

N65928.AR.000793
NTC ORLANDO
5090.3a

LETTER REGARDING U S EPA REGION IV COMMENTS ON ECOLOGICAL ASPECTS OF
THE REMEDIAL INVESTIGATION FOR OPERABLE UNIT 3 (OU 3) NTC ORLANDO FL
10/15/1998
U S EPA REGION IV



UNITED STATES ENVIRONMENTAL PROTECTION A
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

03.01.03.0002

1000103

? Kent Cabbage (A:lec)

October 15, 1998

4WD-FFB

Mr. Wayne J. Hansel
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
Charleston, SC 29419-9010

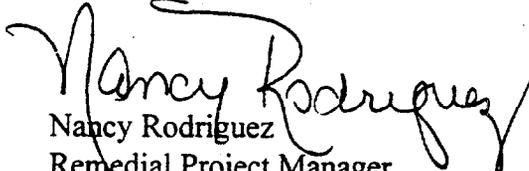
SUBJ: Risk review comments for ecological aspects for the Remedial Investigation Report for OU3, Naval Training Center Orlando.

Dear Mr. Hansel:

The United States Environmental Protection Agency (EPA) has completed the ecological risk review of the Remedial Investigation Report for OU3. EPA's comments on the subject report are enclosed.

If you have any questions regarding these comments, please call me at (404) 562-8536.

Sincerely,


Nancy Rodriguez
Remedial Project Manager

cc: Dave Grabka, FDEP
Rick Allen, HLA
Steve McCoy, Tetra Tech NUS
Lt. Gary Whipple, NTC Orlando
Barbara Nwokike, SouthDiv

**REMEDIAL INVESTIGATION REPORT
OPERABLE UNIT 3
NAVAL TRAINING CENTER ORLANDO**

General Comments:

The ecological risk assessment for Naval Training Center (NTC) Operable Unit 3 (OU3) was evaluated for congruence with the *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997), which is EPA's Office of Solid Waste and Emergency Response's current program guidance for CERCLA. This guidance will be referred to as the *Process Document* in these comments. The Process Document divides the steps in an ecological risk assessment into the Screening-level Ecological Risk Assessment (SERA) and the baseline ecological risk assessment (ERA). This RI appears to be a combination of both a SERA and baseline ERA, because it does not distinguish these steps.

Problem Formulation for the baseline ERA begins with refinement of preliminary contaminants of concern, which were identified in the screening-level risk assessment. (See Chapter 3 of the Process Document.) The identification of contaminants of potential concern (COPCs) for NTC is illustrated in Figure 7-2. A quick look at the data suggests that pesticides and herbicides in SA 8 tend to be detected in the vicinity of the former pesticide storage building (Building 2134), as expected. Certain metals detections (Cd, Cu, Pb, Cr, V, Zn) appear to be both isolated in spatial extent and infrequently detected above a screening value. Some elevated concentrations are associated with presence of metal sheds or a "metal storage box" shown on Figure 1-3. The description of nature and extent for SA 9 did point out how elevated concentrations of pesticides were detected in the north east drainage ditch and discharge points inside the wetland area. A discussion of the frequency, magnitude, and pattern of exceedances of ecotoxicity screening values should be added to SA 8 and SA 9, especially for the metals. Information on the contaminants present and their distribution in the environment is necessary supporting information for selection of assessment endpoints in Problem Formulation.

The next step in Problem Formulation is to discuss the ecotoxicity of the COPCs. The RI report includes the following statement:

The primary ecological effects associated with pesticides include bioaccumulation in the food chain and sublethal reproductive effects in avian species...

While this may be a summary of the ecotoxicity of COPCs detected in OU3, the text has not revealed the identities of the COPCs from the SERA. The text should summarize chemicals

of concern in each medium with a brief discussion of the ecotoxicity of those contaminants. Refer reader to Appendix G for details.

There is a large summary table in Appendix G of toxicity values (NOAELs, LOAELs) for various species. Values used as toxicity reference values (TRVs) in the ERA are boxed on the table. It would be helpful to include an expanded summary in the text of ecotoxicity of the specific set of COPCs to explain the reasons why the particular TRV was selected.

Appendix D on the fate and transport properties of the various COPCs should be expanded to include information on bioaccumulation, i.e., whether COPCs can accumulate in vegetation, invertebrates, or small mammals. This information is important for choosing assessment endpoints and is needed in the Problem Formulation.

The section on Page 7-4 on identification of receptors is not intended to be merely a repeat of the text in Section 3.8 on ecological setting. Rather, it is intended to highlight specific biological groupings that may be particularly sensitive to the contaminants at hand based on the review of ecotoxicology, e.g., the sensitivity of carnivorous birds to DDT. It should focus on ecological resources that should be evaluated more thoroughly and thus provide a justification for selection of the assessment endpoints.

As the intention of the Problem Formulation is to arrive at a set of specific risk questions to guide exposure assessment and risk characterization stages, the section on complete exposure pathways should include language specific to the groups of organisms that are indicated to be sensitive to contaminants identified as COPCs.

Ground-water migration to surface water should be mentioned as a potential secondary source of site-related contamination. Ground water from the wells closest to Lake Baldwin is assumed to represent an exposure medium for aquatic organisms. The fact that surface water data for Lake Baldwin is evaluated as part of SA 6 is insufficient reasoning to exclude it as part of wildlife exposure through drinking water at OU3. Lake Baldwin may not be a potential concern for its own merits (i.e., due to current contamination levels), however, the RI should investigate the contamination at OU3 for its potential to impact Lake Baldwin and surrounding wetlands. The RI report indicates that ground water in SA 8 is within 1 foot of the surface in the wetlands adjacent to Lake Baldwin. The RI should address whether remediation of ground water may be necessary to prevent a potential (i.e., future or intermittent) risk to organisms exposed to ground water seeping to the surface in the wetland. If this migration pathway is truly of concern for this site, exposure to ground water as drinking water should be considered in the dietary intake models.

The report states that "One of the assessment endpoints selected for the SA 8 ERA is the survival and maintenance of receptor populations and communities..." This assessment endpoint, and others such as "survival and maintenance of fish, macro-invertebrates, amphibian, and aquatic plant populations," are too broad to be useful in the ERA. The Problem Formulation step

is the risk assessor's chance to convince the risk managers and trustees that appropriate risk questions are addressed in the ERA. The preferred assessment endpoint is often a combination of type of animal (bird, amphibian, reptile, mammal, etc.) and diet (carnivorous, herbivorous, insectivorous, omnivorous, etc.), e.g., insectivorous bird. Please refine assessment endpoints accordingly.

The ERA includes toxicity testing on ground water for SA 8 but not on soil for either SA or ground water for SA 9. The reasoning behind selection of the particular assessment endpoints is not made clear in the ERA. The connection between the contaminants detected at levels of concern, their sources and migration pathways in the environment, and potential for ecotoxicological effects on plants and wildlife needs to be developed further. This information is typically presented as the conceptual site model (CSM). A CSM is required by EPA's Process Document, however, none was included in the RI for OU3. A description of the CSM should be included in the text. There need not be computer graphic illustrations of wildlife, but a flow chart showing the food web would improve the presentation. Figure 7-1 will not substitute for a CSM because it addresses only exposures.

The risk hypotheses presented on Pages 7-8 and 7-46 for OU3 and endpoints in Table 7-1 are very general. Their utility is limited to the screening level. They can potentially serve in the SERA stage of the RI, especially if some COPCs can be eliminated; but the vagueness of the assessment endpoints and associated risk questions leave risk managers without a path forward to FS/RD if potential ecological risk is indicated by the ERA. Without a clear Problem Formulation it is impossible to develop appropriate remedial goal options.

The cotton mouse and mourning dove both have a diet composed mainly of vegetation. Pesticides, however, typically do not accumulate to a large extent in vegetation. Arsenic has a moderate ability to accumulate in vegetation. Pesticides are more likely to accumulate in invertebrates. Carnivorous birds, such as the robin on a diet of earthworms, should be considered as an assessment endpoint for OU3. The great horned owl, while a carnivorous bird, is not expected to be as sensitive of a receptor, because its food source is not as directly associated with the soil. A smaller bird than the great horned owl should be chosen to better represent the variety of birds at SA 9.

The bioaccumulation factor (BAF) from soil to small mammal for DDT, DDD, and DDE used here is 1.2. (See Appendix G, Table G-1.) The value was obtained from a paper by Forsyth & Peterle (1984) for shrews and voles based on whole body and stomach contents. This value may be over- or under-estimated depending on site-specific conditions. The uncertainties associated with the use of the BAF model should be discussed. EPA thinks that the uncertainties inherent in the BAF assumptions will limit the ability of this approach to obtain a remedial goal option for DDT contaminated soils in SA 9. EPA prefers the use of site-specific bioaccumulation measurements.

The American kestrel would be a more sensitive surrogate receptor species than the great horned owl due to difference in body mass. The kestrel would also better reflect values to be protected at OU3 (threatened/endangered species). The hazard quotients predicted for the owl were in the 10^{-3} range, which is unexpectedly low for DDT exposures to a carnivorous bird. This is probably due to the assumptions for exposure factors and the area use factor. For screening EPA recommends using an area use factor of 1.

One of the assessment endpoints is the reduction in biomass of terrestrial plants. The measurement endpoint is comparison of detected concentrations in soil with published values for RTVs. Based on the introductory description of the SA 8 site, vegetation is indicated to be stressed or absent due potentially to the elevated levels of site-related chemicals in soil (See Page 1-5.). Elevated levels of arsenic in soil can reduce plant colonization and growth (Brady, 1974). The observation of stressed vegetation can be a measurement endpoint for this assessment endpoint. The absence of vegetation should be examined with respect to soil concentrations as an additional line of evidence. The statement, made several times throughout the report, that "no observations of stressed vegetation were evident during October 1997 site visit" contradicts the observation of lack of vegetation on portions of the site on Page 1-5. This discrepancy should be resolved.

The statement on Page 7-33 that some of these inorganic constituents may not be related to the site is unsubstantiated in the text. All of these metals underwent a background screen. There is reason to believe that the plant community at SA 8 could be impacted by elevated levels of arsenic, chromium, silver, vanadium, and zinc in soil due to exceedances of screening values and historical observations of stressed or absent vegetation. Text on potential reasons why inorganic contaminants detected in soils or ground water might not be associated with OU3 should be expanded.

Table 7-13. One of the uncertainties listed in the table is that the occurrence of the food chains assumed in the models is unknown. This is a major source of uncertainty in the ERA. It is uncertain at SA 8 what ecological components are important to protect, assessment endpoints are broad protection of birds and wildlife. The Problem Formulation is too broad and general to make useful predictions of the potential for risk at OU3. The list of chemicals detected above screening ecotoxicity values has not been refined based on frequency, distribution, and pattern of occurrence. The specific manner in which ecological components may be exposed to site-related contaminants has not been defined. All of these points should be clarified in the CSM.

The particular assessment and measurement endpoints chosen for this study appear to be based on the availability of empirical BAFs. For example, herbivorous bird and herbivorous mammal assessment endpoints capitalize on a paper by Travis and Arms (1988) that provides a empirical equations for BAFs in crops and beef, which can be adapted to the particular plants and herbivorous at the site. Carnivorous and/or insectivorous birds and mammals should be considered as assessment endpoints for SA 8 in addition to herbivorous animals. This recommendation is due to the anticipated significance of the food chain pathway coupled with

the sensitivity of birds to pesticides (reproduction). The American kestrel is indicated to be an endangered species at this site. Reproductive effects, including egg-shell thinning by exposure to DDT, based on food chain modeled intakes compared to literature-derived TRVs, should be included as a measurement endpoint. Egg-shell thinning should be specifically addressed.

The uncertainties table (Table 7-13) should also discuss how ground water concentrations in wells closest to Lake Baldwin were assumed to represent surface water concentrations.

An uncertainty is listed on Pages 7-41 (OU8) and 7-69 (OU9) that BAFs for plant material were based on an assumed moisture content of plants of 80 percent. The text points out that the diet of the cotton mouse and mourning dove is predominantly seeds, which have a moisture content of only 10 percent. It is recommended that a more realistic value for moisture content of dietary vegetation be assumed to reduce the magnitude and direction of the uncertainty from less than conservative to conservative.

Elevated concentrations of MCPA and MCPP have not been addressed in the ERA due to lack of toxicity information. A literature search should be performed to obtain this information. A paper by Fargasova is listed in the reference section of these comments.

While the text suggests that the ERA is conservative for SA 8, the logic behind the selection of assessment endpoints for this site is poorly developed, leaving open the possibility that the ERA focused on the wrong questions. Discussions with U.S. Fish and Wildlife should be initiated to clarify what ecological components at OU3 are important to protect, such as the gopher tortoise and American kestrel. Pesticides detected in SA 8 are a more important issue than arsenic with respect to avian and mammalian receptors. Pesticides do not tend to bioaccumulate in plant tissues, therefore, exposures to ecological components were underestimated by the choice of assessment endpoints made. Insectivorous and/or carnivorous birds and mammals should be evaluated in the risk assessment. The earthworm bioassay would be an excellent means to address both the bioaccumulation and the toxicity of site-related constituents to terrestrial invertebrates. Potential exposures of carnivorous birds and mammals to pesticides and herbicides detected in soils has not been satisfactorily addressed in the ERA, especially in the case of SA 8. Toxicity of MCPA/MCPP should be quantitatively addressed.

Specific Comments:

1. Discuss frequency, magnitude and pattern of exceedances of TRVs for COPCs to focus selection of assessment endpoints for food chain modeling.
2. Ecotoxicity of specific COPCs at SA 8 and SA 9 should be included in the text before the selection of assessment endpoints for food chain models. Ability to bioaccumulate in plants and animals should be part of this discussion. Groups of species particularly sensitive to the specific COPCs for SA 8 and SA 9 should be identified.
3. The possibility of *future* impact to Lake Baldwin through ground-water migration should be addressed as potential ecological risk.
4. A CSM should be included in the ERA, showing the food chains modeled, as outlined in EPA's Process Document and previous comments.
5. Specific assessment endpoints should be developed for the Problem Formulation, that identify diet and category of ecological receptor. Thorough justification should be provided for their selection. The selection of assessment endpoints should depend on the ecotoxicity and fate and transport properties of the COPCs. In addition, values to be protected at OU3, such as threatened and endangered species and their sensitivity to the contaminants, should receive elevated attention.
6. The literature search should be expanded to incorporate toxicity reference values for MCPA to allow quantitative assessment of risk. Try the Materials Safety Data Sheets.
7. The RI indicates that Lake Baldwin was assessed as a separate OU (OU 6) and was found to present insignificant risk to ecological receptors (Page 7-6). The basis of this conclusion should be included in the RI for OU3.
8. The discrepancy regarding stressed vegetation should be resolved. If the stressed vegetation is real, then it should be addressed.
9. By defining assessment endpoints in terms of diet, more attention should be paid to carnivorous and/or insectivorous birds and mammals at OU3, in addition to herbivores. This is especially important for pesticide exposures.
10. All assumptions in BAF model and limitations to values used for BAFs should be addressed in uncertainties section.

11. The area use factor of 1 should be used for the carnivorous bird. A smaller bird than the great horned owl such as the American kestrel, robin, or Florida scrub jay. If the hazard quotient exceeds 1, then action should be taken to reduce the uncertainty with site-specific, field-collected biological data.
12. Vegetation should be protected in its own right not just as a source of food and cover for small mammals and birds.