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LETTER AND COMMENTS FROM UNIVERSITY OF FLORIDA REGARDING REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 2 NAS PENSACOLA FL
11/26/1997
UNIVERSITY OF FLORIDA

UNIVERSITY OF FLORIDA

Center for Environmental & Human Toxicology

P.O. Box 110885
Gainesville, Florida 32611-0885
Tel.: (352) 392-4700, ext. 5500
Fax: (352) 392-4707

November 26, 1997

Mr. John Mitchell
Bureau of Waste Cleanup
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Mr. Mitchell:

At your request, we have reviewed the *Remedial Investigation Report (RIR) for OU 2 at Naval Air Station Pensacola, Florida.* This report was prepared by Ensafe/Allen & Hoshall (E/A&H) and dated September 10, 1997. We previously reviewed the *Draft Remedial Investigation Report* for OU 2 and provided comments to you in a letter dated November 15, 1996, and we have been provided with responses to these comments from E/A&H. Based on our review of the RIS and comments, we have the following comments.

**Section 10 Baseline Risk Assessment**

OU 2 consists of 6 contaminated sites located on the northeast part of NAS Pensacola. The baseline risk assessment (BRA) addresses contamination of and potential risk from each site separately. The BRA, while generally performed in accordance with USEPA, USEPA Region IV, and FDEP guidelines and practices, still has some significant problems and inadequacies, as outlined below.

*Subsection 10-2-4- Management of Site-Related Data*

On page 10-7, the treatment of nondetected sample results is discussed. For organics, if the contaminant concentration was less than one-half the SQL, then one-half of the detected concentration was substituted for the concentration. If the detected value was higher than one-half of the SQL, then this value was compared to one-half of the lowest detected concentration, and the lower of the two was used as the concentration. For inorganics, one-half of the detected concentration was used. This method will tend to bias the mean of the data towards lower values, and is not as conservative as the RAGS guidelines, which state that "If there is reason to believe that the chemical is present in a sample at a concentration below the SQL, use one-half of the SQL as a proxy concentration. The SQL itself can be used if there is reason to believe the concentration is closer to it than to one-half the SQL." The method used by E/A&H assumes that the maximum detected concentration is the maximum for all samples (including samples with a large SQL), however there is no justification for this assumption. Therefore, one-half the SQL should be used for all nondetects, both organic and inorganic.

*Subsection 10-2-7 Exposure Assessment*

The potential risk from contact with subsurface soils was not addressed in this BRA. Construction workers could be expected to be exposed to subsurface soil, however risk to construction workers was not calculated because "Construction would generally not disturb soil below the 0- to 2-foot surface soil interval since the water table is too close to the surface. Therefore direct uniform exposure to subsurface soil conditions is not likely." However, the presence of groundwater near land surface does not preclude the plausibility of construction activities.

It is stated on page 10-13 that "adolescent trespassers are a potentially exposed population; however, trespassers would not be likely to frequent all of the OU 2 sites. As a result, this population is not addressed for all sites." Presumably, this is because some sites are fenced and expected to remain "as is" for a period of at least five years. To prevent trespasser access to these sites after five years, the BRA should address the need for continued fencing, etc. around the sites to limit possible future access NOT IF ARA IS CONDUCTED

Exposure point concentrations (EPC) were calculated for groundwater COPCs with more than 10 samples by using the larger of the 95% UCL for the mean or the arithmetic mean of all detected concentrations. This is contrary to USEPA Region IV guidance for groundwater, which does not recommend using the UCL or the arithmetic mean of all detected concentrations, but instead the arithmetic average of the concentrations in the most contaminated area of the plume. (Supplemental Guidance to RAGS: Region IV Bulletins - *Human Health Risk Assessment*, 1996.) E/H&A state on page 10-46 that "since there is no readily definable plume for Site 11 groundwater COPCs, the Region IV guidance for groundwater EPCs applies only marginally." If the Site 11 groundwater plume has not been defined, the more conservative approach would be to use the maximum detected concentrations as the EPCs. This comment is applicable for each site addressed in the BRA.

*Subsection 10.2.10 Risk Uncertainty*

It is stated on page 10-38 that "Exposure in a hot spot may be quantified by calculating an FI/FC from contaminated source factor based on the percentage of the total exposure area of the hot spot, then using this term to modify the maximum (or restricted area average) contaminant concentration to derive the EPC." As an example, this was done with Site 25, as explained on page 10-152 and shown on Table 10.3.3-10. The rationale for the use of the FI/FC term is stated as "the variability in the data caused the 95% UCL to exceed the maximum concentration, thus causing the EPC to default to the maximum concentration...since the traditional statistical approach failed to provide a reasonable EPC value, the FI/FC approach was used to account for the limited extent of contamination." For Site 25, FIs were used for Aroclor 1260 (0.4), cadmium (0.4), and dieldrin (0.5). However, Aroclor 1260 was detected in 7 of 16 samples (44%), cadmium was detected in 6 of 16 samples (38%), and dieldrin was detected in 8 of 16 samples (50%). This frequency of detection is not indicative of hot spot concentrations. Furthermore, when the 95% UCL is above the maximum detected concentration, this is not necessarily indicative of a hot spot, but rather of variable data. As we stated in our November, 1996 letter, the use of FI/FC to adjust the EPC for soils is valid only when the areas of contamination are well characterized. "Hot spots" must be carefully evaluated, and should not disappear from the analysis by the use of FI/FC approaches. The use of the FI/FC approach throughout this RIR should be reevaluated.

Table 10.3.1-4 (chemicals present in Site 11 groundwater samples, phase I) and Table 10.3.1-5 (chemicals present in Site 11 groundwater samples, phase II) list contaminants which were selected as COPCs for Site 11. It should be pointed out that, in Phase I samples, ethylbenzene and xylenes, at maximum detected concentrations of 58 and 200 g/L, respectively, were not retained as COPCs. It should be noted that these concentrations in groundwater may not be harmful to human health, but exceed the FDEP secondary and organoleptic groundwater standards for ethylbenzene and xylenes (30 and 20 µg/L, respectively). Groundwater contaminated with ethylbenzene and xylenes may therefore be considered to have an objectionable taste and odor, and this should be addressed in further assessments. Likewise sodium at a maximum detected concentration of 1,220,000 µg/L was excluded because it is an essential nutrient, yet this concentration exceeds the Florida Primary Standard for sodium in groundwater of 160,000 µg/L.

In Table 10.3.1-5, aluminum (maximum detected concentration: 1,110 µg/L) exceeds the secondary standard (200 µg/L). In addition, ethylbenzene and xylenes exceed the secondary standard, and sodium exceeds the primary standard.

RGOs for Site 11 are presented in Table 10.3.1-24 for groundwater. Both residential and industrial RGOs were calculated. The industrial RGOs may be useful pending site-specific future land use characteristics of the base.

Groundwater RGOs for aluminum, cadmium, 1,2-dichloroethane, iron, manganese, nickel, and trichloroethene exceed either primary or secondary standards for these contaminants. The comments in this and the preceding three paragraphs should be considered to be applicable, as necessary, to all sites in OU 2 reviewed in this BRA.

We hope that these comments are helpful. Please do not hesitate to contact us if you have any further questions.

Sincerely,

Stephen M Roberts

Stephen M. Roberts, Ph.D.

Christine Halmes

N. Christine Halmes, Ph.D.

UNIVERSITY OF FLORIDA

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Dear Mr. Mitchell:

At your request, we have reviewed the errata for the *Remedial Investigation Report (RIR) for Site 38 at Naval Air Station Pensacola, Florida.* This report was prepared by Ensafe/Allen & Hoshall (E/A&H) and dated September 5, 1997. We previously reviewed the *Final Remedial Investigation Report* for Site 38 and provided comments to you in a letter dated November 15, 1996, and we have been provided with responses to these comments from E/A&H. Based on our review of the errata and comments, we have the following comments.

**1. Responses to our November 15, 1997 comments:**

**Comment:** 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. 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 the 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 data sets are used for the calculations. This should be clarified.

**E/A&H Response:** Groundwater plumes at Site 38 are not clearly defined, and high concentrations were often observed at only one sample location. Consequently, using the arithmetic mean of the highest concentrations as the exposure point concentration would generally be the same as using the maximum reported concentration. RAGS does not recommend using maximum concentrations as exposure point concentrations. In

accordance with USEPA Region IV Supplemental Guidance to RAGS, the arithmetic mean concentration was calculated for groundwater EPC. Since one high concentration does not necessarily define a plume, all detected concentrations were used. The UCL usage has been eliminated. Regardless, risk was estimated for each sample location and for each chemical of concern. This is more specific information than is typically provided in baseline risk assessments, which are usually based on only one exposure point concentration that is assumed to represent all sample locations in one exposure unit area.

**Follow-Up Comment:** There still seems to be some confusion over USEPA and USEPA Region IV guidance for EPC in groundwater. Although the presentation of risk calculations for each well is helpful, for the overall risk at this site the averaging procedure is inappropriate. In the errata to the RIS, E/A&H state "Plumes in Site groundwater are generally defined by few samples, so the highest concentrations in the plume are all concentrations reported. Consequently, the arithmetic mean of the highest concentrations in the plume would be closely approximated by the arithmetic mean of the detected concentrations" (page 10-16). However, by averaging samples with a very low contaminant concentration with those that have high concentrations, exposure is likely to be underestimated. Having few samples and ill-defined plumes is not a reasonable justification for averaging values, but on the contrary points to the need for the use of maximum detected values as EPC for groundwater. Region IV guidance allows for the use of the arithmetic mean for groundwater only in the highly concentrated area of the plume. Additionally, RAGS states that "If there is great variability in measured or modeled concentration values (such as when too few samples are taken or when model inputs are uncertain), the upper confidence limit on the average concentration will be high, and conceivably could be above the maximum detected or modeled value. In these cases, the maximum detected or modeled value should be used to estimate exposure concentrations." In this case, where it seems uncertain where the most highly concentrated area of the plume is located, neither the arithmetic mean nor the 95% UCL is appropriate to estimate the groundwater EPC; therefore, the maximum detected value should be used. For example, in Table 10-18 (*Hazard Quotients and Incremental Lifetime Cancer Risks for Ingestion of Groundwater at Site 38, Building 71 Area*) the EPC for 1,1,1-trichloroethane is listed as 0.1345 mg/L (the arithmetic mean of detected concentrations). If the maximum detected concentration of 0.77 mg/L were instead used, the child hazard quotient for 1,1,1-trichloroethane would increase from 0.25 to 1.58.

## 2. Comments on the errata to the RIS (Section 10-Baseline Risk Assessment)

*Section 10.2.5 Selection of Chemicals of Potential Concern*

On page 10-9, E/A&H states that "...USEPA indicated in the 6/25/97 Summary of TQM Contractor Meeting email, iron's reference dose (RfD) is not a proper RfD. In accordance with this guidance, iron should be addressed in the uncertainly section, if at all. Consequently, iron was not considered a COPC in this HHRA." If E/A&H want to eliminate iron from the Baseline Risk Assessment (BRA) on this basis, then the email document should be made available for review by FDEP. Iron was detected in surface soils and groundwater above screening levels, and some rationale should be given for why iron is not a health problem at this site, or an explanation should be given in the uncertainty section that E/A&H cannot determine whether the risk from iron is unacceptable.

To select COPCs, maximum detected concentrations of contaminants were compared to either USEPA Region III RBCs or FDEP Soil Cleanup Goals. It is stated on page 10-10 that "In accordance with USEPA Region IV Supplemental Guidance to RAGS, USEPA screening concentrations were adjusted from a target HQ goal of 1.0 to 0.1 for

noncarcinogens." However, in Tables 10-7, 10-8, 10-10, and 10-11 (*Chemicals Present in Site Samples for Building 71 Area*) and Tables and 10-30, 10-31, 10-33, and 10-34 (*Chemicals Present in Site Samples for Building 604 Area*) the division of screening values by 10 to reflect a HQ of 0.1 does not appear to have been done. Therefore, the following contaminants were inappropriately excluded as COPCs: Table 10-11, antimony, molybdenum, and thallium. In Table 10-34, it is unclear why lead was excluded as a COPC, with a maximum detected value of 639 µg/L; the screening value was 15 µg/L.

In Tables 10-10 and 10-33, some contaminants were excluded as COPCs due to low detection frequency (although they were included in point risk estimates). Based on USEPA Guidance as stated in RAGS, this exclusion was inappropriate in Table 10-10, as there were only 18 samples. RAGS states that if "a frequency of detection limit of five percent is used, then at least 20 samples of a medium would be needed." RAGS also states that, to exclude a contaminant based on low detection frequency, it must be detected infrequently, not be in any other media or at high concentrations, and there must be no reason to believe the chemical is present. The excluded chemicals in Table 10-10 exceed their screening values considerably. For example, based on a HQ of 0.1, 1,1-dichloroethene (42 µg/L) exceeds its screening value (0.0044 µg/L) by almost four orders of magnitude. Therefore, 1,1-dichloroethene, 1,2-dichloroethane, 1,4-dichlorobenzene, and bromomethane should not be eliminated from the site-wide assessment.

FOOT NOTE

In Tables 10-11 (Building 71) and 10-34 (Building 604), sodium was excluded as a groundwater COPC based on the lack of a screening level concentration and because it is an essential nutrient. However, there is a Florida primary standard for sodium in groundwater (160,000 µg/L). The maximum detected concentrations of sodium at Building 71 and Building 604 are 538,000 µg/L and 219,000 µg/L, respectively. Therefore, sodium should be retained as a COPC. HEAR WATER ?

*Section 10-2-6 Exposure Assessment*

Table 10-1 (page 10-14) lists exposure pathways for the site. Inhalation of volatile contaminants from surface soil was eliminated as an exposure pathway for current site workers and future residents and workers based on low concentrations of volatile contaminants in surface soil as well as the fact that portions of the site are paved or covered with buildings. Volatilization from subsurface soil to air was not considered a viable exposure pathway, although Table 9-1 (page 9-1) states that 6 VOCs were detected above screening levels in subsurface soils. Depending upon their concentrations, VOCs may volatilize from subsurface soils into buildings or ambient air; however, no volatilization models were included in the BRA. In any case, if the existence of paving or buildings is considered justification for exclusion of a potential receptor pathway, some institutional controls should be in place to ensure that pavement or buildings are not removed. With respect to subsurface soils, a table should be provided listing the contaminants and detected concentrations found in subsurface soil; Table 9-1 indicates that, in addition to the VOCs, 5 inorganics, 5 SVOCs, and 2 pesticides/PCBs were detected above screening levels in subsurface soils.

Also in Table 10-1, inhalation of chemicals in dust is excluded as a potential receptor pathway for current and future workers and future residents, based on the presence of pavement and vegetation. Will the pavement and vegetation remain "as is" for future uses of this site?

The potential risk to construction workers was not addressed in the BRA. The rationale for this is stated on page 10-61, "future worker assessment is considered to be protective of both current site use and future construction/maintenance workers' exposure

to surface soil...Direct contact with subsurface soil is unlikely because the water table is very close to land surface." However, the water table is close to land surface throughout Florida, yet this has hardly been an impediment to construction. The risk to construction workers should not be regarded as insignificant unless it is actually calculated. The risk to future site workers from ingestion and dermal contact with subsurface soils, inhalation of subsurface VOCs, and inhalation of dust was not addressed, yet construction workers would be expected to have these exposures. After the risk to construction workers is calculated, then it can be determined if it is minimal.

*Table 10-3 Toxicological Reference Information*

In Table 10-3 (*Toxicological Reference Information for Chemicals of Potential Concern*), the RfD for manganese is listed as 4.7E-02 mg/kg-day. On page 10-37, the rationale for this RfD is stated: "Because of the different uptake rates in water and food, a modified RfD was used in this HHRA. The RfD used was 0.047 mg/kg-day." According to recommendations in IRIS, an oral RfD for manganese should be developed by reducing the RfD of 0.14 mg/kg-day to account for a dietary intake of approximately 5 mg/day and then applying a modifying factor of 3 to account for environmental exposures. This results in an oral RfD of 2.3E-02, which is the value used by both FDEP and USEPA Region III.

The ecological risk assessment for Site 38 was not a part of this document, and was therefore not reviewed.

We hope that these comments are helpful. If you have any further questions, please do not hesitate to contact us.

Sincerely,

Stephen M. Roberts

Stephen M. Roberts, Ph.D.

Christine Halmes

N. Christine Halmes, Ph.D.

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