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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303-3104

May 12,1997

4WD-FFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Katherine Landman
Department of the Navy - Atlantic Division
Naval Facilities Engineering Command
Code 1823
Norfolk, Virginia 23511-6287

SUBJ: MCB Camp Lejeune
Draft Feasibility Study
Draft Groundwater Modeling Report
Operable Unit No.9-Site 73

Dear Ms. Landman:

The Environmental Protection Agency has completed its review of the above subject document. Comments are enclosed.

If you have any questions or comments, please call me at (404) 562-8538

Sincerely,

Gena D. Townsend
Senior Project Manager

Enclosure

cc: David Lown, NCDEHNR
Neal Paul, MCB Camp Lejeune

1.0 GENERAL COMMENTS - GROUNDWATER MODELING

1. Figure 4-1 depicts isoconcentration lines for TCE and degradation products in the surficial aquifer. However, it appears that the isoconcentration lines are based on limited monitoring well points. For example, there is no monitoring well point for TCE in the north or northeast section of Figure 4-1. Additional monitoring wells maybe required to clearly define all the plumes points of migration and specify if contaminants exists at MW17.

2. Figures 4-1 and 4-2 present TCE and degradation products (DCE and VC) in groundwater and TCE degradation over distance, respectively. However, the DCE plume on Figure 4-1 appears to have deficiency because the point at A47 3-8 where DCE was detected higher than VC (see Figure 4-2) is not included in the DCE plume. In addition, Figure 4-2 shows the distance between Wells 73-MW27 and 73MW13 as 200 feet, but that distance at Figure 4-1 is 500 feet. The deficiency and discrepancy of these figures should be resolved accordingly. The comment also applies to the same issue in Figure 5-1.

3. Figure 4-2 presents a graph of TCE degradation over distance in surficial groundwater. However, since there are only three samples collected, it is inappropriate to connect these points by straight lines which try to show the trend of degradation vs. distance. Such a trend cannot be representative if there are not enough supporting data. The figure should be revised. This comment also applies to the conclusion in Section 4.3 (see Page 4-3, Paragraph 2). Therefore, the text in Section 4.3 should be revised accordingly.

2.0 SPECIFIC COMMENTS

1. **Section 3, Page 3-1, Paragraph 4, Sentence 1.**
The text alludes to permeability being synonymous with hydraulic conductivity. However, permeability and hydraulic conductivity are two totally separate entities. The text should be corrected accordingly.

2. **Section 3.1, Page 3-2, Paragraph 5, Bullet 2.**
Section 3.1 discusses site data collection and review for the modeling effort. However, it does not mention the review of hydraulic conductivity of the site. The hydraulic conductivity should have been reviewed prior to the modeling because it is such an integral part when discussing groundwater movement. The text should explain why the hydraulic conductivity was not reviewed or discussed.

3. **Figure 3-1.**
Figure 3-1 shows the entire finite difference grid - Site 73 modeled areas. However, the scale shown on the figure of 1 inch - 2000.00 is incomplete. Units should also be added to 2000.00. This comment also applies to Figure 3-2.

4. **Figure 3-4**.
Figure 3-4 is an Aquifer Property Distribution Map. However, the different elevations and Hyd. cond on the legend are lacking relevant units. Also, figures are missing the north arrow. The figure should be revised accordingly. This comment also applies to Figures 3-5, 3-7, 3-11, 3-16 and 3-21.

5. **Figure 3-15**.
Figure 3-15 shows residual vs. observed layer 3. However, the units for the data are missing. The figure should be corrected accordingly.

6. **Figure 3-22**.
Figure 3-22 is a sensitivity analysis effects of Recharge. However, "RM" used in the legend is not in the acronym list. 'RM' should be added to the acronym list.

7. **Figure 3-28**.
Figure 3-28 is a sensitivity analysis. However, the meaning of "C-drn" and "C-RIV" is not in the acronym list. The meaning of the aforementioned should be included in the acronym list.

8. **Section 4.2, Page 4-2, Paragraph 1, Sentence 4**.
The text states that the groundwater concentration of a given contaminant may equal the highest of the three values (No. 1 to No. 3). However, the text describes the No. 3 value as "the lowest of the following three values". The statement and wording are confusing. The text should be revised to give a clear statement.

9. **Figure 4-1**.
Figure 4-1 shows TCE and degradation products in surficial unit groundwater site 73. However, benzene which is shown as a contaminant on the figure is not included in the title of the figure. As such, benzene can be misinterpreted as being a degradation product of TCE. The title of the figure should be revised accordingly.

10. **Figure 5-1**.
Figure 5-1 shows the VOCs exceeding Groundwater Quality Standards at Site 73. However, the boundaries of Site 73 are not clearly defined. The boundaries of Site 73 should be clearly defined on the figure.

1.0 GENERAL COMMENTS - Feasibility Study

1. Table 4-2 shows that the processes of neutralization, precipitation, filtration, flocculation and sedimentation are retained because they are potentially applicable as pretreatment technologies. However, according to the description of these processes in the table, the processes are effective in removal of suspended solids and particulates. Since suspended solids and particulates are not a concern for this remediation, the rationale for retaining these processes is unclear. It should be noted that normally these processes are effective for the treatment of water which has high concentrations of suspended solids and particulates. The text should present a rationale for retaining the processes discussed above.

2. Section 5.1.2, Page 5-2, Paragraph 2, Sentence 7, Bullet 1, states that trichloroethene (TCE) and the daughter product of TCE degradation (CIS-1,2, - DCE and vinyl chloride) have been detected. Since natural attenuation will result in the production of daughter products that are also very hazardous, this alternative should not be considered if the contaminants produced will be above the respective RBCs. The rationale for considering this alternative in the developmental stage of the Remedial Action Alternatives should be given.

3. Figure 5-3 shows a process flow diagram of the groundwater extraction and treatment. However, this flow diagram does not present adequate technical data and information such as estimated mass balance, equipment capacity and size. In addition, it is important to know the amount of sludge that will be generated during the treatment. Figure 5-3 should be modified to present the required technical data and information. A discussion regarding the amount of sludge and the application of the sludge handling equipment should be presented in this document.

2.0 SPECIFIC COMMENTS

1. **Executive Summary, Pages ES-6 and ES-7.**
The text addresses the remedial actions RAA 4D and RAA 5D showing that RAA 4D has a higher O&M cost than that of RAA 5D. However, the rationale for the difference in cost is unclear, since RAA 4D installs three wells and RAA5D installs eleven wells in the same portion of the same aquifer. The text should provide an explanation regarding the higher O&M cost of RAA 4D.

2. **Section 3.3.3, Page 3-5, Paragraph 8.**
The text discusses site-specific risk-based RGOs and indicates that concentrations were calculated to correspond to an HI of 1.0, 0.1, and 0.01 for noncarcinogenic effects. However, HI of 1.0, 0.1 and 0.01 should be corrected to HQ

of 0.1, 1, and 3 according to the Region 4 guidance (EPA, 1995). The text should be revised accordingly.

This comment also applies to the same issue in Tables 3-8 and 3-9.

3. **Section 5.1.2, Page 5-2, Paragraph 2, Sentence 6.**
The text states that technical literature in Section 8.0 indicates that both fuel and chlorinated solvent contamination can undergo natural attenuation. However, the text does not specify this technical literature. Since Section 8.0 is a list of references, unspecified literature cannot be verified. The text should specify the technical literature accordingly.

This comment also applies to the same issue in Section 5.2.2 (RAA 2D, page 5-6).

4. **Section 5.1.5, Page 5-5, Paragraph 4.**
The text discusses the installation of seven extraction wells at pumping rates of 0.25 to 2 gpm and a treatment plant capacity of 11.5 gpm. However, if all seven wells were to operate simultaneously at maximum pumping rates, the treatment plant capacity of 11.5 gpm will be exceeded. This potential problem should be corrected, and the text should be revised accordingly.

1.0 GENERAL COMMENT - Feasiblity Study (Risk Assessment)

NOTE: this site is currently active and will remain active for the foreseeable future, it is impossible for any ecological risk assessment to document risk at the site because the ecology at the site is continuing to be impacted by site operations. A new ecological risk assessment should be performed after the site operations are discontinued.

1. Deficiencies found in the ERA include inappropriate selection of assessment and measurement endpoints,(the terminology is incorrectly applied) and failure to consider the groundwater as potential pathway of exposure to ecological receptors, and conflicting summation of ecological risk at the site.

For example:
•The first measurement endpoint is an assessment endpoint.
•The previous review of the ERA found that the risk conclusions in Section 8 are inconsistent with the risk conclusions Section 7. Specifically, the conclusion in Section 8 of the ERA states that "there appears to be no surface or subsurface soil contamination that presents a significant human health or ecological risk". However, the conclusion in Section 7.12 of the ERA states that "conditions at Site 73 potentially may adversely impact the aquatic and terrestrial ecosystem at the site". The major difference between the two conclusions appears to be the use of the word "significant". As mentioned in the comments on

the ERA, the methodology used to determine "significant" is based solely on risk management decision criteria.

2.0 SPECIFIC COMMENTS

1. **Section 3.1, Page 3-1, Paragraph 3, Sentence 1**.
The text indicates that frequency of detection was used as one of the criteria in COPC selection. However, Region IV does not allow the frequency of detection to be used as the criteria in COPC selection. Therefore, the text should be revised accordingly.

2. **Section 3.3.3, Page 3-5, Paragraph 8**.
The text discusses site-specific risk-based RGOs and indicates that concentrations were calculated to correspond to an HI of 1.0, 0.1, and 0.01 for noncarcinogenic effects. However, the HI of 1.0, 0.1, and 0.01 should be corrected to HQ of 0.1, 1, and 3 according to the Region 4 guidance (EPA, 1995). The text should be revised accordingly.

   This comment also applies to the same issue in Tables 3-8 and 3-9.