the Site to fully degrade PCE [tetrachloroethene] and degradation products.” However, no additional information on the effectiveness of natural attenuation is provided. Revise this discussion to include a reference to the Site document(s) that contain evidence that natural attenuation is functioning to degrade PCE and its degradation products.

18. **Worksheet #11, Project Quality Objectives/Systematic Planning Process Statements; Section 11.3, Information Inputs to Problem Resolution, Page WS 11-3**

- a) In the discussion of Analytical Data on Page WS 11-3, the text indicates “PALs for both CERCLA VI studies and OSHA occupational exposures have been included in this SAP.” Please note that for decision making purposes under CERCLA, for which this document has been submitted and is being reviewed by EPA and for which these comments apply, only CERCLA VI PALs will be used. If the

Marine Corps and/or OSHA officials determine that OSHA applies at the facility specific to the use of PCE, that is a separate issue to be addressed by MCRD at this time.

- b) Furthermore, the text indicates “The applicable PAL will be determined based on the findings of this Supplemental VI Study.” It is unclear what this means. There are no goals of the study or principle study questions asking what PAL is applicable, and no decision rules for making the decision. Please clarify and/or remove the statement.
- c) In the second paragraph, EPA suggests replacing “origin(s)” with “potential indoor sources”.
- d) In the discussion the text indicates “An appropriate attenuation factor will be applied to evaluate risks associated with a potential upper-bound indoor air concentration that may arise from VI.” Information on a site-specific attenuation factor derived during the previous VI study is provided; however, the discussion does not clearly establish the relationship between the previously derived site-specific attenuation factor and “an appropriate attenuation factor” for application in the valuation of risks. Clarify if the stated site-specific attenuation factor was derived using radon concentrations. As discussed above, the use of Radon to estimate an attenuation factor for PCE or its daughter products is not considered appropriate at this time. Revise the discussion on Page WS 11-3 to demonstrate how an attenuation factor for evaluating risks will be determined without using radon as a surrogate and by following EPA Guidance.
- e) The discussion also refers to the derivation of a site-specific attenuation factor of 0.0001 in the previous VI study. A reference citation is not provided for the derivation or for the previous VI study. Furthermore, the discussion indicates that the derived value of 0.0001 is “...consistent with data collected during similar studies at numerous Navy and Marine Corps installations.” However, no reference citation is provided for information that supports this assertion. Revise this discussion to include a reference citation for the previous VI study. In addition, provide a reference to the location of information supporting the assertion that the previously derived site specific attenuation factor of 0.0001 is consistent with values obtained in similar studies at Navy and Marine Corps installations. Explain why consistency would be considered a reasonable attribute when this section is addressing site-specific attenuation factors which typically are impacted by site-specific/building specific characteristics which would be expected to vary, possibly significantly, from building to building.
- f) It is unclear what is intended in the paragraph pertaining to Ambient Air Data. Consider rewording to add clarity. Consider using something like EPA’s OSWER final vapor intrusion guidance, external review draft version. The guidance offers the following on the issue for consideration:

“Results indicating vapor intrusion as primarily responsible for indoor air concentrations. The predominant vapor-forming chemicals and their relative proportions in indoor air and sub-slab vapor samples would be expected to be similar and their concentrations in sub-slab soil gas would be expected to be higher than in indoor air, if vapor intrusion is primarily responsible for indoor air concentrations. If recalcitrant (i.e., not subject to biodegradation in the vadose zone), the predominant vapor-forming chemicals and their relative proportions in the subsurface vapor source should also be similar if vapor intrusion is primarily responsible for indoor air concentrations.

Results indicating indoor sources as primarily responsible for indoor air concentrations. Conversely, if significant concentrations of a contaminant are detected in indoor air, but are not present or barely present in sub-slab soil gas samples (or representative samples of the subsurface vapor source), then the presence of this contaminant in indoor air may not arise from the vapor intrusion pathway, but rather from indoor sources or other background sources.

Likewise, concurrent outdoor (ambient) air samples can be collected, in addition to indoor air samples. If the predominant vapor-forming chemicals and their relative proportions in indoor air and outdoor (ambient) air are similar, then vapor intrusion may not be primarily responsible for indoor air concentrations (particularly if the predominant vapor-forming chemicals and their relative proportions in the subsurface vapor source (e.g., groundwater or soil) are dissimilar).”

Please revise the text for clarity.

- g) Comments a and b also apply to the paragraph of this section regarding Project Screening Limits/PALs.
- h) The paragraph regarding Radon is inconsistent with EPA guidance. See other comments above. The use of radon data to generate comparable soil gas-to-indoor air attenuation ratios for contaminants other than radon will not be acceptable for decision-making under CERCLA at this time.

The reference to EPA’s guidance is incorrectly stated, in that the referenced section of the guidance does not call for use of radon as a surrogate to generate comparable soil gas-to-indoor air attenuation ratios for contaminants. Please modify the text.

The EPA guidance, Section 6.3.3, does offer the following for consideration:

“EPA recommends that more than one line of evidence be employed to assess susceptibility to soil gas entry, when this objective is selected as part of a site-specific investigation plan for vapor intrusion assessment. Vulnerability to soil gas entry can be assessed for a specific building by using any of several methods, including:

- *Concurrently monitoring indoor air samples for presence of radon and finding radon in indoor air at levels greater than outdoors.⁵⁵*
- *Employing a photoionization detector (PID) or other real-time in-field device, capable of detecting parts per billion by volume (ppbv) levels, to directly survey suspected locations of soil gas entry (e.g., utility penetrations, sumps) and finding elevated readings of vapors.*
- *Conducting a visual inspection for cracks and holes in concrete foundation slabs or basement walls. (Openings for soil gas entry will not necessarily be visible or accessible for inspection, so the absence of visible openings, by itself, is insufficient to demonstrate that a building is not susceptible to soil gas entry.)*
- *Monitoring pressure differences between the building and subsurface environment to assess the effects of the heating, ventilation, and air-conditioning (HVAC) systems.*
- *Injecting tracers, such as sulfur hexafluoride or helium, into the subsurface at selected concentrations and subsequently finding it in indoor air samples.*

Certain complementary information obtained for the building, as identified in Section 6.4.1, can also support such assessments. Relevant information includes the operating characteristics of HVAC systems.”

*The footnote states: “⁵⁵ Naturally occurring radon may serve as a tracer to help identify those buildings that are more susceptible to soil gas entry than others. Buildings with radon concentrations greater than levels in ambient air are likely susceptible to soil gas intrusion and would likely be susceptible to other subsurface vapors. **On the other hand, the radon concentration in a building is not generally***

expected to be a good quantitative indicator of indoor air exposure concentrations of vapor-forming chemicals. Hence, radon measurement is not generally recommended as a proxy for directly measuring vapor-forming chemicals in indoor air. Among other factors, the distribution of radon-emanating rock and soil and the spatial and temporal variability of their source strength are generally expected to be very different than the distribution and source strength variability for subsurface sources of chemical vapors.”

Based on this, Radon should not be used to establish an attenuation factor or used in other quantitative assessments for another contaminant which may behave differently, be distributed differently in the subsurface, and vary differently over time. Radon is not to be used as a surrogate for measuring or estimating or predicting indoor air concentrations of other contaminants.

19. **Worksheet #11, Project Quality Objectives/Systematic Planning Process Statements; Section 11.5, Analytical Approach, Page WS 11-5**

See general comments above and modify the SAP accordingly.

Also, as indicated in the first full paragraph, if using both Draft and Final guidance External Review Draft version, will the most current guidance preside if in conflict with the previous guidance? It is assumed portions of the draft guidance which are referenced as still applicable by the final guidance will be used.

20. **Worksheet #12, Field Quality Control Samples, Page WS 12-1**

Worksheet #12 lists the field quality control samples to be collected in the field as part of Supplemental VI Study SAP. No quality control samples are listed for the sampling to be performed using the portable HAPSITE[®] gas chromatograph/mass spectrometer (GC/MS) units (i.e., field screening sub-slab vapor sampling and garment sampling). However, *Vapor Intrusion Analysis by Field-Portable GS/MS Standard Operating Procedures* (included in Appendix A), Worksheet #18 and Worksheet #20 all address the quality control samples (field duplicates and ambient blanks) to be collected as part of the sampling conducted with the HAPSITE[®] unit. Revise Worksheet #12 to include the quality control samples associated with the sampling performed using the HAPSITE[®] unit as listed in Worksheet #20.

21. **Worksheet #14, Summary of Project Tasks, Page WS 14-1**

The discussion of Mobilization/Demobilization at the top of Page WS 14-2 indicates that the Resolution Consultants will inform the Navy Remedial Project Manager and the MCRD Parris Island Point of Contact regarding mobilization a minimum of two weeks before the start of field activities. Worksheet # 6, however, indicates that the Resolution Consultants Field Team Leader (FTL) will contact the MCRD Parris Island Point of Contact at least 10 days prior to commencement of field work. Review the information presented in the discussion of Mobilization/Demobilization and Worksheet #6 and revise the Supplemental VI Study SAP as needed for accuracy and consistency.

22. **Worksheet #14, Summary of Project Tasks, Page WS 14-4**

The discussion of Decontamination on Page WS 14-4 indicates the majority of sampling equipment for the Supplemental VI Study is single use and disposable. In addition, the text states that summa canisters will be provided by the analytical subcontractor and will be certified clean prior to use. Thus, it is unclear if any decontamination of sampling equipment or items related to the sampling will be performed. Revise the discussion on Page WS 14-4 to indicate if any decontamination will occur during the Supplemental VI Study. If some items will require decontamination, revise the discussion to identify those items and describe how decontamination will be performed.

23. Worksheet #14, Summary of Project Tasks, Page WS 14-7

The discussion of Data Storage, Archiving, and Retrieval on Page WS 14-7 indicates that project files will be audited; however, the discussion does not indicate who will perform the audit. In addition, the discussion does not indicate how the results of the audit will be disseminated to the project team. Revise this discussion to indicate who performs the audit of project files and how the results of the audit will be communicated to the members of the project team.

24. Worksheet #14, Summary of Project Tasks, Page WS 14-7

The discussion of Data Review and Validation on Page WS 14-7 indicates that an electronic quality assurance project plan (eQAPP) will be established prior to data validation. The purpose of the eQAPP is not provided in the discussion. Based on the information currently provided in the discussion, it is not clear why the information in Worksheet #20 is not used in establishing the eQAPP. Revise this discussion to include the purpose of the eQAPP. In addition, explain why the information in Worksheet #20 is not used along with the information from Worksheets #12, #19, and #28 in establishing the eQAPP.

25. Worksheet #15, Reference Limits and Evaluation Tables, Pages WS 15-1 and WS 15-2

- a) Recent discussions by the Parris Island Partnering Team determined that Naphthalene is a contaminant that should have been identified as a site related contaminant. It appears that Naphthalene has been omitted from the analyte list. EPA's vapor intrusion guidance indicates that Naphthalene is a contaminant of sufficient volatility to be of concern, and as such it should be included in the list of analytes. Please update the analyte list. Consequently, occurrences throughout the SAP will need updating when specific analytes are mentioned/identified (e.g. Page WS 17-4, first paragraph, etc.) Additionally, the Parris Island Partnering Team should discuss whether BTEX should be included based on results of the initial Vapor Intrusion Study.
- b) The PALs for soil gas presented in Worksheet #15 were calculated using a site-specific attenuation factor for radon. EPA does not accept this approach at this time. Please identify appropriate PALs for soil gas in accordance with EPA Guidance. For consideration, the recommended attenuation factor from EPA OSWER Final Guidance for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Sources to Indoor Air, External Review Draft (U.S. EPA, April 11, 2013) could be used or use of attenuation factors from EPA's Draft Vapor Intrusion Guidance may be used for site related CVOCs. Accordingly, appropriate PALs must be identified for the decision rules to be acceptable.
- c) A reference to footnote 4 could not be found in Worksheet #15. Review the contents of Worksheet #15 and add references to footnote 4 where they are needed. If reference to footnote 4 is not required, the footnote should be removed. References to footnote 4 and continued inclusion in the document may necessitate additional comments.

26. Worksheet #15, Reference Limits and Evaluation Tables, Page WS 15-2

The endnote regarding EPA RSLs states the RSLs used in Worksheet #15 were taken from the May 2013 update. The RSLs are typically revised during May and November of each year. Revise this endnote to indicate that the PALs to be used in the Supplemental VI Study will be based on the most current version of the EPA RSLs.

Also, please revise WS#15 to present RSL and PAL information as recently discussed and agreed to during the Parris Island Partnering Team face to face meeting in Atlanta, May of 2014, so that a complete review of PAL identification may be conducted. Additional comments may become necessary as a result.

27. Worksheet #17, Figure 17-1, Proposed Vapor Intrusion Sampling Locations

For the samples near the Legal Office Building, please relocate the most easterly sample further west along the road in a location between the building corner and the closest edge of the southern plume boundary.

28. Worksheet #17, Sampling Design and Rationale; Section 17.2, Sub-Slab Vapor Sampling Program, Page WS 17-3

- a) The third paragraph of Section 17.2 discusses field screening for CVOCs using a portable HAPSITE[®] unit. This unit will be operated by KD Analytical, a vendor with experience on the use of the unit at Department of Defense (DoD) facilities. The text states “KD Analytical will prepare a summary report of findings, along with associated Quality Assurance/Quality Control materials.” The discussion does not indicate how the information assembled by KD Analytical will be disseminated to EPA and SCDHEC. Revise Section 17.2 to describe how the summary report prepared by KD Analytical will be shared with EPA and SCDHEC (e.g., appendix in the Technical Memorandum described in Worksheet #14).
- b) In the discussion entitled Sub-Slab Vapor Sampling it is proposed to collect sub-slab soil vapor samples from 3 of the 11 vapor sampling points to be installed in the concrete floor of the existing dry cleaning facility. The rationale for selecting three sampling locations is not provided. Worksheet #18 is referenced as a source for additional information, but does not include the rationale for collecting samples from 3 of the 11 sampling points. Revise this discussion to provide the rationale used to determine that three samples will be sufficient to meet the goals and objectives of the Supplemental VI Study.
- c) The discussion entitled Sub-Slab Vapor Sampling states one of the three soil gas sampling locations “will be positioned to evaluate soil gas in the closest work area above the hotspot of PCE contamination....” The text further states, “The remaining two soil gas sampling locations...will be positioned at areas where workers are most likely at risk for VI.” However, Section 11.3 of the SAP indicates “Field screening results will be used to bias sub-slab and indoor air sampling locations to the highest concentrations of CVOCs beneath the slab of the Existing Dry Cleaning Facility.” It is unclear which of these is true and unclear if they are or are not consistent with each other. Reportedly, identification of all three sampling locations will be based upon the results obtained from screening the 11 vapor sampling points with the portable HAPSITE[®] unit. Additional details should be provided regarding the criteria that will be used to identify the points to be sampled as the current text does not clearly delineate between “hotspot of PCE contamination” (which could be indicated by the maximum sub-slab vapor concentration) and points where workers “are most likely at risk for VI” (which could also be based on the maximum vapor concentration obtained during screening) or “locations to the highest concentrations of CVOCs beneath the slab (which may or may not coincide with the other possible scenarios). Given concerns regarding the presence of non-aqueous phase liquid (NAPL) beneath the southeast corner of the existing dry cleaning facility, it appears relevant to consider including sample locations that could assist in determining the contribution to subslab soil gas attributable to the suspected NAPL. Revise this discussion to include additional details regarding the criteria to be used in selecting the three sampling locations for sub-slab vapor sampling. Ensure the revision clearly establishes the basis for selection of all sampling locations. Note that sampling locations need to be representative of those areas of the existing dry cleaning facility which overlie the maximally impacted subsurface sources, as well as reflective of rooms which are compromised by preferential VI pathways, areas where utility lines pass through the building slab from a subsurface location, and areas frequented by personnel which stand the greatest potential for exposure and VI build-up.

29. **Worksheet #17, Sampling Design and Rationale; Section 17.3, Soil Gas Sampling Program, Page WS 17-4**

MCRD Parris Island proposes to collect soil gas samples from two locations beneath a paved parking area between the PCE groundwater plume and the Legal Office Building. The rationale for selecting two sampling locations is not provided. Worksheet #18 is referenced as a source for additional information but does not include the rationale for collecting two samples. Revise this discussion to provide the rationale used to determine that two samples will be sufficient to meet the goals and objectives of the Supplemental VI Study.

30. **Worksheet #17, Sampling Design and Rationale; Section 17.3, Indoor Air Sampling Program, Page WS 17-5**

Section 17.3 states one of the three indoor air sampling locations “will be positioned to evaluate indoor air in the closest work area above the hotspot of PCE contamination...” The text further states, “The remaining indoor air sampling locations...will be positioned at areas where workers are most likely at risk for VI.” Identification of all three sampling locations will be based upon the results of the building evaluation and the results obtained from screening the 11 vapor sampling points with the portable HAPSITE unit. Additional details should be provided regarding the criteria that will be used to identify the points to be sampled as the current text does not clearly delineate between “hotspot of PCE contamination” and points where workers “are most likely at risk for VI” (which could also be based on the maximum vapor concentration obtained during screening). Given concerns regarding the presence of NAPL beneath the southeast corner of the existing dry cleaning facility, it appears relevant to consider including sample locations that could assist in determining the contribution to subslab soil gas attributable to the suspected NAPL. Revise this discussion to include additional details regarding the criteria (e.g., same location as sub slab vapor sampling) to be used in selecting the three sampling locations for indoor sampling. Ensure the revision clearly establishes the basis for selection of all sampling locations. Note that sampling locations need to be representative of those areas of the existing dry cleaning facility which overlie the maximally impacted subsurface sources, as well as reflective of rooms which are compromised by preferential VI pathways such as bathrooms, areas where utility lines pass through the building slab, and those areas frequented by personnel which stand the greatest potential for exposure and VI build-up.

31. **Worksheet #17, Sampling Design and Rationale; Section 17.6, Garment Testing, Pages WS 17-6 and WS 17-7**

- a) Section 17.6 describes the garment sampling that will be performed to determine if PCE emitted from the garments could be a potential source of indoor air contamination at the Existing Dry Cleaning Facility. The text states “It is expected that up to 25 individual garments will be evaluated after dry cleaning at the off-site location, but prior to delivery to the Existing Dry Cleaning Facility.” It is unclear when in the transition this is to occur. No information is provided about the staging and delivery process to allow assessment of the appropriateness of the sampling plan. Alternatively, garment sampling should be conducted upon arrival of the garments at the Existing Dry Cleaning Facility to best represent the potential contribution that garments treated with PCE may be contributing upon their arrival at the facility. Please modify the SAP accordingly.
- b) The text also states, “Testing will be performed in an outdoor area, with ambient conditions representative of background. Each garment will be placed into a new, dedicated, plastic container with an airtight cover. After allowing a minimum 30-minute equilibration period, the HAPSITE[®] unit will be used to analyze PCE concentrations in air within the enclosed container.” The standard operating procedure (SOP) for sampling with the HAPSITE[®] unit (*Vapor Intrusion Analysis by Field-Portable GS/MS Standard Operating Procedures* found in Appendix A) was reviewed to determine if additional details on the actual sampling procedure were included; however, none were found. Thus, it is unclear

how the air inside the sealed container will be sampled. Revise the discussion of garment sampling in Section 17.6 to explain how it will be determined that the container holding the garment to be sampled remains airtight during sampling. In addition, revise the discussion to outline the steps to be followed in sampling the air inside the container.

32. **Worksheet #19, Field Sampling Requirements Table, Page WS 19-2**

The Sample Volume Column for HAPSITE Sub-Slab Screening and Garment Screening are labeled TBD (to be determined). Please explain and ensure that the required sample volumes are entered in the Draft Final and Final versions of the Supplemental VI Study SAP. Additional comments may be necessary.

33. **Worksheet #29, Project Documents and Records Table, Pages WS 29-1 and WS 29-2**

The Technical Memorandum described on Page WS 14-8 of Worksheet #14 is not included among the documents listed in Worksheet #29. Revise Worksheet #29 to include the Technical Memorandum as it will include a summary of field efforts, address deviations from the Supplemental VI Study SAP, present the study results in text and graphic formats, and offer recommendations for moving forward. It is also unclear if the HAPSITE results report is included.

34. **Worksheet #31, Planned Project Assessments Table, Page WS 31-1**

Worksheet #31 indicates that a laboratory systems audit will be conducted as part of the Supplemental VI Study. However, the worksheet does not indicate who will conduct this audit or when the audit will occur. Revise Worksheet #31 to identify the individual(s) or organization(s) that will conduct the laboratory systems audit. It is recommended that at least one audit be performed before field sampling activities begin so that corrective action measures can be implemented to mitigate the impact of any issues identified during the audit.

35. **Worksheet #33, Quality Assurance Management Reports Table, Page WS 33-1**

Worksheet #33 indicates that laboratory quality assurance reports should be submitted immediately to the Resolution Consultants TOM and Project Chemist by the laboratory quality assurance manager or project manager upon detection of a problem. Worksheet #6 indicates that the laboratory project manager should notify the Resolution Consultant Project Chemist within one business day when an issue related to laboratory data or any analytical data anomaly is identified. Review the information entered for these types of reports and communications in Worksheet #33 and Worksheet #6, respectively. If necessary, revise the entries for accuracy and consistency.