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RESPONSES TO USEPA REGION V COMMENTS (02/21/14) ON THE DRAFT FINAL SWMU 16 VAPOR INTRUSION SAMPLING PLAN (APRIL 2013) NSA CRANE

Response to Comment 2:

Per the SOP-02 revision, in Section 4.3 it is unclear how the Helium tracer/Helium gas shroud is created prior to leak testing. Please provide additional description of this activity. Also, please clarify what seems to be a contradiction in sub-slab sampling times. The SOP refers to both 45 minute and 30 minute collection times while the workplan states that the summa canisters will operate continuously for 8-hours.

NSA Crane Response: SOP-02 has been revised to describe how the helium gas shroud is created and the sample collection times. A copy of the revised SOP-02 is attached to this response to comment document.

Response to Comment 5:

Referring to the revised Table 4-1, based on U.S. EPA risk assessment guidance and current practice in Region 5, Responsible Parties are not required to base chemical constituent screening levels on an HQ of 0.1. A target Hazard Quotient of 1 may still be used for the purpose of selecting constituent screening level concentrations and determining if laboratories will be able to achieve Sample Quantitative Limits at (and preferably below) the screening level.

For projects where indoor air sampling will be performed, the use of an HQ of 1 for screening constituents is supported by the following:

The EPA web site for Vapor Intrusion contains a link to the EPA-OSWER on-line tool called the "Vapor Intrusion Screening Level (VISL) Calculator Version 3.2, November 2013." In that calculator, the default screening level for non-carcinogenic constituents remains at a value of HQ = 1.0

The IDEM Remediation Closure Guide became effective on March 22, 2012. In "Appendix A - Screening Levels" tables, the screening levels for constituents with a non-cancer endpoint are derived for an HQ of 1 (for example, see trichloroethylene and tetrachloroethylene).

Region 5 agrees with NSA Crane's plan to use a cancer risk level of 1E-06 to select screening levels for constituents with a cancer endpoint. For any constituent which has both a cancer endpoint and a non-cancer endpoint, NSA Crane should display the numerical screening levels corresponding to a cancer risk of 1E-06 and a Hazard Quotient of 1. Then, depending on which value is lower, NSA Crane should consult with its analytical laboratory to confirm that a Sample LOQ below the screening level can be achieved for that constituent. Please describe instances where the lab may not be able to achieve a LOQ below the screening level.

NSA Crane Response: The project screening levels (PSLs) have been revised in Table 4-1 to show the lowest value of either the 1E-06 and a Hazard Quotient of 1 target risk. It is important to note that the laboratory will report the analytical results to the designated levels of detection (LOD) given in Table 4-1. As a result, the laboratory will be able to achieve a detection limit below all PSLs. A revised copy of Table 4-1 is attached to this response to comment document.

RESPONSES TO USEPA REGION V COMMENTS (02/12/14)
ON THE DRAFT FINAL SWMU 16 VAPOR INTRUSION SAMPLING PLAN (APRIL 2013)
NSA CRANE

Comment 1:

All the analytes associated with chlorinated solvents from the site-specific volatile organic compounds (VOCs) detected in groundwater and/or soil samples and their degradation products should be carried forward for further investigation of vapor intrusion into indoor air. The plan only proposes to analyze for the TCE degradation chain; however, PCE was detected in groundwater at up to 160 ug/L. Add PCE into the analytical suite for this project. Similarly, chlorinated alkanes were also detected in groundwater (up to 220 ug/L for 1,1,2-TCA). Add 1,1,2,2-PCA and its degradation products to the analytical suite for this project. Modify the text and tables (e.g. Table 4-1) of the documents needed to reflect the addition of the site-specific VOCs.

Response: Table 4-1 has been updated to include PCE, 1,1,2-TCA, plus 1,1,2,2-PCA and its degradation products (1,1,2-trichloroethane, 1,2-dichloroethane, chloroethane, and ethane) to the analytical suite. COPC selection tables were reviewed to identify all volatile chlorinated compounds that were detected in soils and groundwater. In addition, chloroform, dichlorodifluoromethane, methylene chloride, and trichlorofluoromethane were also added to Table 4-1.

Comment 2:

Modify Section 2.4.2 and SOP-02 to indicate that a helium leak test will be performed prior to sub-slab sampling to verify the seal of the sample point. If the seal is compromised, the sample point will be re-sealed until the helium leak test passes. Also, indicate the waiting time following sub-slab sample point installation and prior to sub-slab sample collection which will allow for equilibration.

Response: Section 2.4.2 has been revised to indicate that prior to conducting sub-slab vapor sampling, a helium leak test will be conducted at each bore hole to verify the seal of each sampling point. In the event that the seal is compromised, the sampling point will be resealed until it passes the helium leak test. A three to four hour waiting time will be used before collection of each sample after sample point installation. Section 2.4.2 now reads as follows:

"*2.4.2 Sub-Slab Vapor Sampling*

Prior to conducting sub-slab vapor sampling, a helium leak test will be conducted at each bore hole to verify the seal of each sampling point. In the event that the seal is compromised, the sampling point will be resealed until it passes the helium leak test. A three to four hour waiting time will be used before collection of each sample after sample point installation.

A total of six sub-slab vapor samples will be collected using evacuated summa canisters. Based on historical soil and groundwater data, as discussed in Section 1.1, the greatest potential for TCE in soil is located north, and northwest of Building 146.

As stated for indoor air sampling, summa canisters will operate continuously for 8-hours and will be shipped to the FBL for VOCs analysis following the sampling event. In addition, one duplicate sample will be collected for QA purposes. Table 2-1 lists the sample identification numbers for the sub-slab vapor samples that are proposed for collection, along with their respective general locations. SOP-02 provides a detailed procedure for sub-slab vapor sampling using summa canisters.

At the conclusion of the sub-slab vapor sampling, each indoor air and sub-slab vapor sample location will be triangulated from the corner of each bay area. An updated sample location figure will be provided in the VI report."

SOP-02 has also been revised to include the procedure that will be used to conduct the leak test using helium as a tracer gas. A revised version of SOP-02 is included with this response.

Comment 3:

Referring to Section 2.4.3, the outdoor air sample location should be in a prevailing upwind direction and away from any wind obstructions such as trees and buildings and any contaminated soils. The sampling should begin at least 1 hour and preferably 2 hours before indoor air sampling begins and continue until at least 30 minutes before indoor air sampling is complete.

Response: The second paragraph in Section 2.4.3 has been revised to read as follows:

"One outdoor air sample will be collected along the prevailing upwind direction from Building 146 away from any wind obstructions such as trees and buildings and any contaminated soils. On day scheduled for air sampling, the prevailing wind direction will be determined on the basis of the hourly average wind direction reported at the National Weather Service Bloomington (47401) reporting station. In the event, that hourly wind data is not available from Bloomington, Indianapolis and Terra Haute NWS reporting stations will be used to determine the prevailing wind direction. The outdoor air sampling with begin at least 1-hour prior to the start of indoor air sampling and will continue until at least 30 minutes before indoor air sampling is complete. The wind direction and speed will be recorded for each hour in the log book for the period 1-hour before sampling begins to 1-hour after sampling ends."

Comment 3:

Referring to Section 3.0, this section cites a "Modified" EPA TO-15 procedure. Please provide additional detail on the following issues:

a) **If 6-Liter Summa canisters are used (vs 1 liter amber bottles fitted with a gas spigot), how will they be tested for the presence of residual contamination prior to use? Re-used Summa canisters may be very difficult to completely flush.**
b) **How will the air samples be physically taken? Geoprobe? Soil Gas rods? Etc.**

Response:

(a) All canisters used in the sampling program will be "certified clean" by the laboratory. The canisters are hooked to an oven in batches of 8, 6-L canisters. The canisters are evacuated to -30"Hg and then filled with clean humidified nitrogen to 30 psi while being heated to a temperature of 125°C. The process is repeated 5-10 more times until the canister is completely evacuated. One canister is removed and pressurized to 30psi with air. This sample is analyzed by GC/MS for Batch Certification. If the canister meets the criteria, the batch is certified clean and is ready for use.

(b) New Teflon®-lined tubing will be placed down each hole about 2-3 inches below the foundation floor of B-146. Plumber's putty, or a similar VOC-free substance, will be applied to the hole around the tubing to seal the hole, and to minimize disturbance of the sub-slab soil gas concentrations and surface air intrusion. The tubing is attached to a purging pump outside of the hole and three to five tubing volumes are purged into a Tedlar™ bag (to avoid purging into indoor air) to ensure the sample represents subsurface conditions. A pre-evacuated stainless steel canister (6-L) will be attached to the sampling train tubing, and sampled.

Comment 4:

Referring to Section 4, provide additional detail on how the data will be evaluated and conversion calculations made.

Response: The following additional detail has been added to Section 4:

"Multiple lines of evidence will be used to evaluate the magnitude and extent of vapor intrusion at Building 146. Depending on the results of the investigation and a human health risk assessment, it may be determined that either no further action is necessary or that mitigation or remediation may be warranted.

Once the analytical data has been collected, it will be necessary to evaluate the data for site management decision making. The evaluation will utilize a "multiple lines of evidence" approach to assess if the vapor intrusion pathway. The lines of evidence being considered for this project include:

- *Near-slab soil gas data*
- *Indoor air data*
- *Outdoor air samples collected concurrently with indoor air samples*
- *Comparison of constituent ratios of chemicals in soil gas and indoor air*
- *Comparison of analytical results to the USEPA human health project screening levels given in Table 4-1 and determine the level of risk."*

All analytical results reported by the laboratory will be provided in units of "$\mu g/m^3$". As a result, no conversions calculations will be necessary.

Comment 5:

Referring to Table 4-1, the LOQ for TCE exceeds the Project Screening Level for Indoor Air. Is the chosen lab capable of reporting unqualified analytical results for TCE that are below the screening level?

Response: After checking with the laboratory, they indicated that the LOQ for TCE is 0.16 $\mu g/m^3$, which is at least one order of magnitude lower than the Project Screening Level.