



DEPARTMENT OF THE NAVY

NAVY ENVIRONMENTAL HEALTH CENTER

2510 WALMER AVENUE

NORFOLK, VIRGINIA 23513-2617

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Ser 64/ 4313

MAR 30 1992

From: Commanding Officer, Navy Environmental Health Center
 To: Commanding Officer, Atlantic Division, Naval Facilities
 Engineering Command, Code 1822, Norfolk, VA 23511-6287

Subj: MEDICAL REVIEW OF INSTALLATION RESTORATION PROGRAM
 DOCUMENTS FOR MARINE CORPS AUXILIARY LANDING FIELD, BOGUE,
 NORTH CAROLINA

Ref: (a) PHONCON NAVENVIRHLTHCEN Ms. S. Muschett/
 LANTNAVFACENGCOC Mr. J. Steinberg of 9 Mar 92
 (b) PHONCON NAVENVIRHLTHCEN Ms. A. Lunsford/
 LANTNAVFACENGCOC Mr. J. Steinberg of 26 Mar 92

Encl: (1) Medical Review of Baseline Risk Assessment, Site 29 -
 Crash Crew Burn Pit, MCALF, Bogue Field, North
 Carolina

1. As requested by reference (a), medical review of the Draft Risk Assessment for Site 29, MCALF, Bogue, North Carolina has been conducted. Our comments, provided in enclosure (1), reflect the need for additional background information to perform a complete and adequate review.

2. As discussed in reference (b), Atlantic Division, Naval Facilities Engineering Command, will provide Navy Environmental Health Center with additional background information on the MCALF investigation in the near future; a more comprehensive review will then be performed.

3. The technical point of contact for comments on the draft report is noted in the enclosure. If you require additional assistance, please coordinate with Ms. Sheila Muschett, P.E., Head, Installation Restoration Program Support Department at 444-7575, extension 430.

W. P. THOMAS
 By direction

**MEDICAL REVIEW OF BASELINE RISK ASSESSMENT
SITE 29 - CRASH CREW BURN PIT
MCALF, BOGUE FIELD, NORTH CAROLINA**

General Comments

1. Two sections of the draft document entitled "Draft Remedial Investigation (RI) Report For Site 29 - Crash Crew Burn Pit at Marine Corps Auxiliary Landing Field (MCALF) Bogue, North Carolina" were provided to Navy Environmental Health Center (NAVENVIRHLTHCEN) for review. These sections were entitled "7.0 Baseline Risk Assessment" and "Appendix D, Risk Calculations." The report was prepared for Atlantic Division, Naval Facilities Engineering Command (LANTNAVFACENGCOM), by Halliburton NUS Environmental Corporation and subsidiaries. Specific review comments and recommendations are provided below.
2. This review is limited in scope to obvious errors in the information provided and is therefore incomplete. The Baseline Risk Assessment could not adequately be evaluated since sections providing discussion of the types and durations of possible exposures, potential exposure routes (e.g., ingestion of fish, ingestion of drinking water, inhalation of dust) and key exposure points (e.g., municipal wells, recreation areas) potential receptor sites (on and off site) for each media were not provided.
3. A map of the area was not provided in the risk assessment; however by looking at a highway map, it can be seen that Bogue Field is adjacent to the ocean and possibly next to a recreational and fishing area. Site background information was not presented including site history, a discussion on the history of site contamination, present and past activities conducted at the site, geographic location relative to offsite areas of interest, a characterization of potentially exposed populations near the site (as well as on site), etc.
4. No information was provided on groundwater flow; therefore, a determination as to whether or not contaminants impact the local beach could not be made. No information was provided concerning local fishing activities and whether or not the fish may be potentially contaminated. The risk assessment did not address ingestion of fish as a possible pathway. The exposure pathways and receptors selected by the contractor can neither be substantiated nor negated as a result of inadequate data on groundwater, land use, topography, demography, etc.
5. Limited data was provided in the documents, the data determined by the contractor to be "representative concentrations" and the maximum concentrations for certain analytes found in groundwater and surface water. Information regarding the location of the sampling and the specific results for each sampling

location was not provided. Furthermore, the material provided did not contain the data validation procedures. Since we did not have access to the complete analytical data base, many of the data observations and conclusions made by the contractor could not be followed; we could not provide the service of evaluating analytical methods, quantitation limits, qualified and coded data, chemicals in blanks, tentatively identified compounds, or comparisons of chemical concentrations with background. Additionally, uncertainties, limitations, gaps in quality of collection or analyses could not be determined.

6. The documents reviewed do not contain overall conclusions about the magnitude and kinds of risk at the site or major uncertainties to highlight the potential sources of risk so that the Remediation Project Manager can effectively deal with them in the remedial process. Section 8.6.1 of the EPA guidance document "Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual", December 1989, (HHEM) provides information regarding the minimum topics that should be addressed in the risk summary section so that the numerical estimates of risk and hazard can be summarized in the context of what is known about the site. As a minimum, the discussion should include: confidence that the key site-related contaminants were identified, a description of the various types of cancer and other health risks presented at the site, levels of confidence in the quantitative toxicity information used to estimate risks, levels of confidence in the exposure estimates, the magnitude of the cancer risks and the noncancer hazard indices, the major factors driving the site risks, and the major factors reducing the certainty in the results and exposed population characteristics.

7. As a result of insufficient information, we cannot substantiate or negate the contractor's assessment; we cannot determine if the information needed to make our evaluation is available in the report received by LANTNAVFACENGCOM. It cannot be emphasized enough that the information provided in other sections of the remedial investigation is inextricably linked to the risk assessment. We have observed that data needed for risk assessment purposes may be located in any of the particular sections of the specific document delivered.

8. The technical point of contact for this review of the Baseline Risk Assessment is Ms. Andrea Lunsford, Head, Health Risk Assessment Department, Environmental Programs Directorate, NAVENVIRHLTHCEN, who may be contacted at 444-7575 or DSN 564-7575, extension 402.

Specific Review Comments

The following review comments could not be followed/evaluated since the entire remedial investigation report was not provided. Recommendations are provided for correcting inaccuracies that did not require the evaluation of other parts of the report.

1. Page 7-2, Section 7.1.1 (Chemicals of Concern - Soil), paragraph 1

a. Comment: No information is provided regarding the location or depth of the soil samples. The depth and location of the soil samples are necessary to determine the exposure pathway (e.g., individuals are more likely to be exposed to contaminants in surface soils rather than in soils three feet in depth).

b. Comment: The text states that six of the thirteen soil samples collected from five boring locations were analyzed for benzene, toluene, ethylbenzene and xylenes and an additional four samples were analyzed for TCL semivolatile organic compounds, metals and TPH. Text, tables and/or figures are not provided to show the logic behind the sampling schemes.

2. Page 7-2, Section entitled 7.1.1 (Chemicals of Concern - Soil), paragraph 3

Comment: Phenanthrene was detected in two of the five soil samples analyzed but was eliminated from the list of chemicals of concern because no toxicological information was available for it. The HHEM (Section 8.4.1) discusses the need to identify and evaluate important site-specific uncertainty factors inherent in the risk characterization. Chemicals not included in the quantitative risk assessment, as a result of missing information on health effects or a lack of quantitation in the chemical analyses may represent a significant uncertainty in the final risk assessment. Site specific uncertainty factors were not addressed.

Recommendation: Identify and evaluate site specific toxicity assessment uncertainty factors. Discuss the possible consequences of not including certain chemicals in the quantitative risk assessment and the uncertainties that missing data will have on the risk assessment.

3. Page 7-3, Section entitled 7.1.1 (Chemicals of Concern - Soil), paragraph 1

Comment: Arsenic, vanadium, and chromium were omitted from the list of chemicals of concern because all positive results were less than or comparable to background levels; beryllium, cadmium, cobalt, zinc and nickel were not included because of their low frequency of positive detections (less than 4 out of 13 samples) and their comparability to background concentrations. A low frequency of positive detections for a specific chemical(s) is not justification for omitting chemicals from the risk assessment. The concentration at a specific location may be sufficiently high (although the frequency is low) to drive a remediation effort. Information is not provided regarding the specific boreholes in which the infrequently detected materials appeared and what the concentrations were; therefore the logic to remove them from consideration cannot be evaluated.

4. Page 7-3, Section 7.1.2 (Chemicals of Concern - Groundwater), paragraph 3

a. Comment: The text states that phenanthrene and dibenzofuran were eliminated from the list of chemicals of concern because they were detected at low concentrations in only one sample. Sample results are not provided to evaluate the determination.

b. Comment: This is the first of many times that the text states that aluminum, calcium, iron, magnesium, potassium and sodium were not retained as chemicals of concern because of their low toxicity to human receptors; they are essential nutrients. Concentrations of these chemicals were not provided in the text or in the tables. All chemicals, regardless of whether or not they are essential nutrients are toxic at some dose. This statement does not belong in a risk assessment.

Recommendation: Remove this statement from the risk assessment. To eliminate chemicals from the risk assessment, they should be compared to site background and/or natural background concentrations.

5. Page 7-3, Section 7.1.2 (Chemicals of Concern - Groundwater), paragraph 3

Comment: Phenanthrene and dibenzofuran were eliminated from the list of chemicals of concern because they were detected at low concentrations in only one sample. The basis for determining that the concentrations are low is not provided. To adequately evaluate whether or not these chemicals can be eliminated from the risk assessment specific sample results and locations must be provided.

6. Page 7-3, Section 7.1.2 (Chemicals of Concern - Groundwater), paragraph 3

Comment: Again the text discusses the elimination of data from the risk assessment because of their low toxicity.

Recommendation: See "Comment 4" and "Recommendation 4B."

7. Page 7-6, Section 7.1.3 (Chemicals of Concern - Surface Water), paragraph 1

Comment: This is the first time of many that the text discusses the collection of duplicate samples. Analytical data is not provided which shows the concentrations observed in the duplicate samples in comparison to the other samples. Specific results for duplicate samples and their comparison samples were not provided.

8. Page 7-6, Section 7.1.3 (Chemicals of Concern - Surface Water), paragraph 2

Comment: Dimethyl phthalate and nine metals were detected in the surface water samples. The list was screened to six chemicals of concern based on a review of chemical toxicity. No information regarding the specific chemicals that were screened out and their concentrations was provided.

9. Page 7-6, Section 7.1.3 (Chemicals of Concern - Surface Water), paragraph 2

Comment: Again, the text discusses the elimination of data from the risk assessment because of their low toxicity.

Recommendation: See "Comment 4" and "Recommendation 4B."

10. Page 7-8, Table 7-4 "Chemicals of Concern - Sediment Site 29 - Crash Crew Burn Pit MCALF, Bogue Field, North Carolina"

Comment: This is the first table of many that lists chromium III as a chemical of concern. The EPA analyses for chromium specify methods to evaluate total chromium and hexavalent chromium. The sampling methodology used for the determination of chromium (III) and justification for determining chromium (III), rather than chromium (VI) or total chromium, were not presented.

11. Page 7-13, Section 7.3 (Exposure Assessment), paragraph 3

Comment: The text states that a future residential use scenario will be considered in this risk assessment for the area around the site. A definitive statement concerning whether or not personnel currently live on site is not addressed. Table 7-8, "Representative Concentrations and Estimated Intakes - Soil..." provides an estimated intake concentration for adolescent trespassers; the text discusses adolescents playing at the site, throughout the text. Since base access to base entrances is generally restricted, this indicates there is a residential current scenario. The tables for presenting estimated intakes and risks do not delineate particular scenarios.

12. Page 7-17, Section 7.3.1.1 (Soil)

Comment: An inhalation scenario of fugitive dust generated by wind action on contaminated soils is addressed. Risk calculations for this scenario are provided on subsequent tables. No information regarding the exposure setting (e.g., topography, vegetation, climate, soil type, etc.) is provided to substantiate or negate the inhalation pathway.

13. Page 7-17, Section 7.3.1.3 (Surface Water)

Comment: It is mentioned that a drainage ditch near the site cannot support recreational activities. No mention is made of offsite recreational activities which may be impacted by Site 29. Bogue Field is adjacent to the ocean and possibly next to a recreational and fishing area. No information was provided on groundwater flow and therefore whether or not the contaminants impact the local beach.

Additional Comments

14. Page 7-14, Table 7-5, "Federal Regulation Requirements and Dose-response Parameters for Chemicals of Concern..."

Comment: An oral reference dose is not provided for phenol. The HEAST document lists an oral RfD of 6×10^{-1} .

Recommendation: Add the oral RfD to the table or justify why it should not be inserted.

15. Page 7-15, Table 7-5, "Federal Regulation Requirements and Dose-response Parameters for Chemicals of Concern..."

Comment: The oral reference doses (RfDs) listed for cobalt and copper are not listed in the Health Effects Exposure Summary Tables (HEAST). Furthermore, the HEAST document states that the Drinking Water Criteria Document concluded that toxicity data were inadequate for calculations of an RfD for copper; 1.3 mg/l is the HEAST listed value for the oral RfD.

Recommendation: Provide information regarding the source of the RfDs provided for cobalt and copper.

16. Page 7-15, Table 7-5, "Federal Regulation Requirements and Dose-response Parameters for Chemicals of Concern..."

Comment: An inhalation RfD is not provided for manganese. The HEAST document lists an inhalation RfD of 4×10^{-4} .

Recommendation: Add the oral RfD to the table or justify why it should not be inserted.

17. The text states that the cancer risks associated with soil exposure were less than the EPA risk goal of 1×10^{-6} and that the cancer risks associated with dermal contact and incidental ingestion are still within the range goal of 10^{-4} to 10^{-6} . In the preamble discussion to section 300.430 (e)(2) of the NCP Final Rule (Federal Register Vol. 55, No. 46, March 8, 1990, pages 54-55) it is explained that the EPA uses the "risk range" of $1E-06$ to $1E-04$ only for the risk due to a specific medium where there are ARARs which define the risk. The NCP final rule states that "The 10^{-6} risk level shall be used as a "point of departure" for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure" (40 CFR Part 300 Sec 300.430(e)(2)(i)(A)(2).

Recommendation: When summarizing risk, state total carcinogenic risk and total hazard index in relation to a specific medium. Then (as a discrete secondary step) provide "multiple pathway" risk and acknowledge that the EPA will use 10^{-6} as the "point of departure" for determining remediation goals for multiple contaminants and/or multiple pathways.

18. Page 7-44, Section 7.4.2 (Groundwater Exposure), paragraph 2

Comment: The potential for noncarcinogenic adverse health effects is addressed with the qualifier "if the groundwater is used on a routine basis." The risk assessment should have taken into account the expected frequency of groundwater uses; the assumptions made should be reflected in the calculations.

Recommendation: Remove the qualifier "if the groundwater is used on a routine basis."

19. Page 7-45, Table 7-17, "Estimated Carcinogenic and Noncarcinogenic Risks-Potential Groundwater Exposure..."

Comment: The table does not list an inhalation incremental cancer risk for arsenic, cadmium, or beryllium. Inhalation slope factors are available in the HEAST document for both chemicals. It is not clear why a carcinogenic inhalation risk was not determined.

Recommendation: Calculate the inhalation carcinogenic risks for arsenic, cadmium and beryllium or provide a justification as to why they should not be calculated.