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U S NAVY RESPONSE TO REGULATOR COMMENTS TO RCRA FACILITY INVESTIGATION REPORT ADDENDUM AREA OF CONCERN 550 (AOC 550) ZONE E WITH TRANSMITTAL
CNC CHARLESTON SC
11/14/2002
CH2M HILL

AOC 550 Zone E
Response to Comments on RFI Report Addendum

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: Dean Williamson/CH2M-Jones

Date: November 14, 2002

Re: CH2M-Jones' Responses to Comments by SCDHEC regarding the *RFI Report Addendum, Area of Concern 550, Zone E, Charleston Naval Complex* (Revision 0)

Quantity	Description
4	CH2M-Jones' Responses to Comments by SCDHEC regarding the *RFI Report Addendum, Area of Concern 550, Zone E, Charleston Naval Complex* (Revision 0) – Originally Submitted on July 23, 2002

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

Remarks:

Copy To:

Jo Cherie Overcash/SCDHEC, w/att
BCT Distribution List

Engineering Comments Prepared by Jerry Stamps

1. Section 2.0.
The investigation at AOC 550 has resulted in the widespread detection of PAHs, particularly in the subsurface soil. The Navy must calculate a BEQ for the PAHs and screen the result against the appropriate screening value defined in the CNC Project Team Notebook and Instructions (December 2001). Furthermore, the Navy must calculate a TEQ value for the detected dioxins and compare the result to the corresponding EPA Region III Residential RBC. If the calculated TEQ value exceeds the residential RBC, the Navy must demonstrate that the detectable quantities of dioxins do not pose an unacceptable risk to human health.

CH2M-Jones Response:

General Response:

Please note that CH2M-Jones did not intend to request an NFA status for this site. The single sentence in the Revision 0 RFI Report Addendum requesting NFA status (line 12 on page 7-1) was inadvertently included and will be removed from the Revision 1 submittal for this site. AOC 550 is appropriate for current and continued industrial land use as there are no industrial land use COCs. Land use controls restricting land use to non-residential use are expected to be an adequate remedy for this site and appropriate given its location within the highly industrialized portion of the CNC. Such a designation is appropriate for this site and consistent with previous BCT agreements regarding remedial decision-making at the CNC.

The request for NFA in line 12 on page 7-1 of the Revision 0 RFI Report Addendum may have precipitated some of the reviewer's comments. Our responses below may be best understood with the understanding that the request for NFA will be removed from the Revision 1 RFI Report Addendum for this site:

CH2M-Jones Specific Response to SCDHEC Comment 1:

BEQs were previously evaluated in the Zone E RFI Report, Revision 0 and found to not be COCs. No PAHs in surface soil were detected above their respective industrial RBC. The BEQ value for the single upper interval soil in which BEQs were detected was reported as 26.8 µg/kg in the RFI report, which is well below the residential and industrial RBC as well as below the current CNC sitewide reference concentration.

Since BEQs were previously evaluated in the Zone E RFI Report, Revision 0, and were not identified as a COC, there is no need for rescreening these data in the RFI Report Addendum; this approach is consistent with Section 4.5 of the CNC Project Team Notebook, which identifies COPCs/COCs that require rescreening by the Navy/CH2M-Jones team.

PAHs in subsurface soil were also evaluated as potential COPCs and COCs in the Zone E RFI Report, Revision 0, and were not determined to be COCs. Only one PAH (benzo[a]anthracene) was detected in one subsurface soil sample above its SSL (at a concentration of 730 µg/kg versus an SSL of 700 µg/kg). This chemical and other PAHs were concluded to not be COCs at this site. Per current BCT agreements as presented in the CNC

Project Team Notebook, rescreening of PAHs and BEQs in the RFI Report Addendum is not necessary if these chemicals are not identified as COCs in the Revision 0 RFI Report.

It should be noted that no comments regarding the need to reevaluate PAHs at this site were made by SCDHEC or EPA reviewers during their review of the Revision 0 Zone E RFI Report. This suggests that based on the intended continued industrial use of the site, previous reviewers did not consider BEQs to be an issue at the site.

TEQs were also evaluated during the RFI and found not to be a COC. For this reason, TEQs were not reevaluated in the RFI Report Addendum. TEQs were detected in one soil sample at 0.0426 ng/kg, well below the residential RBC of 4.4 ng/kg. There does not appear to be any reason to revise the RFI Report Addendum to discuss TEQs, since TEQs were discussed and evaluated during the Revision 0 Zone E RFI Report.

2. Figure 2-1.
AOC 550 appears to have been identified at two separate locations; however, the investigation was focused on the southern location. Only one sample was collected within the vicinity of the northern location for AOC 550. The Navy must provide the rationale as to why the investigation focused on the southern location, and justify why further investigation is not necessary for the northern location.

CH2M-Jones Response:
The Zone E RFI work plan proposed a similar level of investigation at each of the former locations of the temporary boiler house. During the original RFI field effort, the field team was unable to collect soil samples at some upper and lower intervals at both the northern and southern locations due to the depth of fill encountered during sampling. The sampling conditions encountered and the inability to obtain soil samples at a number of locations during the original RFI field effort were reported in the Revision 0 Zone E RFI Report.

Figure 2-1 of the RFI report addendum did not show all subsurface soil sampling locations at this AOC at the northern location. The actual subsurface soil sampling locations at this northern part of the AOC can be seen in the current GIS. A revised Figure 2-1 showing these locations will be provided.

Additional sampling is not considered necessary in the northern area since the area was targeted for soil sampling in the work plan and adequate samples were collected and analyzed. As occurred at other AOCs and SWMUs at the CNC, conditions were encountered during sampling that precluded collection of some of the intended samples. However, fill material encountered at this site during attempts to collect surface soil samples was previously determined by the BCT to not warrant sampling and analysis. No additional sampling is considered necessary.

3. Section 5.0, Table 5-1.
As included in other RFI Report Addenda, the Navy should include a table identifying all detectable quantities of organic constituents with a column for the EPA Region III Residential RBC for the sake of comparison. Table 5-1 identifies the detectable quantities

of Carbon Disulfide and Methyl Ethyl Ketone; however, the PAHs, 1,3-dichlorobenzene, and 1,4-dichlorobenzene were omitted from this table.

CH2M-Jones Response:
The tables showing detected organic chemicals as compared to residential RBCs that is often provided in the RFI report addenda are typically copies of tables that were previously provided in the Revision 0 RFI report. For this site, the Zone E RFI Report, Revision 0 did not develop a table comparing detected chemicals to residential RBCs.

CH2M-Jones does not intend to request an NFA determination for this site. Since the site meets acceptable risk criteria for continued and future industrial land use, our intent is to request land use controls and No Further Investigation status. Section 7.0 will be modified to indicate that the recommended pathway forward for the site is to apply land use controls to restrict the site to industrial land use, rather than recommending NFA status (See also our response to Comment 2 by Ms. J. Overcash regarding this issue). Thus, no comparison to residential RBCs is necessary at this time. However, such a table comparing detected chemicals to residential RBCs can be created if the Department believes it is essential to the report.

Table 5.1 was developed specifically to address previous BCT agreements to compare soil VOC detections to an SSL based on a DAF=1. The inclusion of residential RBCs in this table is unnecessary. Because PAHs, 1,3-dichlorobenzene, and 1,4-dichlorobenzene are semivolatiles, they were not included in this table.

4. Section 7.0.
This section states that "...there are no soil COCs for the industrial land use scenario...". This section further recommends a No Further Action (NFA) determination for AOC 550. In order to obtain a NFA, the Navy must demonstrate that the contamination is below the EPA Region III Residential RBC and/or background reference concentration, as applicable. It appears as though the surface soil data was compared only to the Industrial RBC. As such, the Department cannot grant a NFA determination for AOC 550 at this time.

CH2M-Jones Response:
Section 7.0 will be revised to recommend that the site be used only for continued and future industrial land use on the basis that no industrial land use COCs have been identified and that land use controls should be an adequate remedy for this site. A CMS work plan and CMS report will be provided to document the remedial action decision making for this site.

Hydrogeology Comments Prepared by Jo Cherie Overcash

Site Visit:

1. According to the facility's geographic information system (GIS) database, there are four monitoring wells in the vicinity of AOC 550; grid wells GDEGW22 and GDEGW22D are depicted at the northern AOC 550 while E550GW001 and E550GW002 are depicted at the southern AOC 550. However, neither grid well GDEGW22D nor E550GW002 exists in the field. Moreover, there is no data in the database from these wells. The Navy should clarify this discrepancy.

CH2M-Jones Response:
Based on a recent well inspection (within the last few weeks) by the CH2M-Jones field team, wells EGDEGW022, EGDEGW22D, and E550GW002 do exist at the site. Well E550GW002 may have been installed to replace E550GW001, which we believe was previously abandoned (but for which we have no documentation). Well E550GW001 was located approximately 9 feet from E550GW002. A small square concrete path can be seen at the approximate former location of this well, suggesting that it was abandoned. Data for wells EGDEGW022, EGDEGW22D, and E550GW001 are in the current GIS version. Apparently no data are available for E550GW002 because this well has not been sampled since it was installed.

The Revision 0 RFI Report Addendum for AOC 550 can be revised to clarify the current status of these wells. One of our field team leaders can also assist the reviewer in locating these wells in the field.

Concerns:

2. The RCRA Facility Investigation, of which confirmatory sampling is the first step, was conducted under the assumption that this area of the Base would remain industrial. However, the Navy has requested a "no further action" (NFA) decision for this unit, which would be based on unrestricted land use. The surface and subsurface soil data generated during the RFI must be screened against residential values (EPA Region III Risk-Based Concentration Table, October 2000) in order to determine whether there are constituents of concern for unrestricted land use.

CH2M-Jones Response:
CH2M-Jones will not be requesting NFA status for this site. Please refer to our response to comments from Mr. Jerry Stamps for a broader discussion of this issue. CH2M-Jones's recommendation in Section 7.0 of the RFI report addendum for this site will be changed from NFA to continued and future industrial use only. No industrial COCs have been identified for this site. Thus, a screening of all site data relative to residential RBCs is not necessary at this time, but such a review or screening may be conducted in the future by an owner who may choose to develop the property for other than industrial land use.

3. In Section 2.2.1, Shallow Groundwater Results, the Navy states that no volatile organic compounds (VOCs) nor semi-volatile organic compounds (SVOCs) were detected at AOC 550 in concentrations above the laboratory detection limit. These statements are inaccurate in that the GIS database clearly lists detections of certain VOCs and SVOCs. For example, acenaphthene, dibenzofuran, fluorine, 2-methylnaphthalene, naphthalene, phenanthrene and 2,4-dimethylphenol are listed as "=" or "J" qualifiers. The Navy should acknowledge the presence of these VOCs and SVOCs in shallow groundwater. Please note that the tap water value for dibenzofuran is 2.4 micrograms per liter (µg/L) at a hazard index of 0.1 for a non-carcinogen. The reported values for this parameter are: 21= µg/L, 8J µg/L, 15= µg/L, 21= µg/L. The Navy must revise the text and address the presence of dibenzofuran in shallow groundwater.

   CH2M-Jones Response:
   The presence of these chemicals in groundwater, primarily in well GDEGW22D, will be acknowledged and discussed in the revised report.

4. The RFI identified arsenic as a constituent of concern in shallow groundwater at AOC 550 because arsenic exceeded the maximum contaminant level (MCL) of 50 micrograms per liter (µg/L) in two of four sampling events at shallow well E550GW001. Arsenic was reported at concentrations of 18.5 µg/L, 19.9 µg/L, 55.9 µg/L and 93.2 µg/L. The Navy further states that the arsenic concentrations at AOC 550 are less than the maximum concentration of 316 micrograms per liter (µg/L) reported for Zone E shallow background as listed on Table 3 entitled Statistical Summary of the Analytical Results for Shallow Groundwater Background Samples by Zone for CNC Main Base of the CNC Team Notebook. However, the mean concentration reported on Table 3 for arsenic in Zone E is 36 µg/L. **Please note that the Department has not approved these background ranges.** Furthermore, one should remember that the mean concentration of arsenic in Zone E is considerably less than the concentration detected at AOC 550.

   The Navy references the hypothesis outlined in *An Overview of Arsenic Geochemistry, TEA Processes in Groundwater Systems, and Implications for the CNC Hydrogeologic Environment* (CH2M Jones, 2001) to explain the natural geochemical processes occurring at AOC 550. While geochemical processes may be occurring at AOC 550, the Navy should substantiate their conclusion that the elevated concentration of arsenic in groundwater at AOC 550 is attributable to geochemical processes. The Navy should clarify terms like "elevated iron" and "iron-reducing conditions". The Navy should more fully discuss the relationship among iron, manganese and arsenic as presented on Table 5-2 entitled Arsenic, Iron, and Manganese in Groundwater and as presented on Figure 5-1 entitled Arsenic Groundwater Detections. **Moreover it should be noted that the Division of Hydrogeology has not approved the referenced technical memorandum.**

   While the highest concentration of arsenic in grid well EGDEGW022 (which should be included in the background data set) located at the northern AOC 550 has been estimated at 6.7 µg/L, the text does not discuss the relationship among arsenic, iron and manganese at this location either, nor does the text explain how it is that the

concentration of arsenic at the northern AOC 550 is so much less than the concentrations found at the southern AOC 550.

The Navy should substantiate their conclusion that the elevated concentration of arsenic in groundwater at AOC 550 is attributable to geochemical processes. The Navy should provide additional data to support this conclusion. For example, the Navy should include groundwater pH values and an explanation of how pH may affect the mobility of certain metals, namely arsenic; the Navy could speciate arsenic to aid in determining whether the elevated values can be attributed to natural geochemical processes. It is important to note that the total dissolved solid (TDS) values recorded in the GIS database for these wells do not preclude this groundwater from being considered a potential source of drinking water.

CH2M-Jones Response:

Per a recent teleconference with the reviewer, it was agreed that CH2M-Jones would provide a summary of the information discussed in the previously submitted memorandum regarding natural geochemical processes involving iron reduction as the most plausible reason for the arsenic observed at elevated concentrations in both background and site wells at the CNC. This material will be provided in a format that can be included as an appendix to the RFI report addenda or similar reports, for which arsenic does not appear to be present in the groundwater due to releases from the SWMU or AOC.

Arsenic in groundwater at concentrations above the MCL of 50 µg/L is a sitewide background issue at the CNC and should be addressed within a context that recognizes the occurrence of arsenic in background wells at concentrations above the MCL. Given arsenic's occurrence in CNC background wells, we believe that developing a sitewide decision-making approach that recognizes the sitewide presence of arsenic in background wells would be appropriate. Decisions regarding arsenic in groundwater need to be made at several sites soon and should be made within a decision-making framework that addresses arsenic as a background issue and in a manner such that site-specific decisions are made efficiently and on a consistent basis.

An analogy to the arsenic in groundwater issue can be made to the issue of PAHs/BEQs in soil at the CNC. Because of the frequent occurrence of BEQs above residential and industrial RBCs in soil samples in both background (grid) soil and site soil samples, the BCT spent considerable effort to create a sitewide decision-making framework that acknowledged the presence of BEQs in background samples and allowed site-by-site decisions regarding BEQs in soil to be made quickly, effectively, and uniformly, while maintaining compatibility with applicable risk management issues. BEQs in soils at specific sites are still evaluated on a site-by-site basis, but the sitewide decision-making agreements that recognize BEQs as a background contaminant have greatly expedited the site-by-site decision process.

We suggest that a similar sitewide decision-making approach for arsenic in groundwater would be helpful to the project. Such a decision-making approach could be included in a brief team memorandum that could be added to the CNC Project Team Notebook and Instructions. The memorandum could provide an opinion, based on the overall weight of evidence, as to why arsenic occurs in background wells at elevated concentrations and outline key issues to assess at a specific site in order to assess whether data indicate that arsenic should be

considered a COC or not. Issues that could be assessed at each site include whether any elevated arsenic in soil has been identified, whether arsenic values consistently exceed the MCL, and whether the iron concentrations are indicative of iron-reducing conditions at the site.

5. In Section 6.3 the RFI Report Addendum states that there "are no data suggesting that there was an impact to the sanitary sewers from this site." However, according to the facility's geographic information system (GIS) database, elevated concentrations of metals were reported at a number of direct push technology (DPT) locations along the sanitary sewer in the vicinity of AOC 550. For example, DPT 037GP074E1 is located at the southeast corner of the northern AOC 550. At this location, the GIS reports arsenic at 216.0 µg/L, chromium at 226.0 µg/L, lead at 379.0 µg/L, thallium at 12.8 µg/L and zinc at 5,600 µg/L. Moreover, according to the GIS, lead was detected in DPT locations 037GP067E1, 037GP073E1, and 037GP075E1 in concentrations above the action level of 15 µg/L.

   While the groundwater data collected from shallow permanent monitoring wells EGDEGW022 and E550GW001 do not indicate an adverse impact of these metals, neither of these wells is appropriately located to monitor groundwater quality at the southeast corner of the northern AOC 550. According to groundwater flow, the existing monitoring wells are sidegradient to this area of AOC 550. Based on available data, the Division of Hydrogeology concludes that groundwater quality has not been adequately delineated in this area of the Base. A permanent monitoring well in this vicinity is necessary in order to verify groundwater quality downgradient of the southern portion of the northern AOC 550 (see attached GIS figure). The Navy must propose to install a minimum of one additional permanent monitoring well to monitor groundwater quality at AOC 550.

CH2M-Jones Response:

As discussed recently in a response to a similar comment on AOC 528, the unfiltered groundwater samples collected as part of the Zone L investigation using Geoprobes are significantly compromised and the metals results are rendered invalid by the presence of significant levels of turbidity. Consequently, the metals concentrations reported for these samples are not representative of actual groundwater quality.

Turbidity levels encountered in the DPT groundwater samples mentioned above were as follows:

DPT Sample	Turbidity (NTU)
037GP074E1	616
037GP067E1	777
037GP073E1	458
037GP075E1	101

These turbidity levels greatly exceed the recommended levels of no greater than 10 NTU (EPA, 2002) and cannot be considered representative of actual groundwater quality.

Consequently, these samples and associated metals concentrations are not appropriate for comparison to MCLs or other regulatory criteria.

In conclusion, the Navy should:

- Propose to install an additional monitoring well at the southern sector of the northern AOC 550.
- Analyze the groundwater samples from the newly installed well(s) for the full suite of RFI parameters.
- Include this additional groundwater data in a revised RFI Addendum.
- Revised the RFI Addendum Report to also address the concerns outlined above.

CH2M-Jones Response:

We disagree with the need for an additional well at this location. The only groundwater data of adequate quality for decision-making (from the permanent monitoring wells) do not indicate that significant contamination is present.

We will revise the RFI Report Addendum as appropriate to address the detected organic chemicals in groundwater and status of the monitoring wells as discussed above.