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LETTER REGARDING REGULATORY COMMENTS ON FINAL DRAFT REMEDIAL INVESTIGATION AT OPERABLE UNIT 4 (OU 4) AND STUDY AREAS 12, 13, 14 NTC ORLANDO FL

1/29/1999

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

FLORIDA
Governor

Department of Environmental Prote

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Kirby B. Green, III
Secretary

09.01.04.0012
00311

January 29, 1999

Mr. Wayne Hansel
Code 18B7
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
North Charleston, South Carolina 29419-0068

RE: Final Draft, Remedial Investigation, Operable Unit 4, Study Areas 12, 13 and 14 (Area C), NTC Orlando, Florida

Dear Mr. Hansel:

I have completed the review of the Final Draft Remedial Investigation for Operable Unit 4, NTC Orlando, dated September 1998 (received September 4, 1998), prepared and submitted by Harding Lawson Associates. I have attached comments from the Department's contracted risk assessors from the University of Florida Center for Environmental & Human Toxicology. I have the following comments that also should be addressed in the Final Remedial Investigation Report:

(1) Figure 2-1 on page 2-5 shows two wells located in Area "C", an abandoned production well and a drainage well. These wells are not described adequately in the text. Specifications on these wells and their history should be provided in Chapter 3.

(2) A well survey should be conducted in the vicinity (1/4 to 1/2 mile) of OU-4. Well locations should be shown on a figure and specifications of the wells, including their history, should be provided in a table.

(3) Chapter 4 should be expanded to include a summarization of samples that failed holding times, matrix spike duplicates, field and laboratory blanks, laboratory duplicates, etc. This could be a summary of the PARCC Report in Appendix J. Also, a discussion of data qualifiers and overall quality and usefulness of the data should be included in this section. Finally, a discussion of contaminants detected in laboratory and field blanks should be included to determine which contaminants may be excluded on that basis.

(4) Possible sources of antimony should be discussed in Section 5.1.

(5) The Remedial Investigation Report repeatedly references the Florida Soil Cleanup Goals (FDEP, 1985). These numbers are obsolete. The Soil Cleanup Target Levels (SCTLs) for Chapter 62-785, Florida Administrative Code, should be used as these are the latest risk-based cleanup levels.

(6) The residential SCTL for beryllium is 120 mg/kg. The increase in this number from the previous SCG may drop this contaminant as a chemical of concern in soil.

(7) A table should be included in Chapter 4 listing the contaminants detected in the DPT groundwater sampling and the depths at which the samples were taken.

(8) Figure 5-6 does not indicate at what depths the contaminants were detected in the chemboxes.

(9) In Section 5.2.3.5, it is stated that antimony is dispersed and probably not plume shaped, possibly the result of a non-point source release or a natural occurrence. This statement is not supported by the analytical data.

(10) The chembox for sample U4D010 on figure 5-11 incorrectly has cadmium at a concentration of 7,080 mg/kg. That is the concentration of calcium. The correct concentration (average) is .39 mg/kg.

(11) Sediment sample U4D050 and surface water sample U4W050 cannot be considered as true control samples as volitile organic halocarbon (VOH) contaminants associated with the site were detected. A control sample would need to be obtained from an area of the lake not impacted by the site.

(12) It is stated on page 7-8 that migration of the volatile organic halocarbon (VOH) plume beyond the near shore of Lake Druid likely does not occur. This has not been verified by actual sample collection and analysis. Surface water sample U4W019, further from the shoreline and directly out from sample U4W010, had appreciable amounts of VOHs. A sediment sample taken at that location also had appreciable amounts of VOHs. Furthermore, "control" samples U4D050 and U4W050, collected from an area not believed to be impacted by the VOH plume, also had detected VOHs. It is possible that contaminants are migrating from groundwater to sediment and surface water further from the shoreline than is predicted in the report.

(13) Section 8.3.1 discusses the demographics and land usage around the Main Base. This discussion should focus on demographics and land usage around Area C.

(14) The extent of contaminants in surface water and sediments does not appear to have been adequately characterized. The

lateral extent of VOHs has not been determined. Also, only two sample locations were analyzed for full TAL/TCL, one location being where the "control" samples U4D050/U4W050 were collected. Because the "control" samples appear to have been impacted by site contaminants (see comment 12), the rationale for not addressing contaminants other than VOHs because they were detected in the "control" sample at similar concentrations is not valid.

If I can be of any further assistance with this matter, please contact me at (850)488-3693.

Sincerely,

David P. Grabka
Remedial Project Manager

cc: Lt. Gary Whipple, NTC Orlando
Barbara Nwokike, Navy SouthDiv
Nancy Rodriguez, USEPA Region 4
Richard Allen, HLA, Jacksonville
Steve McCoy, Brown & Root, Oak Ridge
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January 26, 1999

Ligia Mora-Applegate
Bureau of Waste Cleanup
Florida Department of Environmental Protection
Room 471A, Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399

Dear Ms. Mora-Applegate:

At your request, we have reviewed the Final Draft Remedial Investigation (RI) for Operable Unit 4 (OU4) at the Naval Training Center in Orlando, Florida, prepared by Harding Lawson Associates (HLA) and dated September, 1998. OU4 is located at Area C of NTC Orlando and encompasses Study Area (SA) 12 (the Defense Reutilization and Marketing Office (DRMO) warehouses and salvage yard), SA 13 (the former base laundry and dry cleaning facility), and SA 14 (the DRMO storage area). Contamination at OU4 resulted from release of dry cleaning solvents, primarily tetrachloroethene (PCE), into the soil around and under the former dry cleaning facility. These chlorinated VOCs have migrated into the groundwater beneath the site and are discharging into the sediment and surface water of nearby Lake Druid. Based upon our review of the Final Draft RI, we have the following comments.

Chapter 8: Human Health Risk Assessment

Section 8.2.1.2 Risk-Based Screening

On page 8-6, HLA identifies Florida Soil Cleanup Goals (SCGs) and EPA Region III risk-based concentrations (RBCs) for residential soil as the source of screening levels for contaminants in surface soil. The SCGs were cited from a September 27, 1995 FDEP

Technical Guidance document. However, since the distribution of the 1995 tables, guidance from the USEPA has resulted in the modification of the equations and formulas used to derive health-based soil cleanup target levels. As a result, the soil cleanup target levels have changed somewhat. More current soil cleanup target levels for contaminants at this site can be found in Chapter 62-785, F.A.C. Although these cleanup levels were developed for the Brownfield program, the methodology used to develop the numbers is broadly applicable to other sites. As a matter of practice, soil screening levels should be the lower of the Region III RBCs for residential soils, Florida Soil Cleanup Target Levels (SCTLs) based on residential exposure, or Florida SCTLs based on leachability. In this case, two additional chemicals, aldrin and heptachlor, should be included as COPCs in the surface soil. Beryllium, however, can be removed from the COPC list (Table 8-2).

On page 8-7, HLA identifies Florida Surface Water Quality Standards (SWQs) as a source of screening levels for surface water. While most of the SWQs are cited correctly, no value for aluminum is cited. The Florida SWQ for aluminum is 13 μg/L. Using this screening value, aluminum should be included as a surface water COPC.

In Table 8-1 (Essential Nutrient Screening Concentrations for Surface Soil, Subsurface Soil, Groundwater, Surface Water, and Sediment), the groundwater screening concentration developed for sodium is listed as 396,022 μg/L. The Florida primary standard for sodium in groundwater (160,000 μg/L) should be listed instead. This standard was correctly used in the COPC screening process (Table 8-5) so it is unclear how the value reported in this Table 8-1 was used.

Figure 8-1 Complete Exposure Pathways for Human Receptors

Figure 8-1 on page 8-33 illustrates complete exposure pathways for human receptors at OU4. Ingestion of groundwater is not considered a complete exposure pathway for future occupational workers, and dermal contact with groundwater is not considered a complete exposure pathway for future residents. If OU4 is developed for residential or commercial use, groundwater may be used as a potable water source for residences as well as industry. In addition, dermal exposure should be considered a complete exposure pathway in the residential scenario. It should be noted that in addition to the minimum criteria, all G2 aquifers must meet primary and secondary groundwater standards as defined in Chapter 62-520 F.A.C.

Section 8.3.3 Quantification of Exposures

Chemical–Related Variable HLA states on page 8-36 that the EPC for groundwater "is the arithmetic mean concentration of wells within the groundwater plume." EPCs for groundwater are shown in Table 8-10 for the northern VOC plume, in Table 8-11 for the southern VOC plume, and in Table 8-12 for the antimony plume. The EPCs in these tables appear to be arithmetic mean of all samples within the respective plumes, calculated using one-half the reporting limit for nondetects. This is contrary to Region IV guidance, which allows for the use of the arithmetic mean for groundwater only in the "highly concentrated area of the plume." Including marginally contaminated samples (and, in this case, one-half the reporting limit for nondetects) has the potential to inappropriately lower the EPC. Risk calculations for exposure to groundwater at this site may therefore be substantially lower than those calculated according to the recommended methodology. HLA should determine which of the samples are representative of the most highly contaminated areas of the respective plumes and recalculate the EPCs accordingly.

Population-Related Variables HLA discusses population-related variables on page 8-45 and parameters describing potentially exposed receptors are presented in Appendix E-4. Tables E-4-1 and E-4-13 present exposure parameters for the RME and central tendency resident adult and child, respectively, exposed to surface soil. The equation variables and units for dermal intake should be consistent with guidance in RAGS. However, the dermal surface area used by HLA for a child age 1-6 is 766 cm^2-year/kg. The derivation of this value is shown in Appendix E-7 (Table E-7.1); one-fourth of the total surface areas for males ages 1-6 are divided by average body weights of males and females of the same age. These values are then summed from age 1-6 to produce an age-weighted surface area. The intake equation already accounts for body weight, and cannot be used with a weight-adjusted surface area. Therefore, the child surface area should be the average of the surface area available for contact for males and females ages 1-6. The average area available for dermal contact preferred by FDEP is to assume the exposure of the hands, one-half the arms and one-half the legs. It is not unreasonable, given the climate in Florida, that a receptor would wear shorts and a short-sleeve shirt mot of the year. Using data in the Exposure Factors Handbook (1997) this value for children ages 1-6 is derived as 1869 cm^2. Age-weighted surface areas are also used in equations for the adolescent trespasser/recreational user. These should be adjusted to reflect the average surface area of the trespasser/recreator (in cm^2) available for contact.

Assessment-Related Variable On page 8-45 and in Table E-4-3, equation variables are given for the RME site maintenance worker exposed to surface soil. The exposure frequency is listed as 30 days/year, with the source listed as 'assumption.' Some justification for this, such as a review of records and employee duties, should be given.

Table E-4-4 presents equation variables for the excavation worker exposed to surface soil. The exposure frequency is 30 days/year and the exposure duration is one year. When considering non-carcinogenic effects for the excavation worker scenario, an AT of 42 days (30 consecutive working days plus weekends) should be used. HLA uses an AT of 1 year, corresponding to the improbable situation in which a construction worker visits the site only 1 out of every 12 days over the course of a year.

As we have expressed to FDEP previously, we are concerned that risks for carcinogens calculated using standard procedures, but based on very short or intermittent exposures, such as the excavation worker presented here, may be invalid. In such cases, we generally recommend that hazard based on non-cancer health effects also be calculated, and the higher of the two risks be presented in the risk characterization. We understand that for areas where the health-risk from exposure to contaminated soil is only from short-term exposures, FDEP has opted to control exposure to carcinogens by implementing institutional controls such as deed restrictions requiring the notification of construction workers that contamination exists and that appropriate protective clothing/equipment should be worn as required by OSHA. In the case of soil at OU4, however, application of such institutional controls is probably not warranted. Contamination in the surface soil is such that risk even from chronic occupational exposure is only slightly above FDEP's target risk level of 1E-06, and in the subsurface soil, no contaminants are present at levels above the Florida SCTLs based on industrial exposure.

Inhalation of Particulates from Soil HLA discusses the inhalation of contaminated soil on page 8-47 and the equations describing intake from inhalation of contaminated soil are given in the tables of Appendix E-4. HLA only considers inhalation of particulate matter, neglecting inhalation of contaminants volatilizing from soil. Considering the volatile COPCs in the surface soil, it is inappropriate to omit this exposure pathway. The CA term in the inhalation intake equations should be adjusted to account for volatilization as follows:

$$CA = C \times CF\ (1/PEF + 1/VF)$$

The derivation of the volatilization factor (VF) can be found in the USEPA's *Soil Screening Guidance: Technical Background Document* (EPA/540/R-95/128, 1996)

Inhalation of Vapors while Showering On page 8-48 and in Appendix E-8, HLA cites a shower model by Foster and Chrostowski (1987) which they use to characterize inhalation exposure of future residential receptors to volatile chemicals present in the groundwater. The only reference provided for the Foster and Chrostowski model is a presentation at the 1987 annual meeting of the APCA. If a shower volatilization model is to be used, we would prefer the use of a model that has undergone more extensive peer review. It should be noted that Region IV guidance states that it should be assumed that showering exposure is equivalent to exposure from ingestion of two liters of contaminated water per day. Using this assumption would result in a greater inhalation exposure to VOCs in the northern, southern and antimony groundwater plumes. This results in cancer risks of 1E-3 rather than 2E-5 for the northern plume; 3E-5 rather than 1E-6 for the southern plume; and 2E-6 rather than 7E-8 for the antimony plume.

Section 8.4.2 Dose-Response Assessment

Beginning on page 8-49, HLA discusses the dose-response assessment for COPCs at OU4 and Appendix E-11 presents the toxicity factors for COPCs. However, within section 8.4.2, several references are made to toxicity information located in "Appendix E-8." These references are incorrect and should be changed to read "Appendix E-11."

Inhalation slope factors and reference doses were taken primarily from HEAST. If no inhalation slope factor (or unit risk) or reference dose (or RfC) was available, one was not extrapolated and apparently no inhalation risk or hazard was calculated for those chemicals. To account for risks via this pathway HLA should extrapolate inhalation toxicity values. Alternatively, in the section on site–specific uncertainties, HLA should provide a more thorough, quantitative treatment of the potential underestimates of risk and hazard resulting from the lack of inhalation toxicity data.

Section 8.7 Remedial Goal Options

On page 8-96, HLA illustrates the calculation of RGOs for COPCs at OU4. The calculated RGOs are given in Table 8-19. When using the type ratio method for the calculation of RGOs, Region IV guidance states that "it is important to include all significant pathways and routes of exposure." Since HLA has omitted several potentially important pathways and routes of exposure, as outlined above (e.g., the omission of the dermal pathway for exposure to groundwater and the omission of inhalation of VOCs from the soil), the RGOs for some chemicals may be inappropriate. It should be noted that the RGOs for some chemicals fall below the FDEP SCTLs. In these cases, it would probably not be necessary to cleanup to levels below the SCTLs.

Human Health Risk Assessment Summary

Risks calculated by HLA at OU4 are above FDEP target risk levels for both current and future land use for soils and surface water. Since no groundwater is currently being used at OU4 there are no risks to current users from this exposure medium. However, contaminated groundwater presents the greatest risk to future industrial or residential receptors at OU4. HLA has done a good job of characterizing the extent of the contamination at OU4, yet due to the omission and/or inappropriate characterization of several potentially important pathways of exposure, the risks to all receptors at OU4 may be underestimated.

Chapter 9: Ecological Risk Assessment

Specific Comments

On page 9-24 HLA cites the Dutch Soil Criteria "A" presented in Beyer (1990) as the source for soil ecological screening levels. Table 9-3 lists these values for chemicals detected at OU4. There have been changes in the Dutch Soil Cleanup Levels since the Beyer publication. The new Dutch List can be found on the Internet at www.ContaminatedLAND.co.uk. In the future, HLA should use this updated list as the source for its soil ecological screening values.

Table 9-5 presents the selection of ecological chemicals of potential concern (ECPCs) in Sediment at OU4. For sediment, HLA screened contaminant concentrations against Region IV sediment screening criteria. As a matter of practice, sediment screening values should be the lower of Region IV sediment screening criteria or FDEP's sediment quality assessment guidelines (SQAGs). When the SQAGs are applied to the sampling data from OU4, gamma-BHC (lindane) and silver should be included as sediment ECPCs.

Table 9-9 (page 9-45) describes the equations used to estimate contaminant exposures to the representative wildlife species. A reference should be provided for these equations.

In Table 9-9, the equation for total exposure related to surface soil is shown along with a similar equation for total exposure related to surface water and sediment. In these equations, the variable "site foraging factor" (SFF) is defined as the site area (in acres) divided by the home range of a predator (in acres). For some predators, the SFF is much less than 1. This is contrary to guidance from *Ecological Risk Assessment Guidance for Superfund* which states that in screening level risk assessments, area use factors should be assumed to be 1 (100%). Thus, for this screening level ERA, HLA should change their SFF accordingly.

General Comments

HLA did a poor job of characterizing the levels of contaminants in the Lake Druid surface water and sediment. Few samples were taken, and only one of each was analyzed for contaminants other than VOCs. A sampling plan that better characterized the distribution of all contaminants in the Lake Druid surface water and sediment on the area of OU4 should have been prepared. As is, the data for analytes such as inorganics, pesticides, and SVOCs are not very helpful.

The finding by HLA that site-related VOCs pose little risk to ecological receptors seems justified. However, the dismissal of other ECPCs is troubling. Several inorganic ECPCs, including mercury, exceeded the RTVs for particular receptors. In these cases, the risks to the receptors were dismissed because the ECPCs were deemed not to be "site-related." Whether due to site-related activities or not, several ECPCs may present a risk to ecological receptors at OU4 and should undergo a more extensive evaluation.

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

Sincerely,

Christopher J. Saranko, Ph.D.

Stephen M. Roberts, Ph.D.

cc: David Grabke