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CERTIFIED MAIL RETURN RECEIPT REQUESTED

United States Environmental Protection Agency,  
Region IV  
Attn: Ms. Gena Townsend  
Waste Management Division  
345 Courtland Street, N.E.  
Atlanta, Georgia 30365

Re: MCB Camp Lejeune; Draft Remedial Investigation and  
Feasibility Study for Operable Unit Number 4

Dear Ms. Townsend:

Enclosed are the responses to the comments dated December 15,  
1994 and November 23, 1994 for the referenced reports.  
The responses have been incorporated into the Draft Final RI/FS  
for Operable Unit Number 4.

The LANTDIV point of contact for this project is Ms. Linda  
Saksivg, who may be reached at (804) 322-4793.

Sincerely,

L. G. SAKSVIG, P.E.  
Acting Section Head  
Installation Restoration Section  
(South)  
Environmental Programs Branch  
Environmental Quality Division  
By direction of the Commander

Enclosures

Copy to: (w/encls)  
NCDEHNR (Mr. Patrick Watters)  
MCB Camp Lejeune (Mr. Neal Paul)

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**RESPONSES TO EPA REGION IV COMMENTS  
ON DRAFT FEASIBILITY STUDY (FS)  
OPERABLE UNIT NO. 4, MARINE CORPS BASE, CAMP LEJEUNE, NC  
(Comment Letter Dated December 15, 1994)**

**Responses to General Comments**

1. For sites where the cumulative site risk to an individual based on reasonable maximum exposure is less than 1E-4, action is generally not warranted, but may be warranted if a chemical specific standard that defines acceptable risk is violated or unless there are noncarcinogenic effects or an adverse environmental impact that warrants action. For groundwater, MCLs or state standards will generally gauge whether remedial action is warranted. A specific risk estimate around 1E-4 may be considered acceptable if justified based on site-specific conditions, including any remaining uncertainties on the nature and extent of contamination and associated risk. Furthermore, the upper boundary of the risk range is not a discrete line at 1E-4, although EPA generally uses 1E-4 in making risk management decisions. Therefore, in certain cases, EPA may consider risk estimates slightly greater than the 1E-4 level to be protective. The RGOs developed for this FS were conservatively estimated using 1E-4 as the end point for determining action levels for remediation. Based on the findings of the risk assessment, groundwater was the only medium for which RGOs needed to be estimated; therefore, the RGOs, based on 1E-4, would only be selected as Remediation Levels (RLs) if North Carolina or Federal (MCL) groundwater standards were not available. The estimation of RGOs at varying carcinogenic and noncarcinogenic risk levels will be completed for future FS's including groundwater as a medium of concern and especially for soil, surface water/sediment, or other media if necessary.
2. The passive treatment system developed by EnviroMetal Technologies, Inc. will be evaluated for future projects.
3. The cost components included under Division 1 and the Special Requirements Division were taken from construction cost estimates developed by Baker for Remedial Action Contract (RAC) remedial design/remedial actions. Specifically, detailed construction cost estimates for the Camp Allen Landfill Soil and Groundwater Remediation at Norfolk Naval Base and the Soil and Groundwater Remediation for Operable Unit No. 2 at Camp Lejeune were used for estimating purposes. Additional line items and backup information have been added under these divisions to clarify the costs shown in the costing spreadsheets.
4. The costing spreadsheets contain no reference to a labor rate of \$240/hr. The administration costs included under Division 1 for the Site 41 alternatives have been deleted from the direct capital cost spreadsheets since design and construction administration was already included as a line item under the indirect capital cost spreadsheet.

All labor rates referenced in the cost spreadsheets were estimated as fully burdened rates. A specific overhead multiplier was not used.

A profit margin was not included in the cost spreadsheets in the Draft FS. A 10% profit multiplier on the total capital cost has been incorporated into the cost estimates in the Draft Final FS. This profit margin is roughly equal to the maximum award fee that can be awarded to the construction contractor under the Navy's RAC contract.

5. Discontinuation of a remedial action is regulated under the Corrective Action section of the North Carolina Drinking Water and Groundwater Standards (15A NCAC 2L.0106). Specific requirements and procedures for discontinuance are provided under this section. A discussion of these requirements and procedures has been incorporated into the FS under the Site 41 groundwater treatment alternatives. This regulation has also been added to the ARAR table (Table 2-2).

#### **Responses to 2.0 Specific Risk Comments**

1. This discrepancy will be corrected in the FS for Site 69. The correct ICR values should have been 4E-04 for future residential child and 7E-04 for future residential adult. The ICR and HI values presented for Sites 41 and 74 in Section 1.5 may differ from the Draft to Draft Final version of the FS based on the additional groundwater sampling conducted at the sites.
2. This discrepancy was corrected to show that 1 of 18 concentrations for bromoform exceeded the NCWQS.
3. Corrections to AWQCs for chlorobenzene, 4,4'-DDT, and barium were incorporated into the table. Additionally, this table was updated to indicate the results of the additional surface water sampling conducted at Site 41.
4. The reference that Region III RBCs were used in the selection of chemical-specific ARARs will be removed from the text.
5. See general comment 1.
6. Evaluation of future residential exposure to soils at all sites did not produce a significant risk to warrant this medium as a concern for which remedial alternatives need to be developed. The statement in the text was clarified to explain that the potential presence of CWM is the cause for potential future concern at these sites. The text was clarified to explain that although the soil contaminants at the site do not produce an unacceptable future risk, a potential danger to future residents from potential CWMs does exist.
7. The RfDs used in the evaluation of cadmium, nickel, and manganese were incorrect. The RGOs determined using the incorrect values were recalculated using the most recent RfDs. The RfD for beryllium is correct; therefore, this RGO was not recalculated. Given that an NCWQS and MCL have been published, the estimation of the RGO is essentially used for information purposes only.

#### **Responses to 3.0 Specific Comments**

1. The text was corrected to correspond with the data presented in the table. Additionally, this data was revised based on the analytical findings from the additional groundwater sampling (low-flow sampling) conducted at each site.
2. See response to Comment 1.
3. A present worth cost for a 15-year treatment period will be generated for the in-well aeration (in situ air stripping) alternative for Site 69. The new cost will be included in the FS for Site 69.

**Response to Comments submitted by USEPA  
on the Draft RI/FS Report for CTO-0212  
Operable Unit No. 4  
MCB Camp Lejeune, North Carolina  
(Comment letter by Ms. Gena Townsend dated November 23, 1994)**

**Response to General Comments**

1. According to the Draft Region IV Supplemental Guidance (April 4, 1994) the purpose of the RGOs is to provide the RPM with the maximum risk-related media level options on which to develop remediation aspects of the FS. Region IV's preference for having the RGO's in the risk assessment has been taken under advisement. It is Baker's position that this information should be presented in the FS. However, in the conclusion of the risk assessment, the media and contaminants of concern which drive the overall risk are addressed. This information is then presented in the initial discussion of the FS report. In accordance with Region IV's guidance, RLs are derived from the RGOs. The RLs are used by the engineer to develop the remedial alternatives. Baker is willing to discuss this approach if necessary to complete this and future risk assessments and FSs.

**Responses to Specific Comments**

1. The text will be changed to be consistent to read that the New River is to the "east" of Site 69.
2. The incomplete sentence from Section 4.4.1 will be deleted.
3. The advise of the reviewer to use the Region III RBCs to eliminate contaminants as COPCs will be considered. The analytes selenium, silver, and zinc were not retained as COPCs because they were not frequently detected (1 of 25 samples) at concentrations greater than 2x the average background concentration.
4. The use of ten sample results does not provide an accurate statistical representation to eliminate contaminants as COPCs. However, this criterion was not applied for the elimination of contaminants. The risk assessor selected inorganic COPCs based on their presence at concentrations greater than 2 times the average background concentration. However, in order to justify the elimination of contaminants, the contaminants will be compared to the Region III RBCs.
5. This comment will be considered during the preparation of the draft final report. During the selection process the Region III RBCs were not given as much weight as the criteria published in RAGs. However, if Region IV reviewers approve the use of this published data, we will use this additional information to screen COPC. Because of the receptors (military personnel) at the facilities, discretion should be used in the selection and application of RBCs.
6. Fishing in these waters is conducted from boats, therefore, the evaluation of risks from dermal contact or ingestion of surface water or sediment is not applicable or relevant. The text of the draft final report will provide more detail as to the fishing activities conducted in these waters.
7. Additional information will be provided in the text to explain how blank contamination was used to eliminate bis(2-ethylhexyl)phthalate and di-n-butyl phthalate as COPCs. The maximum blank contamination for these compounds multiplied by ten (common lab contaminants) and by 33 the difference between aqueous and soil detection limits for semivolatile organics will be used to eliminate these contaminants.

8. Region III RBCs will be used in conjunction with the prevalence criteria to eliminate the COPCs. The text will describe which RBCs were applied for the elimination of contaminants.
9. A conservative estimate of 10 m<sup>3</sup>/day was used to estimate inhalation of particulates by a child. This value was derived from 2.4 m<sup>3</sup>/day (heavy activity at 6 years old) x 1.77 hrs/day total outdoor activity which equals 4.25 m<sup>3</sup>/day. The maximum inhalation rates reported by the USEPA were roughly twice the reported mean values. Based on this, it was judged that a value of 1.5 times the mean rate would represent a reasonable worst-case rate. Therefore, a conservative inhalation rate of 10 m<sup>3</sup>/day was used for the child. It should be noted that no adverse risk was determined from the use of this conservative inhalation rate. Therefore, this value will remain in the report.
10. This reference will be added to the draft final report. Foster, S.A., and Chrostowski, P.C. Integrated Household Exposure Model for Use of Tap Water Contaminated with Volatile Organic Chemicals. Presented at the 79th Annual APCA Meeting. Minneapolis, MN. 1986.
11. The fish ingestion amount (0.054 kg) was obtained from the USEPA Risk Assessment Guidance (RAGs). A conservative site-specific exposure duration (250 day/yr) was used in conjunction with this value. Although the exposure duration used in the estimation of the risk is not published in RAGs it was conservatively applied for this estimation. Using the defaults in this risk assessment .054 kg/day x 250 day/yr x 30 yr = 405 kg using the defaults in the USEPA's Standard Default Exposure Factors supplement total ingestion for a residential lifetime would be .145g/yr x 250meals/yr x 9yr = 326kg. Therefore, using the site-specific numbers presented in the risk are more conservative. The values presented in this risk assessment did not indicate a potential noncarcinogenic or carcinogenic risk. Therefore, the estimation will not be changed.
12. The reference provided by the reviewer for the RfDs and CSFs will be incorporated into the text. The interim guidance RfDs and TEFs will not be used to re-estimate the risk. Until these values are published, the uncertainty of their accuracy is unknown. Therefore, assessing risk based on uncertain/pending studies is inaccurate and could possibly lead to misrepresentation of risks. If these interim values are finalized and published prior to the final document submittal, they will be used to estimate potential risk and the total risk values will be adjusted accordingly.
13. This correction will be incorporated in the draft final version of the RI report.
14. The UCL values have been checked and are accurate. The arithmetic mean is not used to describe the central tendency of data that is lognormally distributed. The geometric mean (not provided in the statistical summary) is a parameter used for describing the central tendency of lognormal data, however, this value is not appropriate for estimating risk. For this data set, it was assumed that the data was lognormally distributed. Therefore, the data was transformed by using the natural logarithm form ln(x). In this case, the arithmetic mean of the transformed data is the log of the geometric mean. The arithmetic mean presented in the data summaries was calculated by adding all detected values and one-half the detection limit for all non-detect values and then dividing by the total number of values.
15. The remedial goal options will be estimated and presented in the Feasibility Study.

**Response to Comments submitted by USEPA  
on the Draft RI/FS Report for CTO-0212  
Operable Unit No. 4  
MCB Camp Lejeune, North Carolina  
(Comment letter by Ms. Gena Townsend November 23, 1994)**

*Dynamac Comments*

Responses to General Comments

1. Chemical Warfare Materiel (CWM) disposal events were evaluated in the human health and ecological risk assessments. CWM degradation compounds were analyzed for in both soil and groundwater samples. None were detected. The likelihood of CWM degradation compounds migrating in groundwater from the site is minute, based on discussions with experts from the U.S. Army.
2. The surficial and Castle Hayne aquifers are treated separately in the RI report due to their use and composition/lithology. Confining/semiconfining materials of clay, silty clay, and sandy clay were observed at the three sites. However, these materials were not continuous or uniform in constituents. The shallow (<25'), intermediate (40-60'), and deep (125') monitoring wells were sampled at the appropriate sites and the results discussed. Where contamination was detected within the shallow and Castle Hayne aquifers, the connection between the two aquifers were noted and discussed, indicating the potential of vertical migration.
3. Tables containing site specific background soil for OU No. 4, and Base wide background data on soil, surface water and sediment are referenced and included in the report as tables. The report prepared for LANTDIV presenting background data on metals in groundwater will be referenced and included as an appendix.
4. Information regarding the source of drinking water supply for MCB Camp Lejeune will be provided in the text. The water supply wells which serve the base are located within the boundaries of the base. None of the supply wells service the surrounding community.
5. Concentrations of contaminants and sample locations are presented on figures for each site for the various analytical parameters. Baker does not feel that isoconcentration maps are truly representative of the conditions encountered due to the estimating/approximating of the distribution of isoconcentration lines. The general trends evident from the listed concentrations are discernable on the figures. Site boundaries are presented on separate figures for the different sites. These features would generally be obscured on concentration figures due to the amount of information provided on these figures. Vertical distribution of contaminants on cross-sections would be difficult due to the amount of data (i.e. number of constituents per boring) and the difficulty in correlating this data between boreholes (samples were collected at different depths within the individual sites for analysis).
6. This comment will be considered for this and future RI reports and baseline human health risk assessments.
7. The results and delineation of site boundaries as determined by the geophysical investigations at Sites 69 and 41 are presented in Section 2. These boundaries would be obscured on Section 4.0 figures due to the amount of information provided on these figures.

8. Both terms (i.e., CSM and CWM) mean the same thing. The U.S. Army began using the term CWM just before the Draft RI and FS reports were submitted. Therefore, not all of the references to CSM were changed. Health concerns are addressed in the Health and Safety Plan. Neither health nor environmental concerns were addressed in detail in the RI because: (1) we do not know the exact type or quantity of agents present at the site and (2) no degradation compounds were detected in site media which could result in a current human health or ecological risk.
9. See Response No. 8.

### Responses to Specific Comments

1. Most of the drums were either crushed or were not intact. None of the drums contained product or waste. There was no "pattern" of disposal (i.e., drums were encountered randomly throughout the site). Soil samples were collected adjacent to some of the drums for purposes of assessing potential impacts to the environment.
2. Initial groundwater contour maps indicated a radial flow from the central portion of Site 69. The high concentrations of TCE at well location 69-GW02 indicate a potential source at or near the central area of the site. Wells were installed to the east (at locations 69-GW03 and 69-GW13) to further define the extent of contamination. Subsequently, a cluster of monitoring wells (shallow, intermediate, and deep) were installed south of well location 69-GW02 to investigate the possible migration of contaminants to the south. These wells exhibited VOC contamination, indicating that the plume is migrating offsite. In addition, wells GW13 and GW13I exhibited low levels of VOCs in the second round of sampling.
3. The climatic and tidal information was included as general base background information. No specific discussion of the influences of tidal fluctuations at the sites and correlation to area or regional information can be done as no site specific tidal measurements were obtained during this investigation. Based on the site locations, and knowledge of tidal effects at other sites throughout MCB Camp Lejeune, tidal changes are not likely going to impact migration routes or pathways.
4. Analytical data for supply wells HP-629 and HP-621 was researched. Greenhorn & O'Mara performed a study in 1992 ("Preliminary Draft Report Wellhead Monitoring Study", December 1992) sampling Base water supply wells and tabulating the results. The wells were analyzed for VOCs, selected SVOCs, organochlorine pesticides, PCBs, herbicides, pentachlorophenol, and selected metals. These analytical parameters are similar to those used during the RI for CTO-0212. Well HP-621 was not sampled during the Greenhorn & O'Mara study as it has been taken out of service. Results for HP-629 indicated concentrations for organics below the detection limit. For metals, only iron (580  $\mu\text{g/L}$ ) and manganese (20  $\mu\text{g/L}$ ) were detected above detection limits. Iron was detected above the Federal Secondary MCL and NCWQS of 300  $\mu\text{g/L}$ . The Federal Secondary MCL and NCWQS for manganese is 50  $\mu\text{g/L}$ . This information will be incorporated into the RI Report
5. The analytical reporting units for pesticides/PCBs will be corrected in Table 4-58. The units for metals are correct (mg/kg).
6. During the Greenhorn & O'Mara well study in 1992, groundwater samples were analyzed for VOCs, selected SVOCs, organochlorine pesticides, PCBs, herbicides, pentachlorophenol, and selected metals. These metals included aluminum, arsenic, barium, cadmium, chloride, chromium, copper, iron, lead, manganese, mercury, selenium, silver, and zinc. The study parameters are similar to the COPCs determined for the three sites. None of the wells within a one-mile radius of the three sites had organics detections above detection limits. Of the three metals detected above Federal Primary and Secondary

MCLs and/or NCWQS (aluminum, iron, manganese), manganese was listed as a COPC and was detected at all three sites. This information will be incorporated into the RI Report.

7. The geophysical investigation provided results which correlated to the presence of buried metal at Sites 41, 69, and 74. Subsurface soil sampling was performed at sites 41 and 74 (onsite) and at Site 69 (offsite). The extent of buried metal at Sites 41, 69, and 74 has been adequately defined and no additional GPR surveys are necessary.
8. Re-doing the GPR survey would not provide information that would result in changing the RI conclusions or alternatives in the FS.