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CNC CHARLESTON
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U S NAVY RESPONSE TO REGULATOR COMMENTS TO RCRA FACILITY INVESTIGATION
REPORT ADDENDUM AND CORRECTIVE MEASURES STUDY WORKPLAN AREA OF
CONCERN 569 AND 570 AND 573 (AOC 569 AND 570 AND 573) ZONE E WITH
TRANSMITTAL CNC CHARLESTON SC
3/10/2003
CH2M HILL

AOCs 569, 570, + 578 Zone E
REC RFI Report Addendum + CMS Workplan (RO)

CH2MHILL TRANSMITTAL

To: Jerry Stamps
South Carolina Department of Health
and Environmental Control
Bureau of Land and Waste
Management
2600 Bull Street
Columbia, SC 29201

From: Sam Naik/CH2M-Jones

Date: March 10, 2003

Re: CH2M-Jones' Responses to Comments by EPA regarding the *RFI Report Addendum and CMS Work Plan, AOCs 569, 570, and 578, Zone E, Revision 0*

Quantity	Description
2	CH2M-Jones' Responses to Comments by EPA regarding the <i>RFI Report Addendum and CMS Work Plan, AOCs 569, 570, and 578, Zone E, Revision 0</i> – Originally Submitted on December 30, 2002

If material received is not as listed, please notify us at once.

Remarks:

Copy To:

Tim Frederick/Gannett Fleming, Inc., w/att
Dann Spariosu/USEPA, w/att
Rob Harrell/Navy, w/att
Dean Williamson/CH2M-Jones, w/att
Gary Foster/CH2M-Jones, w/att

General Comment

The RFIRA does not appear to adequately consider the impact of the proposed realignment of Hobson Avenue on the potential human health risks at the site nor on the land use controls that may be necessary at the site. Many of the sections in the COPC/COC Refinement Section (Section 5) state that the AOCs are currently paved and are likely to remain paved, thereby limiting the potential for exposure. It does appear that the construction of a new road bed through the AOCs as part of the realignment has been considered. Construction through this area would presumably require the removal of some or all of the existing paving, excavation into subsurface soils, and the possibility of worker exposure to the exposed soils. However, the RFIRA does not discuss these possibilities. It is also not clear if the roadway realignment would result in some areas of the AOCs becoming unpaved medians, drainage areas, or roadside green space. The evaluation of methylene chloride indicates that site-specific SSLs were calculated for both the paved and unpaved scenarios. However, the paved or unpaved scenarios are not described in any detail nor is this type of evaluation conducted for any of the other COPCs/COCs. The document should be revised to discuss the roadway realignment through the AOCs in greater detail, and the RFIRA and CMS Work Plan should discuss the impacts of the realignment on the potential risks and land use controls.

CH2M-Jones Response:

The reviewer raises several important considerations that can be addressed through a few revisions to the RFI Report Addendum (RFIRA). While the CH2M-Jones/Navy team did consider the potential impacts from the realignment of Hobson Avenue, and concluded that the available data indicate that exposure to environmental media at AOC 569 as part this work would not be expected to present an unacceptable risk to road construction workers, we agree that some additional clarification on this issue could be added to the RFIRA. Additional information regarding this topic is presented below (see response to Specific Comment 1) and appropriate portions of this can be included in the RFIRA, either in a Responses to Comment Appendix or in the report itself.

It is also important to note that OSHA regulations require the contractor that is responsible for the construction work to make their own determination of the potential health and safety concerns for work at contaminated sites, such as AOC 569. This requirement will apply to redevelopment work at all of the contaminated sites at the CNC. Any discussions of these health and safety issues in the RFIRA are not intended to take the place of these independent determinations to be made by the construction contractor regarding the need for specific health and safety protocols to protect workers and the environment during construction.

With regard to the method used to evaluate potential leaching concerns via calculation of SSLs, the CH2M-Jones/Navy team used the procedures agreed upon by the BCT for this issue. These procedures, described in the CNC Project Team Notebook (CH2M-Jones, December 2001), in general, are as follows:

- 1. Screen individual chemical results against the applicable generic SSL (DAF=1 for VOCs, DAF=10 for other chemicals) and background values (for inorganics). If individual results exceed the chemical of potential concern (COPC) screening criteria, the chemical is then identified as a COPC.*
- 2. Compare the average surface or subsurface soil concentration of the COPC to the generic SSL. If the average concentration is below the generic SSL, the chemical is not considered a COC.*

3. *If the average concentration exceeds the generic SSL, a site-specific SSL may be calculated or, for inorganics, it may be more practical to perform an SPLP leaching test to assess site-specific leachability. If a site-specific SSL is calculated, SCDHEC has requested that both a paved and unpaved SSL be calculated. These two scenarios are differentiated only by the assumed infiltration rates (0.0283 inches/year for the paved scenario, 0.45 inches/year for the unpaved scenario).*

If the average soil concentration is below the unpaved SSL, the chemical is not considered a COC. If the average concentration exceeds the paved or unpaved SSL, it will generally be considered a COC for the paved or unpaved scenario (depending on the exceedance). In some cases a weight of evidence (WOE) approach may also be applied to assess whether it is a COC. These WOE factors include whether the exceedance is only in surface soil, and the subsurface soil at that location is not elevated, or whether the groundwater exhibits any detectable concentrations.

The RFI soil boring locations where soil COCs were identified in the Revision 0 RFIRA (CH2M-Jones, 2002) are E569SB005 (with benzene and ethylbenzene as surface and subsurface soil COCs, and toluene and xylenes as subsurface soil COCs); E569SB012 and E578SB005 (with BEQs as surface soil COCs) and E578SB005 (with BEQs as subsurface soil COCs). Site-specific SSLs were calculated for benzene, ethylbenzene, toluene and xylenes (BTEX) and are included in Table A-1 attached to these responses. Table A-2 compares the detections of the soil COCs with the site-specific SSLs for the paved and unpaved scenarios. From this comparison, only the benzene detections at E569SB005 exceed the site-specific SSL for the unpaved scenario.

With respect to calculation of site-specific SSL for the other COPCs discussed in Section 5.0 of the document, none exceeded respective generic SSLs (with a DAF=10). Therefore, calculation of site-specific SSLs for these COPCs was not necessary. Also, no exceedances of the generic SSLs (with a DAF=10) were noted in subsurface soils for the seven polycyclic aromatic hydrocarbons (PAH) compounds that make up the BEQs.

Specific Comments

1. Page 1-2, Lines 21-23.

The text indicates that the realignment of Hobson Avenue will overlay the current locations of AOCs 569, 570, and 578. Additional information should be provided regarding the proposed realignment that would include, at minimum, a diagram of the proposed roadway realignment. Of interest would be the areas to be impacted by excavation of a new road bed and whether the adjacent areas would become unpaved medians, drainage areas, etc., as these details may have an impact on the evaluation of risks and the land use controls that may be necessary.

CH2M-Jones Response:

The attached figure (Figure A-1) shows the proposed footprint (90-percent design stage) of the Hobson Avenue realignment and the RFI soil boring locations that fall within this footprint. As shown in this figure, the only soil boring location with identified COCs that falls within the footprint of the roadway realignment is E578SB005, where a BEQ detection of 1.619 mg/kg in surface soil exceeds the CNC BEQ sitewide reference concentration for surface soils of 1.304 mg/kg. The subsurface soil BEQ detections at this location of 0.323 mg/kg did not exceed the CNC BEQ sitewide reference concentration for subsurface soils of 1.4 mg/kg.

Should the realignment of Hobson Avenue be implemented as shown in the attached Figure A-1, the existing pavement and surface soils in the location of E578SB005 will likely be excavated and repaved with asphalt. Since asphalt material consists of a significant concentration of the PAHs that make up the BEQs, the risk of human exposure to the existing soil BEQ concentrations at this location are no greater and are likely much less than that encountered during the asphalt paving activities.

It should be noted that with the exception of two surface soil BEQ detections above the CNC sitewide reference concentration, none of the other COCs showed detections above the EPA Region III residential RBCs, thereby indicating that direct exposure from other soil COCs identified at the site are not of concern. The other surface soil COCs were identified based on detections that exceed of their SSLs (with a DAF=1). BEQs are known to be associated with asphalt pavements, and it is likely that a roadway realignment project will increase the potential risk of exposure to BEQs. None of the other soil boring locations showing the COCs are likely to be impacted by the realignment project as proposed. CH2M-Jones is conducting additional delineation sampling for BTEX at E569SB005, and an evaluation will be made after this sampling for excavation of soils around this boring location. The remaining COC locations of E569SB012 and E578SB005 will likely not be disturbed by the Hobson Avenue realignment project and will continue to exist under pavement.

The above information will be included in the Revision 1 of this RFIRA, and will be taken into consideration during the preparation of the CMS Report for this site.

2. Page 2-4, Lines 5-9.

This section references the human health risk assessment that was conducted as part of the RFI. Subsequent sections detail the COCs identified in the RFI. It is recommended that these sections should include the quantified risk characterization results for the sites as well as the media specific risk values. These values would provide context for the subsequent analyses and recommendations.

CH2M-Jones Response:

A variety of the RBCs used in developing the Zone E RFI Report, Revision 0 (prepared in 1996), as well as the SSLs have changed, compared to the SSLs and RBCs that are currently used (October 2000 Region III Risk-based tables). The BCT has agreed that the risk evaluation sections from the previous Revision 0 RFI Reports do not need to be included in the RFIRAs. Rather, the BCT has agreed to present the COCs that were previously identified in the Revision 0 RFI Reports and evaluate them as COCs against the SSLs and RBCs currently used, incorporating all available site data (the original RFI data plus data from additional sampling completed since the RFI Report was completed). Section 5.0 of the RFIRA presents this information, per the abovementioned agreements. Thus, we suggest that the additional information requested from the Revision 0 RFI Report not be included in the RFIRA at this time. Interested parties that would like to review that information can do so by reviewing the Revision 0 RFI Report, housed at the SCDHEC offices.

3. Page 4.2, Section 4.1.3.

The section presents the findings for the April 2002 groundwater sampling. The list of wells sampled includes only one deep well, E569GW05D. However, an exceedance of the groundwater MCL is reported from monitoring well E570GW03D, a well that is not reported as having been sampled in the text. Figure 4-2 includes E570GW03D as having been sampled. The apparent discrepancy should be corrected.

CH2M-Jones Response:

The text in Section 4.1.3 will be revised to reflect that E570GW03D was sampled during April 2002. This information was inadvertently not included in the text.

4. Page 4.2, Lines 17-19.

The Summary does not include findings for groundwater. For completeness and clarity, groundwater findings should be added to the Summary.

CH2M-Jones Response:

Comment noted. The text in Section 4.2 will be revised to include the list of groundwater COPCs identified during the 2002 groundwater sampling.

5. Page 5-4, Page 5-4.

The text states that detections of carbon tetrachloride exceeded its SSL in two subsurface soil samples from sample location E569SB005: one during the RFI sampling (3.80 mg/kg) and again during the April 2002 sampling event (1.53 mg/kg). The text also indicates that a sample at subsurface soil location E569SB005b did not have concentrations of carbon tetrachloride above laboratory detection limits in 2002. The reader is referred to Table 5-1 for all sample results for carbon tetrachloride analyses. Table 5-1 confirms that carbon tetrachloride exceeded its SSL at sample location E569SB005 at the time of the RFI, but there are no 2002 data reported for carbon tetrachloride in the Table. The 1.53 mg/kg exceedance reported in the text appears to be an erroneous reporting of the concentration value for ethylbenzene at E569SB005b on Page 5-19. The clean sample data for carbon tetrachloride reported in the text for sample location E569SB005b in April 2002 is not included in Table 5-2. The text then arrives at the conclusion, based on these observations, carbon tetrachloride is not considered a COC in soils at this site. It is not clear what observations are referenced. The carbon tetrachloride section should be re-written.

CH2M-Jones Response:

The text in Section 5.1.4 for carbon tetrachloride will be revised to reflect that carbon tetrachloride was not detected during the April 2002 sampling, and the citing of 1.53 mg/kg value inadvertently attributed to carbon tetrachloride will be removed from the text. Table 5-1 will be revised to include the results from the April 2002 sampling for carbon tetrachloride, which showed detections below laboratory detection limits.

6. Page 5-5, Line 5.

The text indicates that Table 5-1 lists benzene detections in soil from samples at the site. Since this statement appears in the evaluation of ethylbenzene in soil, it appears that benzene should be changed in the text to ethylbenzene.

CH2M-Jones Response:

The text will be revised to remove this paragraph (between lines 3 and 8) referring to benzene detections, which was inadvertently left in.

Attachments

Leachate Transport Analysis Model
 Charleston Naval Complex
 Zone E - AOC 569, 570, and 578

		Parameter	Methylene chloride	Benzene	Toluene	Ethylbenzene	Xylene
Chemical Specific Input Parameters							
Cw	= Target groundwater concentration MCL (mg/L)		5.00E-03	5.00E-03	1.00E+00	7.00E-01	1.00E+01
H	= Henry's Law Constant, dimensionless		8.98E-02	2.28E-01	2.72E-01	3.23E-01	2.13E-01
Kd	= Soil-water sorption coefficient (cm ³ water / g soil = L/kg) = Koc x foc where koc = organic carbon-water sorption coefficient, (cm ³ (ml) water) / (g soluble organic carbon) foc = Fraction of organic content, dimensionless	0.037	4.33E-01	2.18E+00	6.73E+00	1.34E+01	1.34E+01
			1.17E+01	5.89E+01	1.82E+02	3.63E+02	3.63E+02
Site Specific Input Parameters							
Sw	= Width of Source Parallel to Groundwater Flow Direction (impacted soil zone)	70.1 m	230 ft				
da	= Aquifer Thickness	7.6 m	25 ft				
d	= Groundwater Mixing Zone thickness (paved)	7.51 m	24.6 ft				
	(unpaved)	7.62 m	25.0 ft				
i	= Groundwater Gradient		6.2E-03 (unitless)				
Ks	= Saturated Hydraulic Conductivity	1112.5 m/yr	3650.0 ft/yr				
θw	= Volumetric Water Content of Soil Pore Space	0.3 cm ³ _{vapor} /cm ³ _{soil}	0.3 in ³ _{vapor} /in ³ _{soil}				
θv	= Volumetric Vapor Content of Soil Pore Space	0.15 cm ³ _{vapor} /cm ³ _{soil}	0.15 in ³ _{vapor} /in ³ _{soil}				
ρs	= Soil Bulk Density	1.5 g/cm ³	93.64 lbm/ft ³				
qi	= Water Infiltration Rate (paved)	0.0086 m/yr	0.0283 ft/yr				
	(unpaved)	0.1372 m/yr	0.4500 ft/yr				
Partition Term, Cw/Csoil, (L/kg)			6.42E-01	2.40E+00	6.96E+00	1.37E+01	1.37E+01
Dilution Term, dimensionless (paved)			8.64E+01	8.64E+01	8.64E+01	8.64E+01	8.64E+01
(unpaved)			6.46E+00	6.46E+00	6.46E+00	6.46E+00	6.46E+00
Csoil/Cw = Partition term * Dilution term (mg/kg / mg/L) = L/kg (paved)			5.55E+01	2.08E+02	6.02E+02	1.18E+03	1.18E+03
(unpaved)			4.15E+00	1.55E+01	4.50E+01	8.83E+01	8.82E+01
Calculated Site Specific Target Level for Soil							
Csoil	calculated source soil concentration (SSL, mg/kg) Cw*(partition term)*(dilution term) (paved)		0.277	1.038	601.726	826.738	11801.041
	(unpaved)		0.021	0.078	44.976	61.794	882.064

Cw is the MCL from EPA National Drinking Water Standards (March 2001) or US EPA Region III RBCs (October, 2000).
 H from Table 36 of the Soil Screening Guidance; Technical Background Document (EPA, 1996).
 Kd = koc x foc.
 koc from Table 39 of the Soil Screening Guidance; Technical Background Document (EPA, 1996).
 foc calculated as the mean foc from TOC measurements from Zone E.
 Sw Estimated as the distance along gw flow path (length, SW-NE) of AOC 570 (230 ft).
 d is calculated as $M = (0.0112 L^2)^{0.5} + da \{1 - e^{-(L \cdot \alpha / Kd \cdot da)}\}$ or da, whichever is less.
 da is based on top of Ashley (-20 ft, GIS) and nearest Isocontour line for groundwater level (5 ft msl, GIS).
 i Calculated from isocontour groundwater map for Zone E ((4.82-3.99)/134 ~ 0.006, CH2MHill, 2002).
 Ks Based on CH2MHill's hydraulic conductivity theme in the GIS (10 ft/d).
 θw is the default value presented in the Soil Screening Guidance: User's Guide (EPA, 1996)
 θv is calculated as total porosity (0.45, assumed) - θw (0.3) = 0.15.
 ρs is the default value presented in the Soil Screening Guidance: User's Guide (EPA, 1996)
 qi is a derived value (unpaved, 5.4 in/yr or paved, 0.34 in/yr) based on annual precipitation, evapo-transportation, and runoff coefficient values for the Charleston area

TABLE A-2

Detected Concentrations of Benzene, Ethylbenzene, Toluene, and Xylenes (Total) in Surface and Subsurface Soils

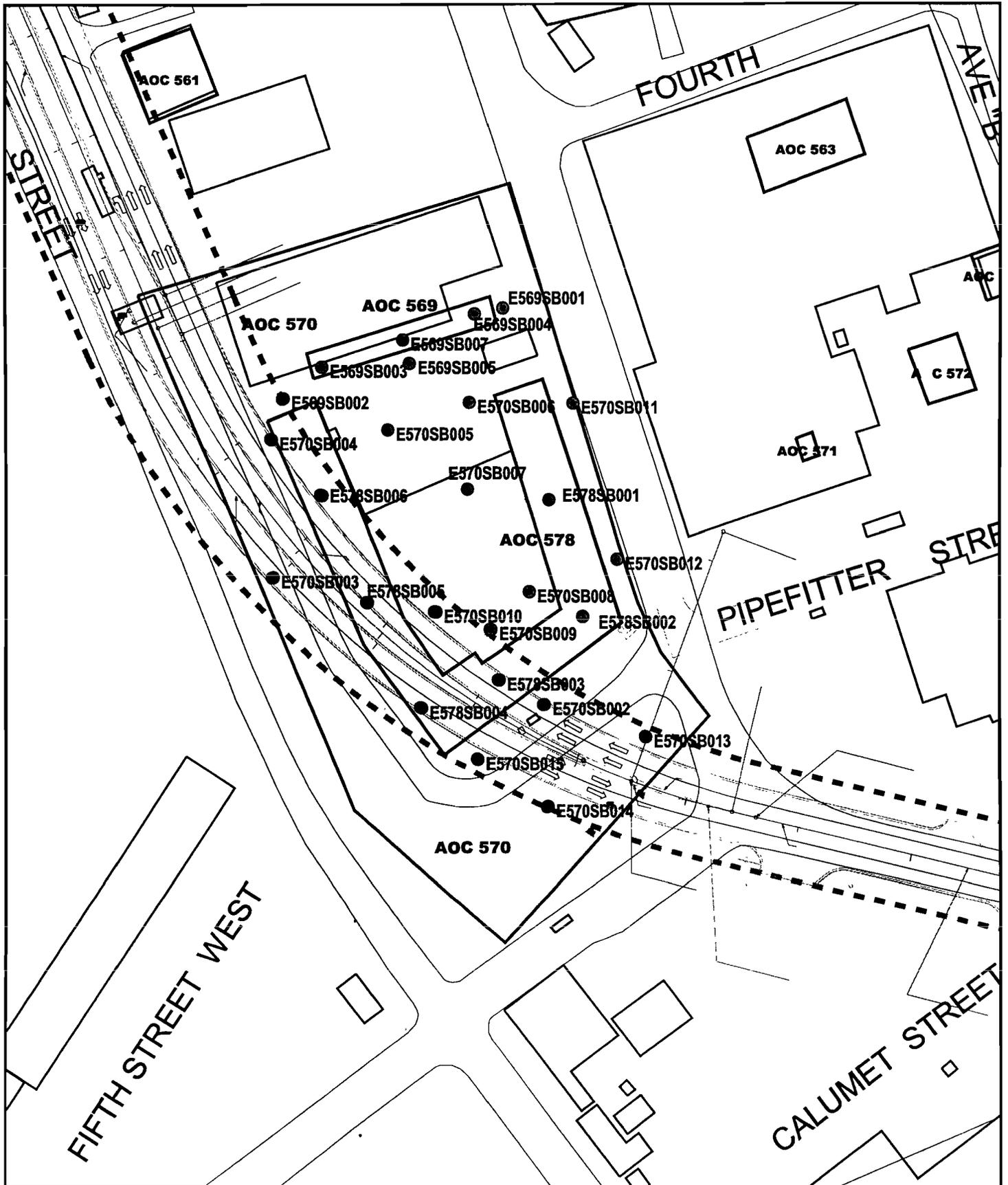
RFI Report Addendum/CMS Work Plan (Responses to EPA Comments), AOCs 569, 570 and 578, Zone E, Charleston Naval Complex

Parameter	Station ID	Sample ID	Concentration (mg/kg)	Qualifier	Date Collected	EPA Region III Residential RBC (mg/kg)	Generic SSL (DAF=1) (mg/kg)	Site-Specific SSL (mg/kg) (paved scenario)	Site-Specific SSL (mg/kg) (unpaved scenario)
Benzene	Surface Soil					12	0.002	1.04	0.078
	E569SB005	569SB00501	0.002	J	10/13/1995				
	E569SB005b	569SB00501b	0.68	=	04/25/2002				
	Subsurface Soil								
	E569SB005	569SB00502	10	=	10/13/1995				
	E569SB005b	569SB00502b	0.428	J	04/25/2002				
Ethylbenzene	Surface Soil					780	0.7	826.74	61.79
	E569SB005	569SB00501	0.003	J	10/13/1995				
	E569SB005b	569SB00501b	1.53	=	04/25/2002				
	Subsurface Soil								
	E570SB005	570SB00502	0.006	UJ	01/16/1996				
	E569SB005b	569SB00502b	19.3	=	04/25/2002				
Toluene	Surface Soil					1,600	0.6	601.73	44.98
	E569SB005	569SB00501	0.005	U	10/13/1995				
	E569SB005b	569SB00501b	0.093	J	04/25/2002				
	Subsurface Soil								
	E569SB005	569SB00502	220	=	10/13/1995				
	E569SB005b	569SB00502b	3.17	=	04/25/2002				
Xylenes (Total)	Surface Soil					16,000	9	11,801	882
	E570SB005	570SB00501	0.005	UJ	01/16/1996				
	E569SB005b	569SB00501b	0.207	J	04/25/2002				
	Subsurface Soil								
	E569SB005	569SB00502	800	=	10/13/1995				
	E569SB005b	569SB00502b	44.2	=	04/25/2002				

Concentrations in bold and outlined text exceed the appropriate screening criteria.

J Indicates an estimated value. One or more quality control (QC) parameters were outside control limits or the value was detected below the laboratory's quantification limit.

U Indicates that the concentration was not detected.



- AOC Boundary
- SWMU Boundary
- RFI Soil Sampling Location
- RFI Soil Sampling Location within Proposed Realignment Footprint
- Outer Boundary of Proposed Realignment Footprint

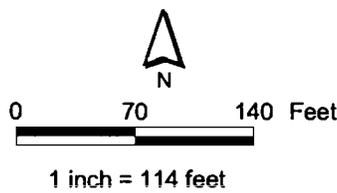


Figure A-1
 RFI Soil Sampling Locations
 Potentially Impacted by
 Proposed Realignment of Hobson Ave
 AOCs 569, 570 & 578, Zone E
 Charleston Naval Complex

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