CP-00500-3.01-6/15/92

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REMARKS:

FROM:

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CODE: LN

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JIM,

FAX TRANS INCLUDES MARKED PAGES OF "RESPONSE TO COMMENTS - UNITS 5 AND 17"

HOPE THIS WILL FLY!

THANKS,

RENÉE

RESPONSE TO COMMENTS - UNITS 5 AND 17

J. Franmathes Comments

1. To further understand the extent of contamination and the context of the report contained within the Unit 17 discussion, a unified numbering system should be developed and implemented. In reviewing the sections of the report referring to Unit 17, the reader could not determine the location of the samples due to a repetitive and complex numbering system.

Response: During the 1990 field investigation, field personnel inadvertently assigned sample numbers starting with "01" instead of with the next sequential number as was done at other sites. ~~This field error has led to the confusion regarding the nature and extent of contamination~~. At the time of report preparation, HALLIBURTON NUS considered changing the sample numbering scheme to a sequential one, however, this would result in some amount of confusion regarding sample chain of custody forms, field notebooks, laboratory reports, etc., all of which are maintained in the project files for future reference. HALLIBURTON NUS will provide additional details regarding this numbering scheme in the body of the report, as well as making the figures more legible to clear up some of the confusion. DELETE

2. Figure 6-3 of the report illustrates concentrations of PCB's, however, it does not include the creek and several points beyond the shaded area. In addition, as stated above, the data used to illustrate the extent of contamination could not be determined from the figure.

Response: Sample results in the creek were not included in this figure, which was intended to show only those general locations at which PCB concentrations exceeded 1, 5, and 10 mg/kg, because all concentrations in the sediment samples collected from Schoolhouse Branch were below 1 mg/kg. State and EPA cleanup goals are 5 and 10 mg/kg, respectively. One sample collected in 1985/1987 contained 1.1 mg/kg total PCBs, but this sample is contained within the shaded area for greater than 5 mg/kg (17SD05a).

The data used to generate this figure were contained in Table 6-6. A reference to this table will be added to the text when the figure is mentioned.

3. Groundwater samples were analysed for PCB's, however, were not analysed for the constituents listed in 40 C.F.R. Appendix IX. These constituents should be addressed in the report.

Response: Earlier sampling at Unit 17 was conducted for priority pollutant analyses. The most recent investigation

Pollution Monitoring (Gilbert, 1987) to arrive at the 95% upper confidence limit for normal distributions. However, environmental data often come from a lognormal distribution which is highly skewed to the right (i.e., 'hot spots'). To account for this deviation from a normal distribution, Chapter 13 of this book presents methods for estimating the mean, standard deviation, and confidence limit for lognormal distributions. Equation 3.13 (sic) should be used to calculate representative concentrations for each chemical of concern. Also, a one-sided limit should be used instead of a two-sided limit.

Response: While it is true that environmental data often come from lognormally distributed data sets, in many instances, the distribution can be normal. A test for data distribution would first be required, and in many cases, the typical (simple) test (e.g., the Shapiro-Wilk W-test) is inconclusive regarding distribution. This requires the contractor to proceed to a nonparametric test for data distribution prior to applying the appropriate test for distribution. While all of this is technically correct, the approach taken by HALLIBURTON NUS is more conservative for several reasons.

First, using the upper confidence limit on the arithmetic average (assuming normal distribution) results in a higher concentration than by using the geometric mean (assuming lognormal distribution). The geometric mean for a given sample set is always less than the arithmetic average, and hence the calculated upper confidence limit is higher using the normal distribution equation than the confidence limit on the geometric mean using the requested equation for lognormally distributed data.

Second, using a two-sided upper 95% confidence limit is the same as using a one-sided upper 97.5% confidence limit. In addition, HALLIBURTON NUS only used the upper limit rather than the upper and lower limit for the two-sided test, and did not present a range of concentrations as the two-sided limit calculates.

Third, Risk Assessment Guidance for Superfund does not specify one- or two-sided tests, it only requires that the upper 95% confidence limit be used. The Region IV supplemental guidance published in March 1991 was not available to this contractor at the time of report preparation (submitted to the Navy for review in April 1991 and submitted to the regulators in May 1991).

~~Therefore,~~ HALLIBURTON NUS can ensure that the approach taken, ~~which used the latter of the Region IV guidance issued a month prior to report submittal,~~ is more conservative than the March 1991 guidance and has not resulted in underestimating potential risks to receptors. Text to this effect will

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be added to Section 2.4.2.

4. Section 2.4.3, page 2-27, Table 2-4. The Health-Advisory data should be changed to reflect the updated November 1991 values (the table uses data from the November 1990 report). The appropriate reference doses and slope factors should also be listed in the carcinogenic risk and hazard quotient tables for each unit.

Response: Table 2-4 was prepared in April 1991, and all dose-response parameters and Health Advisories were current for that time. The table will be updated to reflect the most current numbers available from IRIS and the Health Advisory summary tables from November 1991.

5. Section 2.4.3, page 2-30, Table 2-4. Relative slope factors were assigned to benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and dibenzo(a)anthracene (sic) based on a slope factor of 11.5 kg-day/mg for benzo(a)pyrene. Region IV has recently adopted a toxicity equivalency factor methodology for carcinogenic PAHs based on the relative potency of each compound to the potency of benzo(a)pyrene. This approach should be incorporated into the document. The attached memo outlines this methodology as well as other new interim Region IV Guidance.

Response: Table 2-4 will be revised to reflect the updated cancer slope factor for benzo(a)pyrene (5.8 kg-day/mg), as well as the Region IV guidance on toxicity equivalents as provided in a February 1992 memorandum. All subsequent tables on which risks were presented will be revised to reflect this new toxicity information.

6. Section 2.4.4.1, page 2-38. There is no mention of the potential for inhalation exposure as a result of either the of the following mechanisms: (1) volatilization and/or particulate emissions from contaminated surface soil or (2) volatilization of contaminants in groundwater during household use (i.e., cooking or showering). Although these exposure routes are not specifically addressed in the RFI Guidance for the health and environmental assessment process, these pathways should at least be discussed in the baseline risk assessment.

Response: Volatilization is not a significant exposure route at this site, given the low concentrations of volatile organic chemicals in the surface soil, the sandy nature of the soil (which would promote volatilization from old surface spills), and the age of the sites. Text will be added to this section that discusses volatilization and the reasons that it is felt to be ~~unimportant~~ insignificant at these sites.

Particulate emissions will be addressed for a

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construction scenario in which adult personnel are assumed to be exposed at the frequency, etc., requested in Comment 7. This scenario would result in higher risks than for the maintenance scenario, primarily because under the defined scenario exposure is limited to surface soil only. The units are all currently vegetated, and fugitive dust emissions would be minimal. In addition, no one actually works all day outside in these areas. Text to this effect will be added to the new section describing the inhalation exposure scenario.

Volatile emissions from groundwater, as well as dermal contact, will be added for adult residents under the scenario for the future residential use of groundwater. Table 2-7 will be expanded to include the appropriate exposure input parameters shown below:

- Inhalation rate = 14 L/min
- Exposure time = 15 min/day, 350 days/year
- Exposure duration = 10 years based on 2 to 3 tours of duty for military personnel
- Exposed skin surface area = 19,400 cm^2
- Dermal permeability constant = 1E-03, as per Comment 8, assuming that all chemicals are present in dilute solution and that their flux is controlled by that of water

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Even when only ingestion was addressed, there were no "stay areas" in the risk.

that is, risks were above 10^{-4} when ingestion alone was considered, thereby prompting a CMS.

It should be noted that, at these four units under discussion in this report, that the groundwater is either acceptable for potable use or it is not, even when only the ingestion route of exposure is addressed. The addition of the inhalation and dermal pathways does not change the conclusions of the groundwater investigations for Units 10 and 16, which is that groundwater is of unacceptable quality for potable use and that a CMS is needed. Cleanup goals are not calculated in the RFI portion of the investigation. EPA guidance on development of Preliminary Remediation Goals will be used as a first cut for this task in the CMS.

confusing clarify

7. Section 2.4.4.2, page 2-39. Three separate populations should be considered when evaluating exposure to soil: (1) base personnel; (2) adolescent trespassers; and (3) maintenance/construction workers. Base personnel who are not involved in maintenance activities may also be exposed to surficial soil while at the work place. All three populations should be carried through the quantitative risk assessment so that cancer risks and hazard indices are calculated for each individual population. "Standard Default Exposure Factors" (OSWER Directive 9285.6-03, March 1991) provides standard default values for the commercial/industrial setting.

Unless there are site-specific reasons for not evaluating exposure to base personnel during a normal work day (other

rate to make the adjustment. This comment applies to the calculation of risk for all units.

Response: ~~The reviewer commented that she was able to duplicate the final risk numbers even though the lifetime intakes were not presented in the tables. While it is possible to create tables that include the lifetime intakes (All of which~~ are presented in the spreadsheets in the appendices~~, the usefulness of such tables is questioned. The real concern for these units is whether or not they present an unacceptable risk to receptors, not what the intakes are. This would require generation of new (almost duplicate) sets of tables because this information will not fit on the existing tables and would really add nothing substantive to the report.~~ LIFETIME INTAKES

HALLIBURTON NUS ~~proposes to~~ will add a footnote to each of the intake tables indicating that the doses presented are the chronic daily intakes, and that the lifetime intakes can be found in the appropriate appendix. In addition, the appendices containing the lifetime intakes will also be referenced in the text.

With respect to the second part of the comment regarding the conversion of toxicity parameters for dermal exposures, the following information is offered. While HALLIBURTON NUS is familiar with Appendix A of Risk Assessment Guidance for Superfund, two alternative approaches are possible. First, without absorption information available for many of the chemicals of concern at these units short of requesting such information from ECAO (which can take months and often requires the direct intervention of EPA personnel for a contractor), we can make some assumptions. Absorption of many of the halogenated aliphatics is almost complete (e.g., 90 to 100 %), while information on other chemicals is sparse to nonexistent in the literature/IRIS. Therefore, since RAGS proposes the use of a 5 % absorption for metals to be conservative, the 5 % figure can be applied across the board. This would reduce the reference doses by a factor of 20, which would increase the Hazard Quotient by a factor of 20. The same increase would apply to the cancer risk.

The second option is in line with the latest dermal absorption guidance document EPA Headquarters (Dermal Exposure Assessment: Principles and Applications, EPA 60/8-91/011b), published in January 1992, which offers the following solution: to use the oral slope factors and reference doses directly and to offer a strong statement regarding the uncertainties involved in doing so (page 10-10).

HALLIBURTON NUS proposes to add footnotes to the risk tables to present the risks multiplied by a factor of 20

EPA concurred during the preparation of the Work Plan for this Unit that volatile organics were not site-related and would not be evaluated further in the RFI.

11. Section 3.6, page 3-47. Although most of the individual soil constituents did not exceed their respective action levels in the screening level health assessment, the overall risk may still deem that a CMS is required since there were so many constituents detected in the soil. In accordance with Section 2.4.1, an evaluation of the chemical mixtures should be completed before the chemicals that do not exceed their respective action levels are excluded from the baseline risk assessment.

Response: The onset of toxic or carcinogenic effects is unlikely to occur at Unit 5 from the presence of several other analytes at concentrations below the action levels. Table 3-14 shows that the maximum concentrations of these other chemicals were, with two exceptions (lead and vanadium), at least one order of magnitude below the action level and in many cases two or more orders of magnitude below. In addition, the action levels are based on the assumption of constant exposure in a residential setting, which was considered unlikely to occur at this facility since it is neither slated for closure nor does the current master plan call for development of housing in any of these areas. Therefore, while there may be multiple chemicals detected at these units (particularly Unit 5), the onset of adverse human health effects is highly unlikely and therefore also unlikely that corrective measures would be required for contaminants other than the PCBs (which are present at concentrations greater than the state cleanup goals) since the chemicals considered in the risk assessment do not pose an unacceptable risk under current land use conditions.

12. Section 3.7.3. The reviewer was able to duplicate the carcinogenic risks and hazard quotients for soil exposure at Unit 5. However, the exposure doses listed in Table 3-16 only show chronic daily intakes (intakes that are averaged over the period of exposure). These intakes are only appropriate for calculating noncarcinogenic effects. The lifetime intakes (intakes that are averaged over a lifetime of 70 years) should also be presented in all exposure dose tables throughout the document so that carcinogenic risk can be readily verified.

When calculating risk from dermal exposure, toxicity values that are expressed as an administered dose (reference dose and cancer slope factors) must be converted to an absorbed dose. Refer to Appendix A of the Risk Assessment Guidance for Superfund, Volume I, for guidance on how to make this conversion. A table should be included in the risk assessment that summarizes the adjusted toxicity values and absorption

to account for some conservative dermal absorption assumptions, with appropriate text in the discussion on dose-response parameters. However, an additional statement will be added to the uncertainty discussion in Section 2.4.5 that discusses this issue.

13. Section 3.8.1.3, page 3-64. The RFI focuses on soils that are less than five feet below the land surface (bls). Although organic contaminants were infrequently detected at depths greater than five feet bls, the text should include an explanation in this section as to why leaching tests will not be used to assess the potential for release of contaminants to ground water from the deeper soils (5.5 - 10 feet bls). There is a statement in Section 2.4 that mentions that these tests may be conducted.

Response: At Units 5 and 17, the primary contaminants that will drive the corrective measures are the PCBs in soil. However, PAHs and dieldrin were found at maximum concentrations greater than the soil ingestion action level. All these compounds are very insoluble, and are not likely to be found in the groundwater (see Table 2-4 of the RFI report and the associated text). Fourteen soil samples were collected from depths of greater than 5.5 feet, and the following contaminants were detected: gamma-BHC in two samples at a maximum concentration of 8.1 µg/kg and heptachlor epoxide in one sample at a concentration of 5.8 µg/kg. Based on these results, there is minimal potential for leaching of contamination at this site.

14. Pages 6-1 through 6-4 were missing from the document.

Response: Hopefully the reviewer was provided with copies of the first page of text and two figures that make up the first four pages of this section from another review copy provided to the EPA. HALLIBURTON NUS apologizes for any inconvenience this may have caused.

15. Section 6.4.1, page 6-12, paragraph 3, fifth sentence. The North Carolina clean-up goal for PCBs is 5,000 µg/kg and the EPA standard for nonresidential areas is 10,000 µg/kg. The units should be changed in the document.

Response: The text will be changed to reflect the proper units for the cleanup goals.

16. Section 6.4.1, page 6-12. PCBs were detected in 14 of 17 surficial soil samples (0-0.5 ft) and 4 of 5 shallow subsurface soil samples (2-2.5 feet). PCBs were not detected in the single deep subsurface soil sample 3-3.5 ft) that was collected. However, the deep sample was collected from the boring that also did not have a hit at the shallow subsurface soil depth. Since PCBs were detected in 4 out of the 5