LETTER REGARDING U S EPA REGION IV REVIEW COMMENTS ON REMEDIAL INVESTIGATION FEASIBILITY STUDY WORK PLAN FOR OPERABLE UNIT 4 (OU 4) NTC ORLANDO FL

12/8/1998

U S EPA REGION IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
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4WD-FFB

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SUBJ: Comments on Remedial Investigation Report for OU4, Study Areas 12, 13 and 14 (Area C), and Feasibility Study, Technical Memorandum No.1, Operable Unit 4, , Naval Training Center, Orlando, Florida.

The United States Environmental Protection Agency (EPA) has completed the review of the Remedial Investigation Report for OU4, Study Areas 12, 13 and 14 (Area C), and the Feasibility Study, Technical Memorandum No.1, Operable Unit 4, Naval Training Center, Orlando, Florida. EPA's comments on the subject reports are enclosed.

If you have any questions regarding these comments, please call me at (404) 562-8536.

Sincerely,

Nancy Rodriguez
Remedial Project Manager

cc: Dave Grabka, FDEP
Lt. Gary Whipple, NTC Orlando
Rick Allen, HLA
Barbara Nwokike, SouthDiv
Bob Cohose, BECHTEL

Two issues of concern are the source and extent of PAH contamination in soils and the source and extent of the antimony plume in groundwater. Antimony trends over time have not been presented. The antimony plume is said to be stable (not expanding), but no supporting data is presented. Some comments which follow address these issues.

2. A range of hydraulic conductivity values are reported in the RI. The values from the 18 hour pumping test (RI, p.2-18) agree closely with the values determined by the USGS (p.2-26). However, the Kh values reported from the slug tests (RI, p.3-27) are an order of magnitude lower than the pumping test Kh. The lower hydraulic conductivity values from the slug tests were used in calculations presented in the RI.

   The recovery from most of the slug tests was complete in less than 3 minutes (Appendix I), therefore, the results from the longer pumping test probably are more representative of the conditions in the aquifer away from the well screens and gravel packs. USEPA Guidelines for MNA (1998, p. 30) state "The investigator should use the highest valid hydraulic conductivity measured at the site during the preliminary screening because solute plumes tend to follow the path of least resistance (i.e., highest hydraulic conductivity). This will give the "worst-case" estimate of the solute migration distance over a given period of time. Compare this "worst-case" estimate with the rate of plume migration determined from site characterization data." The same language was present in earlier versions of the guidance document. Groundwater travel times should be estimated with a hydraulic conductivity closer to that observed during the pumping test.

   The problem appears to have been resolved in the TS, which uses USGS hydraulic conductivity values.

3. The RI (p.2-8) states a "production well" was located north of Area C in what is now a condo complex. Also an abandoned production well is shown on RI Figure 2-1 less than 100 feet from Building 1100 and a 500 ft deep drainage well is shown near shore of Lake Druid approximately 600 ft SW of Building 1100. After stating that the wells exist in Section 2, the wells are not addressed further in the report. No operational history, construction details or estimates of capture zone size are provided. The current status of the well screens is not described.

   If these wells remain open or are in use, they may be pathways to deeper aquifers. Groundwater flow paths and contaminant distributions under the influence of pumping or drainage wells may be different observed under current conditions.

Were the two production wells screened above or below the uppermost Hawthorn Group clay? The 500 foot deep drainage well must have been open deep into the Avon Park Limestone of the Floridan Aquifer (RI Figure 3-3). Using the groundwater velocity estimates from page 3-29, which range up to 115 ft/year and are not "worst-case" estimates, if groundwater from the vicinity of Building 1100 was within the capture zone of one of these wells, contamination may have entered the wells. Did contamination flow toward the production wells or the drainage well? Did the drainage well contaminate the Floridan Aquifer? Construction details and the operation history of these wells should be provided and used to evaluate the potential for contamination in deeper aquifers.

4. The RI (p.5-7) states that PAHs were detected in surface soil at concentrations greater than the relevant SCGs, but goes on to say that these are not considered to be site related. One detect at an up gradient location (U4S00901) is dismissed in the text as being due contaminated runoff in a drainage area. However, two other notable occurrences, U4S00601 and U4S01501 (RI Figure 5-2), with exceedances greater than at U4S00901, are not addressed in Section 5. How did contamination which is not site related get so far into the property?

   The RI (p.5-7) notes that "... many surface soil samples collected throughout SA 14 (much of which is paved) did not contain PAHs above SCGs." If many of the samples did not contain PAHs, the relatively high concentrations detected at U4S00601 and U4S01501 would seem to deserve additional evaluation and possibly additional sampling in the areas. Note that subsurface soil samples were not collected in the vicinity of U4S00601 and U4S01501 (RI Figure 5-4), and the nearest surface soil sample is at least 90 feet away from either location (RI Figure 5-2). Therefore, the source and extent of PAH contamination in soils have not been defined. Please include text evaluating these locations for previous activity which would explain the presence of PAHs and please evaluate the need for additional sampling to define the extent of PAH contamination.

5. Numerous inorganic analytes, particularly metals, were detected at concentrations above applicable standards in 37/75 unfiltered groundwater samples (RI, p.5-20). Region 4 Standard Operating Procedure (USEPA, 1996, Section 7.2.1) states a turbidity of less than 10 NTU is the "...goal for most groundwater sampling objectives ... ". The monitoring well development records (RI Appendix G) show that the turbidity at the end of development was often much greater than the goal of 10 NTU. The Groundwater Sampling Logs (RI Appendix H) show that the turbidity at the end of the purging period often was greater than 10 NTU. The records in RI Appendix H show that purge time typically was 45 minutes to 1 hour.

As noted in the RI (p. 5-21), samples with high turbidity sometimes result in apparently high metals concentrations. It appears that some wells have not been fully developed and are likely to continue to produce samples with high turbidity if the same sampling procedures are implemented during the next sample event. EPA Region 4 policy is to use unfiltered sample results only for risk assessment and determining the extent of contamination. The available data suggest that there are numerous exceedances of inorganic constituents in groundwater at this site, but the turbidity of the samples makes the results suspect. Therefore, the extent of metals contamination in groundwater has not been defined.

HLAt should consider revising their sampling protocol to collect samples for metals analysis only after the turbidity meets the specifications of the Region 4 Standard Operating Procedure. A goal for the next groundwater sampling event should be to collect samples with turbidity levels suitable for definition of the extent of metals contamination in groundwater. It may be necessary to re-develop the wells or increase purging time until samples of suitably low turbidity can be collected.

6. Two different buildings are identified as Building 1066 on RI Figure 2-1.

7. Antimony was detected in groundwater at concentrations greater than applicable standards in unfiltered samples from 4 locations (RI, p.5-21) and in 4/7 filtered samples (RI, p.5-22). In the Executive Summary (page v), antimony is said not to have migrated in the last 3 years, but no supporting data or graphs showing antimony concentrations versus time are presented in Section 5 (Nature and Extent of Contamination). The stability of the plume has not been demonstrated.

8. An "isolated occurrence" of antimony in groundwater is described in the RI (p. 7-1), but a source is not identified. The interpretation of the antimony data presented in the report is that the distribution of antimony "... appears to be more dispersed and probably not plume shaped, but possibly the result of a non-point release or a natural occurrence" (RI, p.5-24). However, the antimony is not widely or randomly distributed through the area as would be expected from a natural occurrence or non-point release. Instead, RI Figure 5-13 shows that the distribution of antimony in groundwater can be contoured and is centered near Building 1066 and 1068. No explanation for the source of antimony is presented (RI, p.5-34). The history of Building 1066 and 1068 are not included in the descriptions of Area Background and Conditions (RI, p.2-4 through 2-9).

The history of Building 1066, Building 1068 and the vicinity should be examined and included in the report. Antimony concentrations in groundwater should be plotted versus time since the first observation in March, 1993 to demonstrate that the antimony plume is not expanding and support the statements that it is not migrating toward Lake Druid.

Vertical hydraulic gradients in the vicinity of the antimony plume are not apparent on RI Figure 3-9 or RI Table 3-2. From the concept model (RI Figure 2-5) and RI Figure 3-10, the dominant hydraulic gradient in Area 14 is inferred to be downward. Please evaluate whether the down gradient wells in Area 13, cited as evidence that the antimony plume is not migrating toward Lake Druid (RI p. 7-12), are screened at a level which will intercept flow from Area 14. It may be necessary to draw a flow net for this demonstration.

9. The text in RI Section 7 does not clearly distinguish between movement of contaminant dissolved in groundwater and the movement of contaminant as a DNAPL. The TerraProbe investigation (RI, p.2-20) found some VOC concentrations in groundwater were approximately 20 percent of the solubility limit for PCE, which is strongly suggestive of NAPL presence. The text also states that a residual source for PCE probably has migrated downward in the aquifer beneath the source area and has become immobile (RI, p.7-4). However, the next paragraph on RI page 7-4 states that while some downward movement may occur near recharge areas, the short distance to the lake, and the strong upward gradient to the surface water discharge area most likely limits the further vertical downward spread causing contaminants to converge along streamlines of flow into the lake. It is not clear if the paragraph is referring to dissolved contamination or DNAPL.

Dissolved contamination probably does move toward the natural discharge area, but there is no conclusive evidence eliminating the possibility of downward migration of a DNAPL source. There is no evidence that a DNAPL source, if it exists, will move upward to this discharge area. The high concentrations relative to the solubility of PCE indicate that a DNAPL source probably exists beneath Building 1100 and DNAPL contamination is likely to downward until it reaches a layer of low permeability, possibly the top of the Hawthorn Formation. Additional characterization of the source area probably will be necessary when a source control measure is evaluated.

10. Retardation factors and contaminant specific travel times between the source area and the discharge area are not presented in the RI Section 7, Fate and Transport of Contaminants. Contaminant travel times are required to evaluate the validity of statements such as "The down gradient extent of the PCE plume is generally limited by this degradation" of PCE to TCE (RI, p.5-34). Contaminant specific degradation rates have not been presented in Section 7. These hydraulic characteristics are included in the TS. Normally they are presented in the RI as part of the site characterization.

11. RI Figures L-2 and L-5 show PCE and TCE concentrations above and below a horizon selected at an elevation of 85 ft above MSL. The RI text states that as groundwater moves down gradient, "The down gradient extent of the PCE plume is generally limited by this degradation" of PCE to TCE (RI, p.5-34). However, RI Figures L3 and L5 indicate that the down gradient extent of the groundwater plume is limited by discharge to Lake Druid rather than by degradation processes. Contaminant mass may be flushing from the groundwater flow system into the lake rather than being destroyed by degradation processes. Retardation factors, contaminant specific travel times and degradation rates are required to evaluate the fate of contamination at this site.

    Some of this is addressed in the TS, however, some anomalies remain in the evaluation of MNA. Vinyl chloride detects are relatively rare in the down gradient portions of the plume. The dissolved oxygen levels in this area are low, so vinyl chloride should be persistent, yet "Ethene is present in almost all groundwater samples collected" (TS p. 3-2). Ethene is a product of reductive dechlorination of vinyl chloride, so it appears that a step in the process is being missed. Our understanding of MNA processes at this site remains incomplete. This is addressed further in the next comment.

12. The seasonal variability of contaminant concentrations and concentration trends with time have not been presented in either the RI or TS. The AFCEE guidelines for MNA, the now superceded Region 4 Guidelines on MNA, and the newest USEPA (1998) MNA guidelines all stress that an evaluation of MNA should be rely on multiple lines of evidence. Model results and calculations must be supported by field observations. The TS (p. 3-2) notes that several of the wells have been resampled since the December, 1997 event which was the basis for the conclusions in the TS, but these data are not presented. These data should be evaluated to resolve anomalies in the MNA process at this site, to define seasonal variations in site conditions and define degradation rates based on field observations. This is particularly important because the potential for successful MNA after the implementation of source control measures may be limited because carbon sources (TOC) in the aquifer may be depleted (TS, p.3-9).

13. If monitored natural attenuation is to be considered as a potential remedial measure, a plan to monitor the process of natural attenuation should be implemented as soon as possible. The guidelines for a monitoring plan to demonstrate the effectiveness of monitored natural attenuation, including lists of parameters to be measured in the field and laboratory, and the recommended frequency of sample events, are included in the EPA Monitored Natural Attenuation Protocol (USEPA, 1998, p. 44 & p. 52). Typically, sample events should be conducted quarterly for the first year of a MNA evaluation to determine seasonal changes in groundwater flow direction, hydraulic gradient, water table elevation, MNA indicators and

contaminant migration. Quarterly sampling should be maintained for at least one year, after which an evaluation of the observed variations in water level and water quality should be performed, and the appropriate interval for subsequent sample events should be determined. Methods for interpreting these data are provided in the references cited. If all wells are not to be sampled during these quarterly events, EPA would like to review the list of wells selected and see reasons for their selection.

14. HLA should follow the EPA Protocol for the evaluation of MNA (USEPA, 1998) to the extent possible. All depth to water measurements, well drilling procedures, sample collection procedures, sample analysis methods, etc, shall be performed in a manner consistent with the specifications in the EPA Region 4 Standard Operating Procedure (SOP, USEPA, 1996). Data collected during the investigation should be stored and reported to EPA in a digital format, in addition to any data presented in tables and figures included in the final report. A generic digital data format is presented in Table 1 of this letter. The format is intended to facilitate data transfer with as little transcription from paper records as possible, and therefore is negotiable on a project by project basis. Please contact Dave Jenkins (404-562-8462, jenkins.dave@epamail.epa.gov) at EPA Region 4 with questions or suggestions regarding the recommended data exchange format.

References

McAllister and C.Y. Chiang, 1994, A Practical Approach to Evaluating Natural Attenuation of Contaminants in Groundwater, Ground Water Monitoring and Remediation, Spring, 1994, pp. 161-173.

USEPA, 1996, Region 4, Science and Ecosystem Support Division, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May 1996. http://www.epa.gov/region04/sesd/eib/eisopqam.html

Wiedemeier, T.H., M.A. Swanson, D.E. Moutoux, E.K. Gordon, J.T. Wilson, B.H. Wilson, D.H. Kampbell, P.E. Haas, R.N. Miller, J.E. Hansen, F.H. Chapelle, 1998, TECHNICAL PROTOCOL FOR EVALUATING NATURAL ATTENUATION OF CHLORINATED SOLVENTS IN GROUND WATER, USEPA Office of Research and Development, Washington DC 20460, EPA/600/R-98/128, September 1998 http://www.epa.gov/ada/reports.html

REMEDIAL INVESTIGATION REPORT OU4 AND FEASIBILITY STUDY, TECHNICAL MEMORANDUM NO. 1, OU4 NAVAL TRAINING CENTER ORLANDO

Table 1. Recommended Generic Formats for Digital Data Exchange EPA Region 4.

Four types of data should be stored in a digital format:

1. Depth to water in monitoring wells,
2. Location of monitoring wells (X-Y Coordinates),
3. Construction of monitoring wells,
4. Field and laboratory analysis results.

DEPTH TO WATER DATA

The depth to water data should include all measurements ever made in any of the area wells which are available to the consultants. These can be submitted in any of the following formats, listed in order of preference:

1. (Most Desirable) A file created by a common database program containing fields for:
   - UNIQUE WELL NAME
   - DATE OF MEASUREMENT
   - TIME OF MEASUREMENT
   - DEPTH TO WATER
   - COMMENTS
2. (Almost as desirable) A common spreadsheet program containing columns for:
   - UNIQUE WELL NAME
   - DATE OF MEASUREMENT
   - TIME OF MEASUREMENT
   - DEPTH TO WATER
   - COMMENTS

WELL CONSTRUCTION DATA AND WELL LOCATION DATA

The data necessary include:

Boring Name or Number		if not same as Well Name or Number
Well Name or Number		Same unique name as for depth to water measurements
Date Drilled		
Date Abandoned		defines valid range of well data
Depth to Screen Top	ft	
Screen Length	ft	
Total Depth	ft	may be different from screen bottom

Ground Elev.	ft msl	
Reference Elev1	ft msl	Top PVC or measuring point elevation
Reference Elev Change Date		Date of elevation resurvey
Reference Elev2	ft msl	New measuring point elevation
X Coordinate		Easting
Y Coordinate		Northing
Screen Slot Size	mm	
Mean Grain Size	mm	in screened interval
Comments		TEXT

It would be best if the data were in a dBASE type file or spreadsheet in the format shown, but these data are only entered only once for each sample location, so the construction data could be entered manually from paper copies of the well construction records.

FIELD ANALYTICAL DATA AND LABORATORY ANALYTICAL DATA

The analytical data could be better utilized if it were available in a dBASE type file. This usually is a little more difficult than for water level or well construction data. The format requirements are somewhat flexible because some data conversion always is necessary. An ideal minimum analytical data format for EPA use would resemble the following:

Laboratory #	Lab Sample ID number
Sample Name	Common location or well name
Date	Sample Collection Date
Time	Sample Collection Time
Sample ID	Sample ID from Chain of Custody
Matrix	Water (W), Soil (S) or other as defined
Analyte	Chemical or compound name
Units	Analysis units
Concentration	as text or “<“ detection limit for non-detects
Qualifiers	Analysis Qualifiers & Flags
Method	Method Description or Number
Top	Soil Sample Interval Top
Bottom	Soil Sample Interval Bottom