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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

JAN 27 1992

4WD-FFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Ms. Laurie A. Boucher, P.E.
Remedial Project Manager
Department of the Navy - Atlantic Division
Naval Facilities Engineering Command
Code 1822
Norfolk, Virginia 23511-6287

RE: MCB Camp Lejeune NPL Site
Camp Lejeune, North Carolina

Dear Ms. Boucher:

EPA has reviewed the "Interim Action ROD, the Draft Focused Feasibility Study, and the Draft Remedial Investigation/Baseline Risk Assessment for the shallow aquifer at the Hadnot Point Industrial Area Operable Unit of the subject site. Enclosed are the comments resulting from our review. In addition, I have enclosed a revision of the text of the Interim Action Proposed Plan as an appendix to this letter for your review. This revision has been reviewed by EPA Headquarters and found to be acceptable. Changes to the document are underlined.

If you have any questions concerning these matters, please call me at (404) 347-3016.

Sincerely,

Michelle M. Glenn

Michelle M. Glenn
Senior Project Manager

Enclosures

cc: Jack Butler, NCDEHNR
George Radford, MCB Camp Lejeune

EPA Comments on the Interim Action
Proposed Plan for The Shallow Aquifer
Hadnot Point Industrial Area
Marine Corps Base
Camp Lejeune, North Carolina

GENERAL COMMENTS

1. The majority of EPA's comments have been included as an Appendix to this letter.

2. The expected air emissions from this proposed treatment were not addressed in the evaluation. EPA recommends a thorough air pathway analysis to evaluate the impact of TCE and benzene emissions in the ambient air. Air pollution control will be necessary if calculated concentrations of the contaminants exceed acceptable ambient concentrations found in the State of North Carolina Air Toxics Regulations.

3. EPA concurs with the Navy that remedial action is needed at the Hadnot Point Industrial Area (HPIA). The pump and treat system proposed will suffice in creating a hydrologic barrier to prevent the contaminated plume in the shallow aquifer from migrating further. However, for the final remediation at the site it will be necessary for soil excavation and/or remediation of some type to occur. Without soil remediation, the pump and treat system may have to be implemented for an indefinite, extensive period of time and may be ineffective in actually remediating the site. This may prove to be more costly than addressing the source problem early in the remediation stage.

4. Any alternative which results in a discharge to the Sewage Treatment Plant should address possible pre-treatment standards for applicability. Any alternative which results in the discharge of wastewater to a surface water feature, drainage ditch, etc. should address the necessity of obtaining a wastewater discharge permit.

SPECIFIC COMMENTS

1. Figure 2 in the Proposed Plan does not have a scale. Please provide a scale for the figure.

2. Page 6, 2nd Paragraph - The phrase "by ESE" is repeated twice in a phrase in the first sentence.

3. Page 17 - A primary contact with MCB CLEJ or DON should be identified. Other contacts could be listed as additional sources of information.

4. Page 18 - The mailing list should be maintained by MCB CLEJ, not EPA.

EPA Comments on the Interim Action
Remedial Investigation for The Shallow Aquifer
Hadnot Point Industrial Area
Marine Corps Base
Camp Lejeune, North Carolina

GENERAL COMMENTS

1. The Draft Interim Action Remedial Investigation Report indicates that enough preliminary data has been collected to begin implementation of the proposed interim remedial action. However, the following data gaps must be addressed as part of this plan or as part of the plan for reaching a final Record of Decision for the shallow aquifer.

Some examples are:

studies must be conducted on surface water and sediment in the area.

detailed hydrologic/hydraulic tests must be performed on the deeper underlying aquifer(s) at the site.

a background well should be installed so that a water quality baseline may be established that is truly representative of background water quality at the HPIA.

if the proposed alternative does not meet the required objectives, it will be necessary to collect more data to determine what final remedial action should be implemented.

the cleanup criteria to be used to evaluate "success" for those chemicals not included in published or promulgated standards.

the disposition of the benzene plume identified in the shallow aquifer in the area of the tank farm.

2. The Remedial Investigation discusses source areas at the HPIA which are mostly near or at buildings. The building numbers are referred to in the text but in the figure provided, figure 2-2, the building numbers are not legible. This figure should be revised so that the building numbers can be easily read. Most of the figures that Baker Environmental, Inc. drafted do not have a map scale. These figures include figures 4-1, 4-2, 4-3, and 4-4 in the Remedial Investigation. These figures should be revised to include map scales with units.

SPECIFIC COMMENTS

1. Page ES-2, 4th paragraph - The aquifer designation and/or classification is of more significance when assessing threats than the current use.

2. Page ES-2, last paragraph - The following sentence must be deleted "...None of the metals were selected since the analyses represent unfiltered samples, which may be elevated due to suspended solids in the sample." The Risk Assessment Guidance specifically requires that unfiltered samples be used when developing exposure scenarios for potentially potable water sources. In addition, MCLs are based on unfiltered samples.

3. Page 1-1, 3rd paragraph - The guidance provided by Mr. Froede is EPA Publication 9355.3-02FS-3, dated April 1991.

4. Page 2-1, Section 2.0 - This section should state that this document is focused on the shallow aquifer within the HPIA operable unit.

5. Figure 2-2 - This is a poor reproduction.

6. Page 2-4, 2nd paragraph - The terminology and structure of the "Program" come from the National Contingency Plan. They did not come from EPA.

7. Page 2-5, Section 2.2.2.1 - Define MCLs for the reader.

8. Page 2-6 - It is not clear why Step IB-Characterization did not include performing any hydrologic/hydraulic tests on the deeper underlying aquifer(s) at the site. Please provide the rational for not conducting these tests.

9. Page 2-6 - Why were subsurface soil samples from the well borings not collected for laboratory analysis as part of the characterization process? This must be performed to determine what threat, if any, the subsurface contamination poses to the shallow aquifer. This may be more appropriately addressed in the on-going work necessary for characterization of the shallow soils and deep aquifer.

10. Page 2-6 - Why were the three rounds of groundwater samples collected during the first part of 1987 analyzed for such a small list of parameters? Please provide clarification in the text.

11. Page 2-7 - Have wells HPGW-18 and HPGW-17-3 since been located in the field?

12. Page 2-7, Section 2.2.4 - My reading of this section suggests that the benzene plume in the shallow aquifer is not addressed in the interim action proposed plan. If this is true, why is not being addressed?

13. Page 2-7 - Why wasn't the benzene contaminant plume identified in the December 1988 report further delineated as part of the characterization process?

14. Page 3-1, Section 3.2 - What about federal Ambient Water Quality Criteria?

    Water quality criteria for North Carolina should be referred to as North Carolina Water Quality Standards.

15. Page 3-2, top of page - If the "soils are often wet" wouldn't this be considered a wetlands?

16. Figure 3-1 - This figure is hard to read. It appears to have been reproduced too often. Also, some information as to depth and/or relevance to the site would make the figure much more helpful.

17. Figure 3-4 - This map is "busy" and difficult to read. An attempt should be made to provide a better map.

18. Page 4-6 - EPA agrees that surface water and sediment samples should be collected to determine if these media have been contaminated by site activities. This should be proposed either as part of the ongoing characterization studies for the shallow soils/deep aquifer or as part of the additional work that will be necessary to reach a final Record of Decision on the shallow aquifer.

19. Page 4-6, Section 4.4, last paragraph - These are not typical CLP protocols for metals analysis. Please delete this discussion.

20. Page 4-7, top of page - Please delete the last sentence of this paragraph.

21. Page 4-7 - "Accuracy of the ESE summary tables must be assumed, as raw analytical data supplied by the laboratory was not provided". Has this situation since been corrected - the raw data package should have been submitted for review to determine if the summary tables were valid.

22. Page 4-8 - Table 4-1: Well samples were collected 1/87; 3/97; 5/87 and 1/91. Why weren't samples collected for over three years (5/87 to 1/91)? (This comment also applies for Tables 4-2 through 4-16).

23. Page 4-8 - 1,2 DCA was detected in the associated blank for one sample. What procedures will be implemented to correct this QA/QC problem? Couldn't this contaminant actually be present at the site?

24. Page 4-25, 4-28 - Acetone was detected in the associated blank for one sample. What procedures will be implemented to correct this QA/QC problem?

25. Page 5-1 - "It should be noted, however, that groundwater samples were collected for unfiltered groundwater only. As a result, inadvertently high levels of inorganics contaminants may be present in the groundwater samples due to suspended particulate matter. Thus, these data may not accurately reflect (i.e., concentrations evaluated in this report may overestimate) the levels of inorganic compounds present in the shallow aquifer or the potentially associated human and/or environmental risk". The high degree of sediment in the groundwater samples could indicate well construction deficiencies such as inappropriate screen slot size or filter pack material, or that the wells were not adequately developed.

    Please note in this section that Maximum Contaminant Levels (MCLs) are based on unfiltered samples. The discussion of "unfiltered" samples is only appropriate if inordinately high levels of sediment were evident. If not, the speculation provided as to the origination of contamination is totally inappropriate.

26. Page 5-2, Table 5-1 - Methylene chloride was detected in the associated blank for one sample. What procedures will be implemented to correct this QA/QC problem?

27. Page 5-3, Table 5-2 - Acetone and 1,2-dichloroethane were detected in the associated blank for some samples. What procedures will be implemented to correct this QA/QC problem?

28. Page 5-4 - "Although certain inorganics were detected at a frequency of 100 percent (iron, manganese, barium, and lead), the samples were unfiltered and, therefore, may represent "normal" concentrations of these compounds in groundwater". This statement appears to contradict the discussion on unfiltered groundwater samples given on page 5-1. (See comment pg 5-1 above).

    Please remove the words "although" and everything after the close parentheses in the above statement.

29. Page 5-5, Section 5.2.2 - From the discussion presented here, it would appear that collection of soil classification and other physical data are necessary for the discussion of soil remediation alternatives.

30. Page 6-4, Section 6.4.1.3 - The assumption made in the first sentence is incorrect and should be deleted.

31. Page 6-7, Section 6.4.2.3 - The assumption made in the first sentence is incorrect and should be deleted.

32. Page 7-1, Section 7.0 - The last item should be revised to note contaminants in the shallow aquifer are present above acceptable regulatory concentrations. The Final Baseline Risk Assessment (to be prepared after completion of the additional studies at the site) will determine which contaminants pose potential threats to human health and the environment.

33. Appendix A - There were not boring logs for all wells noted in the text.

34. Appendix B - A footnote or key should be included in the data summary. Also the date for the Appendix J data summary should be included.

35. Appendix C - Methylene chloride was detected in the associated blank for some samples. What procedures will be implemented to correct this QA/QC problem?

Interim Remedial Action Focused Feasibility Study
November 19, 1991

GENERAL COMMENTS

1. Overall, this is a very poorly written document. The action contemplated for the shallow aquifer is "interim". This nomenclature does not imply the documents to support the decision need only be cursory. The guidance allows an action to be taken where minimal documentation exists, the action: 1) is to protect human health and the environment from an imminent threat in the short term, while a final remedial solution is being developed; or, 2) is a temporary measure to stabilize the site and/or prevent further migration or degradation. Nowhere does it state that existing information should be ignored or available information not provided. This document assumes that because the action is "interim" that the FS Guidance and the other regulatory requirements don't apply. Repeatedly, the author states, "...Interim remedial action alternatives are not required to meet ARARs...". This is absolutely not true! Requirements that are applicable or relevant and appropriate requirements (ARARs) to the limited-scope action are to be incorporated into the description of alternatives. Therefore, ARARs to be discussed include federal and state drinking water standards, NPDES standards, federal and state air quality standards, OSHA standards as well as any others found to be potential ARARs or "To be considered" (proposed MCLs, risk-specific doses, lifetime health advisories, MCLGs, and water quality criteria).

2. "Focused" refers to the fact that a particular media is being addressed, not to the fact that the remedy has been selected.

3. The entire document needs to "fleshed out" to fully discuss those parts of the Feasibility Study that can be fully addressed at this time. Clarification must be added to indicate what additional work will be needed to reach a "final" remedy at the site. Ultimately, if this alternative is retained as the final remedy, the only "new" work would be in writing those sections of the FS which can not be completed in compliance with the guidance due to current data gaps.

4. Significant data gaps are apparent in the description of the alternatives. The time to implementation of alternatives, the time to achieve the remediation of the aquifer, the total volume of water estimated to be contaminated, the volume of water to be extracted and treated by day or some other increment.

5. Remedial Action Objectives and General Response Actions should be determined in accordance with the RI/FS guidance.

6. "Institutional controls" represent an "action" and, therefore, must be discussed independently of the "no action" alternative.

7. The thirty years used to estimate costs should be explained. Is it based on estimated time to reach ARARs? Or is it used because the time would exceed 30 years and the guidance directs that 30 years be the maximum length of time when estimating long-term cost?

8. Any alternative which results in a discharge to a Sewage Treatment Plant should address the applicability of pre-treatment standards. Any alternative which results in the wastewater discharge to a waterbody or drainage pathway leading to a waterbody should address the necessity of obtaining a wastewater discharge permit. Region IV Water Quality Screening Values may provide appropriate values to evaluate the contaminant levels remaining in the wastewater discharge.

GENERAL COMMENTS ON THE PROPOSED EXTRACTION AND TREATMENT SYSTEM

1. Data provided in the Focused Feasibility Study was applied to the Well Head Protection Area (WHPA) model. This model was applied by the USEPA to determine capture zones at the site. A comparable model with similar capabilities should be used to determine appropriate recovery well configuration for optimal remediation at the site.

   The WHPA General Particle Tracking Module (GPTRAC) semi-analytical option was applied to simulate the capture zones using recovery wells in the configuration shown in figure 1. These wells are spaced 300 feet apart in the northeast-southwest direction and 300 feet apart in the northwest-southeast direction. The data set created for the model was taken from information provided in the Feasibility Study. These data applied include: transmissivity, 66 ft2/d; hydraulic gradient 0.003 ft/ft; and saturated thickness, 20 ft. The porosity of the aquifer is not discussed in the documents, but a value of 10 percent was assumed based on the lithology of the aquifer. The areal recharge rate was estimated based on the annual precipitation, evapotranspiration, and surface runoff. The estimated value used for the areal recharge rate was 7 inches/year.

   As shown in figure 1, the capture zones of the 17 recovery wells nearly cover the areas contaminated in the shallow aquifer. The capture zones depicted are for a 5 year period with each well pumping at 100 ft3/d. This model indicates that to capture all contaminated ground water in the large plume, 3 to 4 additional recovery wells should be installed along the west side of the plume (see figure 1). A maximum of 21 wells installed in this configuration should capture the contaminated plume within a 5 year period. This design is more cost effective than installing 32 wells as proposed in the Focused Feasibility Study. Alternatively, the 17 wells could be shifted to the southwest to the point that the capture zones encompass the entire plume; this alternative would not necessarily create capture of the entire plume within 5 years as would addition of 3 to 4 more wells.

The recovery well configuration appears to be successful in remediating the contaminated plume. Other recovery well configurations may be proposed that involve fewer wells with higher pumping rates. If possible the shallow aquifer and the Castle Hayne aquifer should be remediated simultaneously to prevent large differences in head between the aquifers and maintain a small vertical hydraulic gradient. This will minimize ground-water communication and subsequent contaminant migration between the aquifers.

In summary, a computer model such as WHPA should be applied to determine appropriate recovery well locations. This approach is good for designing a successful extraction system and should prove to be cost effective. Other remedial alternatives should be considered that will treat the contaminants of concern to appropriate discharge criteria.

2. The primary treatment alternatives carried through to the detailed analysis will remove the organic compounds from the ground water, the oil/water gravity separator will remove oil and grease, and the chemical reduction unit will remove chromium and lead; however, the treatment of other constituents of concern are not addressed. These constituents include antimony, beryllium and nickel. Other remedial alternatives should be considered that will treat all contaminants of concern. One potential treatment option is the ion exchange process. This process is capable of removing all metallic elements from water, and the system can be set up to remove organic compounds as well. Alternatives that reduce contamination for all compounds detected above MCLs and/or health-based concentrations should be carried through to the detailed analysis.

SPECIFIC COMMENTS

1. Page ES-1, 1st paragraph - One of the objectives of this FS is not "...to gain additional information and data during the operation of the interim remedial action so that an effective long-term remedial alternative can be developed and implemented.". The objective described in the preceding sentence would be perfect as the objective of the work plan to fill the data gaps in order to reach the final remedy.

2. Page ES-2, "Site Description" - The second paragraph should clarify that the "focused study area for this FS is the shallow aquifer in the area of the HPIA".

3. Page ES-4, "Alternative 1: No Action/Institutional Controls" - "Institutional controls" are an action.

4. Page ES-5, "Recommended Alternative" - Please delete this section. The Proposed Plan Interim Action presents the lead agency's recommended alternative. It is inappropriate for the contractor to make a recommendation in the feasibility study.

5. Page ES-6, Table ES-1 - I recommend this table be removed. This information should be explained prior to providing it to the reader in this very abbreviated format.

6. Page 1-1, Section 1.0, 4th paragraph - Item #2 should be identified as a draft document. In addition, it should be noted that all the documents are under review by EPA and the State.

7. Page 1-2, Section 1.1 - What is the reference for the items presented in the second paragraph? Chapter 4 of the RI/FS guidance provides an overview of the "major activities" involved with the "development and screening of alternatives". Please use the guidance.

8. Page 1-2, Section 1.2.1 - Please clarify that only the shallow aquifer is addressed by this document.

9. Page 1-5, Section 1.3 - Other reports pertaining to the HPIA indicate the water table was encountered at 1.5 feet during the studies conducted there. Which is accurate?

10. Page 1-9, Section 1.5.3 - Is this area included in the Interim Action? If not, why is it emphasized here? This is more information than is provided in the Draft Interim Action Remedial Investigation Report.

11. Page 1-10, Section 1.5.4 - What is the relevance of repeating a recommended alternative from a 1988 document that was never used? The paragraph should end after the sentence stating "...This FS was a preliminary study and did not follow all of the FS requirements under CERCLA." If this document is any indication, the earlier FS did not meet any of the statutory requirements under SARA either.

12. Page 1-11, Section 1.5.7 - This section must be revised or deleted. The baseline risk assessment for the shallow soils and deep aquifer is incomplete and does not really address the shallow aquifer. The reference to a baseline risk assessment must be to the assessment that addresses the shallow aquifer. The document best meeting this definition is included in the draft Interim Action Remedial Investigation. To be even more accurate, it may suffice to say that "a thorough quantitative, qualitative baseline risk assessment has not yet been performed on the contamination in the shallow aquifer; however, contaminants exceeding statutory regulations have been documented. This action is taken to restrict the further migration of contamination above regulatory levels until the information necessary to select the final action has been collected."

13. Page 1,11, Section 1.5.8 - This document was unacceptable as written. There is not enough characterization information available to evaluate alternatives. At a minimum, the sentence stating "...The recommended alternative is dependent upon EPA's decision for an acceptable risk."

    Also, what was the document a supplement to?

14. Page 1-11, Section 1.6 - The metals concentrations should be discussed in reference to the ARARs or "To be considered" criteria identified for the contaminants in the shallow aquifer. The attempt to discredit the results of metals analysis is inappropriate. MCLs are based on unfiltered samples.

15. Page 1-12, Section 1.7 - "An overall limitation to the preparation of this FS was that the raw analytical data was only available in summary table form. No raw analytical data was available for review. Therefore, the accuracy of the report-generated summary table could not be checked". Has this situation since been corrected - the raw data package should have been submitted for review to determine if the summary tables were valid.

16. Page 1-12, Section 1.7 - "Another limitation is that the groundwater samples in the previous investigation were not filtered, and therefore high concentration of basic metals associated with clays were detected in all samples. Filtered groundwater samples are needed to determine dissolved metals". Please delete this paragraph.

    Filtered samples have no use in determining risk. Maximum Contaminant Levels (MCLs) set forth in the Safe Drinking Water Act are based on <u>unfiltered</u> samples.

16. Page 1-15, Section 1.8 - Please remove the following sentence: "The recommended remedial action alternative is discussed in Section 6.0.". The contractor should not be recommending an alternative. This will be done through the proposed plan. The rest of the document should be adjusted accordingly.

17. Page 2-1, Section 2.1 - Remedial Action Objectives aimed at protecting human health and the environment should specify:

    The contaminants of concern

    Exposure routes and receptors

an acceptable contaminant level or range of levels for each exposure route

Table 4-1 (page 4-10) of the RI/FS guidance provides examples of remedial action objectives.

Item 2 in the first paragraph of this section is the objective of the additional studies necessary to reach a final Record of Decision on the shallow aquifer.

In the second paragraph, remove the following: "Often in the FS process, the cleanup criteria may be based on the results of a health-based RA."...to the end of the paragraph. A more appropriate statement might be "Until work is completed to support a final remedial decision, the remedial action objective for the shallow aquifer is to reduce contamination in the aquifer to established state and/or federal drinking water standards.

18. Page 2-3, Section 2.2.5 - Were any innovative treatment technologies considered?

19. Page 2-7, "Pumping Wells" - A statement is needed indicating this technology is retained for further evaluation.

20. Page 2-9, "Trickling Filter" - The volume of detailed information provided here is admirable, however, some of the information would be more appropriate under the detailed analysis of alternatives. For instance, the last paragraph on this page contains much of the information required when evaluating "implementability" in the detailed analysis.

21. Page 2-13, "Steam stripping" - Is this technology retained or eliminated? The discussion doesn't say.

22. Page 2-16, Section 2.3.2.6, "Surface Water" - NPDES and /or state and federal water quality criteria are ARARs for this part of the alternatives.

23. Page 2-17, "Publicly Owned Treatment Works" - The discussion here is about treatment, not discharge. The relative merits of discharging the contaminated water to a POTW should be discussed with the treatment technologies, not in a discussion of discharge alternatives.

24. Page 2-17, "Reinjection" - "The State of North Carolina does not permit reinjection as an acceptable option." Is it against the law? What is the basis for this statement? Also, why is the State's objection cited here and in Table 2-2 the screening comments state "...Subsurface characteristics unsuitable.". Which one is it?

25. Page 2-20, Table 2-2 - See the earlier comment about "POTW". Also, discharge to the POTW may be redundant when considering the on-site treatment plant, but I don't think it is impracticable.

26. Page 2-24, Table 2-4 - It is unclear to me why sedimentation was eliminated.

27. Page 3-1, Section 3.1.1 - The "no action" alternative does not include institutional controls. A "no action" and a "no action with institutional controls should be evaluated.

28. Page 3-4, top paragraph - What is the rationale for monthly sampling? What is the rate of flow in the aquifer?

29. Page 3-4, Section 3.1.2 - What is the volume of water to be treated? Can the current treatment system handle an additional 500 gallons/day?

30. Page 3-5, Figure 3-1 - The contaminated plume depicted in figure 3-1 should include well numbers 6, 8, and 18 because of the high levels lead detected in the water quality samples.

    Also, the wells identified would not provide sufficient information on plume migration.

31. Pages 3-4 through 3-6 - As stated on pages 3-4 through 3-6 of the report "...details of the extraction system (i.e. number, location, and pumping rates of the extraction wells) will be determined through a phased approach...Additional wells will be added to the system as dictated by monitoring results." The design of the extraction system appears to be a trial and error approach

which may or may not work and will likely be more expensive than necessary. A better approach to designing the extraction system is to apply a computer model that simulates the capture zones at the site. Applying such a model will allow the user to determine the most appropriate configuration of the well field to adequately remediate contaminated ground-water to the full extent of the plume. EPA recommends that at least a preliminary design effort using such techniques be conducted at this site.

32. Page 3-6, 2nd paragraph - What is the capacity of the holding tank described here? Would it be designed to hold a 24 hour flow or would it be designed with extra capacity in the event of a system shutdown? Please provide more information.

33. Page 3-6, 3rd paragraph - Why wouldn't a literature search and/or bench-scale studies be initiated prior to the expense of a pilot-scale study?

34. Page 3-6, last paragraph - Are the sanitary sewers part of a combined system? If so, what would happen to the contaminated water released to the sewer in the event of flooding or heavy seasonal rainfall? Will the integrity of the sewer lines be upgraded to prevent reinfiltration of the contaminated water?

35. Page 3-9, 1st paragraph - What is the ratio 85:1 based on? What is the current flow into the treatment plant? Out of it? How much contaminated groundwater will be added? What is the current capacity of the treatment plant and the upper discharge limit on the permit?

36. Page 3-10, 1st paragraph - What impact will the discharge have on the creek's normal flow? What is the discharge point for the creek? Will this discharge cause flooding at the discharge point or downgradient? The substantive technical requirements of an NPDES permit would have to be met and, dependent on a determination as to whether or not the remedial action is occurring wholly "on-site" the actual permit may be necessary.

    How does the author know "small" carbon systems will be used? The reader has not been given any idea as to what volume of contaminated water this dual system will treat over what time interval. How will breakthrough be determined? Will the creek be protected from inadequately treated groundwater? How?

37. Page 3-12, 2nd paragraph - Whether or not a permit will be necessary has not yet been determined. In addition, all substantive technical requirements would still have to be met.

38. Page 3-12, Section 3.1.5 - Inclusion of this alternative is somewhat alternative is somewhat awkward. It addresses a situation contemplated four years from now in an "interim" action FS. Within the next few years the additional data gathering should be complete and the final remedial decision documented in a Record of Decision for the shallow aquifer.

39. Page 3-14, 2nd paragraph - By "year 7", the final remedial action will be underway.

40. Page 3-14, Section 3.2 - The RI/FS guidance should be used in preparing this section. In addition, Table 3-2 should be revised to more closely correlate with the guidance.

42. Page 4-1, Chapter 4.0 - Table 5-1 should be included at the end of Chapter 4.0.

43. Page 4-1, "The following nine criteria..." - Item #8 should be "EPA/State" Acceptance. EPA and the State are considered support agencies since the federal facility is designated as lead.

44. Page 4-1 - The paragraph beginning "...Since this is a focused FS for interim action,..." is incorrect. All of the criteria that can be discussed in detail will be discussed in detail. The only items <u>not</u> discussed in detail are those which will be finalized or determined as a result of the additional work to be performed in reaching a final Record of Decision for the shallow aquifer.

    In light of the author's approach, and the comment above, it should be obvious that this entire section will require revision to meet the quality expected in an FS.

    The statement: "Interim remedial action alternatives are not required to meet ARARs." is not true and must be deleted. The last sentence is also incorrect.

45. Page 4-1, last paragraph - What is meant by this statement? This should be clarified.

46. Page 4-2 through 4-20, Section 4.1 - The detailed analysis of alternatives is inadequate. The analyses should be conducted in accordance with the RI/FS guidance.

47. Page 4-4, Table 4-1 (and subsequent cost estimates) - EPA recommends the Navy scrutinize the costs more closely for evaluation with recent expenditures. For instance, why would cost for the technicians performing the monthly sampling be $34/hour? Also, $2000 for travel and misc. expenses per month seems excessive. What kind of report costs $3,000 to produce? In Table 4-2, the costing estimates that someone would be paid $25/hour for 365 days a year to oversee what is essentially an in-place treatment system.

48. Page 5-1, Chapter 5.0 - This chapter should be retitled "Comparative Analysis" and revised to reflect the guidance. This summary does not appear to have been conducted in accordance with any guidance.

49. Page 5-2, Table 5-1 - This table should be revised to reflect the guidance and should be moved to the end of Chapter 4.

50. Chapter 6.0 - Delete this chapter. It is inappropriate to include this in the FS report. The proposed plan will recommend an alternative and provide the supporting rationale as required in the NCP.

51. Appendix A - 1,2 DCA and acetone were detected in the associated blank for some samples. What procedures will be implemented to correct this QA/QC problem?

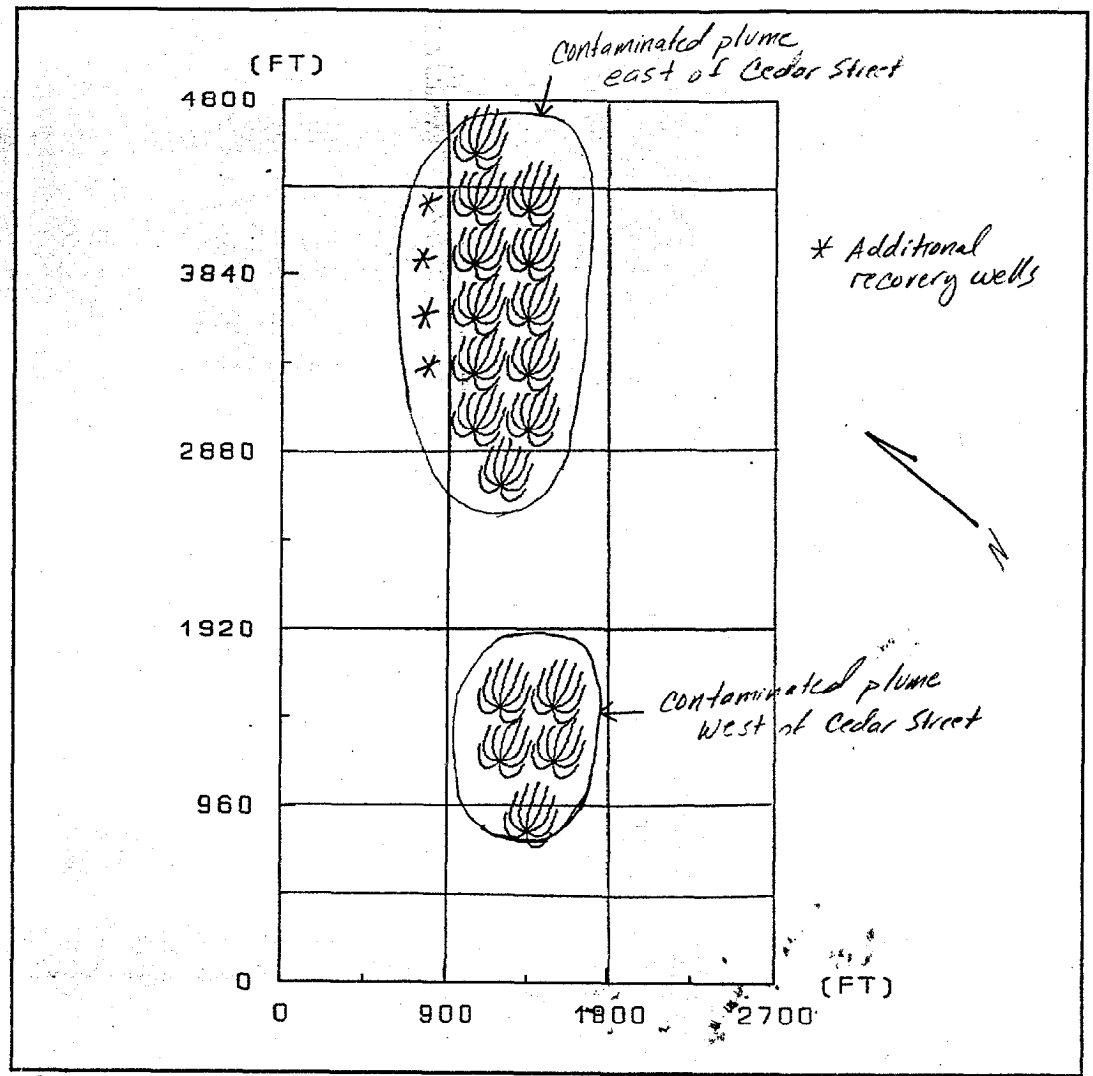

Figure 1 Camp Lejeune capture zone- 5 yrs at 100 ft3/d

APPENDIX

INTERIM REMEDIAL ACTION PROPOSED PLAN

This Interim Remedial Action Proposed Plan is issued to describe the Marine Corps Base Camp Lejeune (MCB CLEJ) and the Department of the Navy's (DON's) preferred interim remedial action to restrict the further migration of the contaminated groundwater plumes in the shallow aquifer at the Hadnot Point Industrial Area (HPIA), an operable unit at MCB CLEJ. The HPIA operable unit is located within the Camp Lejeune Military Reservation and Marine Corps Base located in Onslow County, North Carolina.

The MCB CLEJ/DON is issuing this Interim Remedial Action Proposed Plan as part of its public participation responsibility under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the Federal Facilities Agreement between the DON, Region IV of the U.S. Environmental Protection Agency (EPA), and the North Carolina Department of Environment, Health, and Natural Resources (N.C. DEHNR).

The MCB CLEJ/DON, with the assistance of EPA Region IV and the N.C. DEHNR, will select an interim remedy for the HPIA operable unit only after the public comment period has ended and the information submitted during this time has been reviewed and considered. The selected remedial action plan may be different from the preferred interim alternative presented in this plan depending upon new information or public comments on all of the interim remedial action alternatives identified in this plan.

This document summarizes information that can be found in greater detail in the Interim Remedial Action Remedial Investigation (RI) and Interim Remedial Action Feasibility Study (FS) reports and other documents referenced in the RI and FS Reports. The DON encourages the public to review these other documents in order to gain a more comprehensive understanding of the site. The administrative record file, which contains the information upon which the selection of the interim response action is based, is available for public review at _____. The public is invited to review and comment on the administrative record and this proposed plan.

Site Description and Background

Camp Lejeune is a training base for the Marine Corps, located in Onslow County, North Carolina (see Figure 1). The base covers approximately 170 square miles with 14 miles of coastline. It is bounded to the southeast by the Atlantic Ocean, to the northeast by State Road 24, and to the west by U.S. 17. The town of Jacksonville, North Carolina is north of the base. The HPIA, located within Camp Lejeune, is bounded by Sneads Ferry Road to the north, Holcomb Boulevard to the west, Louis Road to the east, and Main Service Road to the south (see Figure 2).

The HPIA, constructed in the late 1930s, was the first facility at the Marine Corps Base (MCB) Camp Lejeune. It was comprised of approximately 75 buildings and facilities including: maintenance shops, gas stations, administrative offices, commissaries, snack bars, warehouses, storage yards, and a dry cleaning facility. A steam plant and training facility occupy the southwest portion of the HPIA. Several of these areas have been investigated for potential contamination due to Marine operations and activities resulting in the generation of potentially hazardous wastes. The investigations indicate that contamination has resulted at HPIA due to improper waste disposal, underground storage tank leakage, solvent spills, and sludge disposal.

Since 1983, various investigation and sampling activities have been conducted at the HPIA operable unit. On November 4, 1989, Camp Lejeune was placed on the National Priorities List (NPL). The Department of the Navy, the EPA, and the N.C. DEHNR entered into a Federal Facilities Agreement on February 13, 1991. The studies that have been conducted at the HPIA operable unit are briefly summarized below.

In 1983, an Initial Assessment Study (IAS) was conducted at Camp Lejeune by Water and Air Research, a consulting firm. The study identified a number of areas within Camp Lejeune, including HPIA, as potential sources of contamination.

Between 1984 and 1988, Environmental Science and Engineering, Inc. (ESE) conducted a two part confirmation study which focused on the potential source areas identified in the IAS. The first stage of this two-step study identified the presence of volatile organic compounds (VOCS) in the shallow aquifer within the HPIA operable unit. As a result of this part of the investigation and limited additional sampling, Camp Lejeune closed five supply wells in the area. The second stage of this investigation was designed to evaluate the extent of the VOC contamination identified in the first stage. Thirty-three groundwater monitoring wells were installed and sampled during this part of the investigation. The shallow aquifer is the subject of this interim remedial action.

A focused FS for HPIA was conducted by ESE in May 1988. The FS was to provide information about potential remedial alternatives to restrict migration of contamination within the shallow aquifer at HPIA.

An RI for HPIA was conducted by ESE during 1986-1987 and 1990-1991. The purpose of this investigation was to delineate the horizontal and vertical extent of contamination within the shallow aquifer. The investigation included installation of monitoring wells downgradient of potential source areas, determination of groundwater flow direction and gradients, and collection of groundwater analytical data to characterize the plume.

Baker Environmental, Inc. (Baker) conducted an Interim Remedial Action RI and an Interim Remedial Action FS for HPIA in 1991. These studies focused on the shallow groundwater aquifer beneath the HPIA and were based solely on data generated during previous field investigations. The purpose of the Interim Remedial Action RI was to consolidate currently available information on the shallow aquifer and to develop the basis and supporting documentation for preparation of the Interim Remedial Action FS.

The Interim Remedial Action FS prepared by Baker considered various interim remedial actions which may be taken to contain and/or remediate contamination in the shallow aquifer. The study focused on a limited number of alternatives directly applicable to conducting an interim remedial action for the shallow aquifer.

Based on the results of the above-mentioned studies and investigations, two contaminated groundwater plumes have been identified in the shallow aquifer at the HPIA Operable Unit. The contaminants of concern contained in these plumes include: benzene, toluene, ethylbenzene, xylene, 1,2-dichloroethene (1,2-DCE), trichloroethene (TCE), chromium, lead, iron, manganese, and oil & grease. One of the plumes is located in the northeast portion of the site, the other in the southwest portion of the site.

Scope and Role of Action

The proposed interim remedial action identified in this plan is a component of the overall site strategy in that it restricts the migration of the contaminant plume identified in the shallow aquifer. Implementation of this interim remedial action will reduce the potential for the migration of the contaminated groundwater both horizontally and vertically, which in turn will reduce the risk to human exposure through continued contamination of the aquifer. This interim remedial action is consistent with future plans for complete remediation of the site and will not preclude implementation of a comprehensive final remedy.

Subsequent actions are planned to fully address the soil and groundwater contamination at HPIA. The overall site remediation strategy for the entire HPIA Site includes the remediation of the soil and all groundwater contaminated at the site. Additionally, it includes the remediation of the other separate study areas within HPIA (i.e., the fuel tank farm and the transformer storage yard).

Summary of Site Risks

The analytical results from previous studies conducted at the site, predominantly the RI, indicate that there are two plumes of contamination in the shallow aquifer within the HPIA Site. Compounds detected in these plumes include typical gasoline/fuel compounds such as benzene, ethylbenzene, toluene, and xylene; other VOCs such as TCE and 1,2-DCE; and metals such as chromium, iron, lead, and manganese. These plumes have adversely affected several drinking water supply wells on site. In 1986, VOCs were identified in five on-site supply wells screened in the deeper aquifer (to be addressed as part of the additional studies at the site), and subsequently, the wells were closed. It is not known whether or not the contaminants detected in the shallow aquifer have contributed to the contamination of these deeper wells. However, concentrations of contaminants above regulatory limits have been documented in the shallow aquifer. This contamination is the basis for this interim action at the site. The interim action proposed in this plan will prevent further degradation of the shallow aquifer. Another potential benefit is reduction of the risk posed to the deep aquifer at the site. As noted on Table ??????, state and federal drinking water standards have been exceeded in the aquifer.

Summary of Alternatives

Extraction and treatment of the contaminated groundwater is an element of each of the treatment alternatives evaluated, with the exception of the "no action" alternative. The five interim remedial action treatment- alternatives evaluated in the FS for the containment/remediation of the contaminant plumes in the shallow aquifer are:

Alternative 1: No Action

Alternative 1a: Institutional Controls

Alternative 2: Trickling Filter

Alternative 3: Carbon Adsorption

Alternative 4: Air Stripping

Alternative 5: Trickling Filter/Carbon Adsorption

These alternatives are intended to prevent the spread of contaminated groundwater by treating the migration of the contaminated shallow groundwater plume early in the Superfund process. The final alternative for the shallow aquifer may require alteration and refinement, based on monitoring results and the evaluation of data collected during implementation of interim remedial action.

Common Elements Between the Alternatives: With the exception of the No Action Alternative and the Institutional Controls Alternative, all of the interim remedial action alternatives being considered for the HPIA operable unit can be considered as "pump and treat" options. Each of these alternatives include extraction of the contaminated groundwater, pretreatment via gravity separation and chemical reduction, and discharge to a surface water body. The difference between each of the three pump and treat alternatives is in the primary treatment technology (i.e., trickling filter, carbon adsorption, and air stripping). All of the alternatives, excluding the No Action Alternative, include a long-term groundwater monitoring program and aquifer-use restrictions. The surface water discharge will be conducted in accordance with the National Pollution Discharge Elimination System (NPDES).

The four "pump and treat" alternatives include a phased approach for groundwater extraction and treatment. Initially, four extraction wells will be installed in each of the two contaminated plume areas. Based upon the results of groundwater monitoring, additional extraction wells may be installed. (For costing purposes only in the FS, it was assumed that eight additional extraction wells would be installed during each of the first three years of operation for a total of 32 wells.)

A brief overview of each of the interim remedial action alternatives is included below. All costs and implementation times are estimated.

Alternative 1: No Action

There are no costs associated with the no action alternative.

Alternative 1a: Institutional Controls

Capital cost:	$0
Annual Operation and Maintenance (O&M) Costs:	$150,000 for Year 1 $58,000 for Years 2 thr
Present Worth (PW):	$980,000
Months to Implement:	1

Under the No Action and the Institutional Controls Alternatives, the groundwater in the shallow aquifer is left as is and no remedial actions are implemented. The no action alternative is required by the NCP and provides a baseline for comparison with other groundwater alternatives. The Institutional Controls Alternative includes periodic sampling of 14 existing monitoring wells at the HPIA. In addition, use of the aquifer will be restricted.

Alternative 2: Trickling Filter

Capital cost:	$347,500
Annual O&M Costs:	$303,000 for Year I $208,000 for Years 2 through 30
PW:	$3.6 million
Months to Implement:	12

Alternative 2 includes groundwater extraction, on-site treatment, discharge to surface water body, long-term groundwater monitoring, and institutional controls to restrict aquifer-use. The on-site treatment system will consist of an oil/water gravity separator, a chemical reduction system, and a biological trickling filter system. The trickling filter system that will be utilized is the existing system at the Hadnot Point Sewage Treatment Plant (STP).

Alternative 3: Carbon Adsorption

Capital cost:	$507,500
Annual O&M Costs:	$380,000 for Year 1 $287,000 for Years 2 through 30
PW:	$5.0 million
Months to Implement:	12

Alternative 3 is similar to Alternative 2 with the exception of the method of groundwater treatment. In general, the Carbon Adsorption Alternative includes groundwater extraction, on-site treatment, discharge to surface water body, long-term groundwater monitoring, and institutiona controls to restrict aquifer-use. The on-site treatment system will consist of an oil/water gravity separator, a chemical reduction system, and an carbon adsorption system.

Alternative 4: Air Stripping

Capital cost:	$777,500
Annual O&M Costs:	$367,000 for Year 1
	$272,000 for Years 2 through 30
PW:	$5.0 million
Months to Implement:	12

Alternative 4 is similar to Alternatives 2 and 3 with the exception of the method of groundwater treatment. In general the Air Stripping Alternative includes groundwater extraction, on-site treatment, discharge to surface water body, long-term groundwater monitoring, and institutional controls to restrict aquifer-use. The on-site system will consist of an oil/water gravity separator, a chemical reduction system, and an air stripping system.

Alternative 5: Trickling Filter/Carbon Adsorption

Capital cost:	$542,500
Annual O&M Costs:	$303,000 for Year 1
	$208,000 for Years 2 through 3
	$381,000 for Year 4
	$287,000 for Years 5 and 6
	$208,000 for Years 7 through 30
PW:	$4.1 million
Months to Implement:	48

Alternative 5 is a combination of Alternatives 2 (Trickling Filter) and 3 (Carbon Adsorption). This alternative was developed in the event that the existing STP cannot accept the estimated flow of 40 to 160 gallons per minute due to over capacity at the STP (other sources of wastewater at Camp Lejeune will be diverted to the STP during the next few years). It is anticipated that in years 1 through 3, extracted groundwater will be treated at the STP as proposed under Alternative 2. As the capacity of the STP is reached, which may be in year 4, use of the trickling filters may not be implementable. Therefore, during approximately years 4 through 6, the extracted groundwater will be treated on site via carbon adsorption (as proposed under Alternative 3) until a new STP is operable, which is anticipated to be in year 7. Once the new STP is operable, the extracted groundwater would then be treated at the new STP and the on-site carbon adsorption system would be removed.

Evaluation of Alternatives and the Preferred Alternative

The preferred interim remedial action alternative for reducing the potential for further migration of the contamination in the shallow aquifer at HPIA is Alternative 2: Trickling Filter. Based on available information, this alternative appears to provide the best balance with respect to the nine CERCLA evaluation criteria used to evaluate alternatives. The action will limit the extent of migration of the contamination in the shallow groundwater aquifer and reduce the concentration of contaminants in the groundwater. This interim remedial action will be consistent with any other remedial actions that selected for the site. Based on new information or public comments, MCB CLEJ/DON, in consultation with EPA and the State of North Carolina, may later modify the preferred alternative or select another treatment alternative presented in this Proposed Plan and the RI/FS. The public therefore is encouraged to review and comment on all of the alternatives identified in this proposed plan. The RI/FS should be consulted for more information on these alternatives.

A profile of the performance of alternatives with respect to the nine criteria follows. A glossary of the evaluation criteria is noted on the next page.

Analysis of Alternatives

Overall Protection of human health and the environment- The four "pump and treat" alternatives would provide protection of human health and the environment by reducing or controlling risk through treatment, engineering controls, or institutional controls. Each of these four "pump and treat" alternatives would treat the contaminants in the extracted groundwater, thereby reducing the risks associated with contact with the groundwater and minimizing the migration of contamination from the groundwater.

Since neither the No Action Alternative or the Instititutional Controls Alternative is protective of human health and the environment, they are not evaluated any further in this analysis for the HPIA Site.

Compliance with ARARs - An interim remedial action alternative need only address those ARARs applicable or relevant and appropriate to the limited-scope interim action. All of the treatment alternatives will meet the NPDES requirements for discharge to a surface water body. ARARs for the aquifer are Federal and North Carolina Maximum Contaminant Levels (MCLs) for drinking water and groundwater, respectively. The ultimate goal of all of the "pump and treat" alternatives is to meet these ARARs. The final remedial alternative (to be proposed after completion of additional studies) will provide additional information on the compliance with ARARs.

Long-term effectiveness and Permanence - This criteria is irrelevant to the interim action presented in this Proposed Plan. Long-term effectiveness and permanence will be evaluated as part of the final remedial action for the shallow aquifer.

Reduction of Toxicity, Mobility, or Volume of the Contaminants Through Treatment - All of the "Pump and treat" alternatives would extract and treat the contaminated groundwater to reduce the toxicity, mobility, and volume of the contaminants in the water.

Short-term Effectiveness - It is not expected that the implementation of any of the alternatives would cause adverse effects to human health and the environment. Workers could be exposed to contaminated soil or water during construction and installation of the extraction well systems. Implementation of appropriate worker health and safety precautions will mitigate any threat. No threats to the community are anticipated, due to the location and industrial nature of the activities at HPIA. All of the "pump and treat" alternatives will be effective in achieving the goal of reducing contaminant migration upon implementation. Alternatives 2, 3 and 4 would take approximately 12 months to implement, while alternative 5 is anticipated to require 48 months.

Implementability - All of the alternatives have similar administrative difficulties (i.e., obtaining waivers or discharge permits) that could delay implementation. Acquiring the necessary permits is feasible and should not adversely affect the implementability of any of the alternatives. All of the alternatives are technically feasible and, therefore, implementable. The required equipment for each of the alternatives is readily available. Alternatives 2 and 5 have an advantage with implementability since the trickling filter system is in-place and operating at the existing sewage treatment plant on site.

Cost - Alternative 2 has the lowest capital, O&M, and present worth cost as compared to Alternatives 3, 4, and 5. The present worth cost for Alternative 2 is approximately $3.6 million; for Alternative 3 is approximately $5.0 million; for Alternative 4 is $5.0 million; and for Alternative 5 is approximately $4.1 million.

State/Support Agency Acceptance - The Environmental Protection Agency and the State of North Carolina..... [will be completed following the State's review of this plan].

Community Acceptance - Community acceptance of the preferred interim remedial action alternative summarizes the public's general response to the alternatives described in this Proposed Plan and in the RI/FS, based on public comments received during the public comment period. Community Acceptance of the Interim Remedial action will be evaluated following the public comment period and described in the ROD for the HPIA.

Summary of the Preferred Alternative

In summary, the preferred alternative is believed to provide the best balance of trade-offs among the alternatives evaluated with respect to pertinent criteria, given the limited scope of the action. MCB CLEJ/DON believe the preferred alternative would protect human health and the environment, would comply with the pertinent ARARs, and would be cost-effective. The preferred interim alternative would also use treatment to the maximum extent practicable. The permanence requirement will be addressed in the final decision document for the shallow aquifer. The interim remedial action alternative is an initial start in the complex process of remediating the shallow groundwater.

Alternative 2 would achieve risk reduction through withdrawal, treatment by use of the existing site trickling filters and discharge to the New River. In addition, alternative 2 includes groundwater monitoring and aquifer-use restrictions.

COMMUNITY PARTICIPATION

A critical part of the selection of an interim remedial action alternative is community involvement. The following information is provided to allow the community to provide input into selection of the remedy for the shallow groundwater at HPIA.

PUBLIC COMMENT PERIOD

[DATE-DATE]:

The public comment period will begin on [DATE] and end on [DATE] for the Interim Remedial Action Proposed Plan for the shallow aquifer within the HPIA operable unit. Written comments should be sent to the following:

Commander, Atlantic Division Naval Facilities Engineering Command Code 1822
Attention: MCB Camp Lejeune RPM
Norfolk, Virginia 23611-6287

A Public Meeting will be held at [PLACE, ADDRESS] at [TIME]. The purpose for this meeting will be to answer questions and accept public comments on the proposed interim Record of Decision (ROD) for the shallow aquifer at the HPIA operable unit.

The meeting will be transcribed and a copy of the transcript will be made available to the public through the information repository. A responsiveness summary will be prepared at the conclusion of the comment period to summarize significant comments, criticisms, and new relevant information submitted to MCB CLEJ/DON during the comment period and the response to each issue. After the interim Record of Decision is signed, MCB CLEJ/DON shall publish a notice of availability of the ROD (including the Responsiveness Summary) in the newspaper and place a copy of the ROD in the information repository.

INFORMATION REPOSITORIES - A collection of information, including the administrative record is available to the community at the following location:

Installation Restoration Office
AC/S EMD, Building I
MCB Camp Lejeune
Camp Lejeune, North Carolina 28542-5001
Telephone: (919) 451-5003

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