



# UNIVERSITY OF FLORIDA

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Dear Ms. Mora-Applegate:

I have reviewed the *Final Remedial Investigation Report, Site 38, Naval Air Station Pensacola, Florida*, prepared by EnSafe/Allen & Hoshall (E/A&H) and dated August 12, 1996. The manner in which the risk assessment was performed was generally consistent with USEPA guidance and FDEP accepted practices. There are, however, some areas of concern with the analysis, as outlined in my comments below.

1. E/A&H defines surface soil samples for use in health-based risk calculations as samples from 0 to 1 foot of soil, and uses data below 1 foot in evaluating potential leachability (see pg. 7-5). FDEP typically regards soils from 0 to 2 feet as surficial soils when evaluating potential risks from direct soil contact, and all soils from the surface to the water table when evaluating leachability.
2. There are apparently some problems with consistency in presentation of the data among various tables and in the text. For example, the maximum concentration of aluminum detected in soils in the Building 71 area is described as 21,200 mg/kg on pg. 7-10, and this is the value listed as the maximum in Table N-1 in Appendix N. Appendix L, however, lists aluminum soil concentrations as high as 24,300 mg/kg. Similar discrepancies are seen for arsenic, beryllium, manganese, iron, and others. There are also problems with consistency in presentation of soils data for Building 604, as well as groundwater data.
3. E/A&H correctly cite EPA Region IV guidance as indicating that the arithmetic mean of groundwater concentrations in the most concentrated area of a plume can be used as the EPC. The approach taken by E/A&H is not entirely consistent with this guidance, however. In this report, E/A&H used either the maximum concentration, the UCL, or the arithmetic mean of the detected concentrations. The maximum concentration was used as the EPC only in instances where a contaminant was detected only once or in less than 5% of the total samples analyzed (see pg. 10-17). For the remainder of the chemicals, "... If the UCL was greater than the maximum reported concentration, the arithmetic mean of the detected concentrations was used as EPC. The UCL and arithmetic mean were compared for the remaining chemicals, and the higher concentration was used as EPC." The arithmetic mean of all of the detected concentrations is not the same thing as the arithmetic mean of concentrations within the most concentrated area of the plume. Including marginally Contaminated samples in the averaging process has the potential to inappropriately lower the EPC. With respect to the last comparison ("... The UCL and arithmetic mean were compared ...") it is unclear how the UCL

could ever be lower than the mean, unless different datasets are used for the calculations. This should be clarified.

4. The report indicates that when the maximum reported concentration was used as the EPC for groundwater, it was "... modified based on the FI to reflect site-wide exposure." Individuals are generally not assumed to have site-wide exposure to groundwater — consumption of groundwater for domestic purposes will come from a single well. As such, the use of an FI less than 1 (100%) in calculating groundwater contaminant intakes is inappropriate. FI and FC values are also used extensively in calculating exposure to soils. Justification for these values is not well explained. On page 10-56, there is some discussion of an FI/FC based on the percentage of the total exposure area encompassed by the contaminated soil in the case of hot spots. I could find no information regarding procedures for estimating this area, however.

In summary, there are a number of important weaknesses in the risk assessment portion of this remedial investigation report that need to be corrected: 1) Discrepancies in data presentation need to be corrected to insure that correct data are being used in the risk calculations; 2) Development of groundwater EPCs needs to be re-evaluated so as to be consistent with USEPA Region IV guidance; 3) FI/FC values of 1 (100%) should be used for groundwater intake calculations; and 4) better [clearer] justification needs to be provided for any FI/FC less than 1 for soils.

If you have any questions regarding these comments, please feel free to contact me.

Sincerely,



Stephen M. Roberts, Ph.D.