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NAS CECIL FIELD, FL
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LETTER REGARDING U S NAVY AND UNIVERSITY OF FLORIDA COMMENTS ON
DEVELOPMENT OF ECOLOGICALLY-BASED REMEDIATION GOALS FOR LEAD AND
POLYCYCLIC AROMATIC HYDROCARBONS IN SOIL AT SITE 15 NAS CECIL FIELD FL
2/12/2001
ECOLOGICAL RISK TECHNICAL ASSISTANCE TEAM

DATE: 12 February, 2001

TO: Ruth Owens, NFESC

FROM: ERTAT

SUBJECT: Development of Ecologically-Based Remediation Goals for Lead and PAH's in Soil Site 15, Blue 10 Ordnance Disposal Area Naval Air Station Cecil Field Jacksonville, Florida

COMMENTS:

This revised document has a much improved organization and transparency of logic which facilitates decision-making and communication on the risk assessment and management teams. There are a few issues that I would recommend addressing before finalizing this draft and I will discuss those and then address the University of Florida comments.

The first issue involves the discussion of direct toxicity to an endpoint thru ingestion of contaminated prey versus a decline in predator populations due to a toxicity-induced decline in prey populations. This topic is mentioned on pages 4, 6, and 7 and the conclusion is that neither lead nor PAH's cause toxicity via the food web. "Lead toxicity to carnivores via the food web is not significant" is referenced from a study by Eisler and "potential risks from PAH's via the food web are generally negligible" is referenced from a study by Simon. This assumption is a key component of the conceptual site model and the scientific explanation in the studies by Eisler and Simon should be included in the text. A few sentences to explain the decision to evaluate toxicity only at the primary consumer level would be appropriate. Because of this assumption, the entire assessment rests on toxicity to insects which is being evaluated thru earthworm bioassays - an endpoint with adequate laboratory standards available but very low relevance to our site. The earthworm has the highest degree of test standardization of all soil invertebrates but information on comparability between earthworms and insects is lacking which adds considerable uncertainty.

Another endpoint, plant populations, is not mentioned in the conceptual site model but appears for the first time on the assessment endpoint list on page 7. I have the same problem with the lettuce seed germination tests that I do with the earthworm - high standardization and low relevance. The seed germination tests done previously on-site did not differ from the reference area but contaminant concentrations tested were much lower than maximum levels. The defense that additional studies are unnecessary because field observations were that plants looked viable is very weak. Just because plants are not visually impacted does not tell you anything about their risk. If plants remain an assessment endpoint, I would add them into the conceptual site model discussion and specify a measurement endpoint that covers not only reproduction (germination) but growth as well (since these two attributes are listed in the assessment endpoint). If they are not going to be further addressed (and this is certainly an option), then they may not belong in the list of assessment endpoints. Including them as an assessment endpoint is valuable only if they are appropriately addressed and I would argue that field observations are a weak defense for

assessing risk.

The evaluation of soil toxicity to earthworms is being separated out for lead and PAH's in order to calculate individual PRG's. This is a good way to avoid confounding factors but in reality the insects at Cecil Field will not be exposed solely to either lead or PAH's but some combination of the two. Based on the dispersal of these contaminants it would be helpful to have a sentence of two explaining the reality of each PRG and whether the contaminants are expected to act synergistically or antagonistically with each other in terms of toxicological effects on the invertebrate populations. I think the goal of calculating site-specific PRG's that may be higher than background (lead = 197 ppm) or conservative screening values (PAH's = 20,500 ppb) could be stated more clearly during the PRG calculation discussion. The conservative screening value for PAH's is arguable in terms of scientific validity as it seems to be midway between a clean "target" value and an unacceptable "seriously contaminated soil" value. Again, the defense that 20,500 ppb is close to a screening value calculated on data from a study by Neuhauser is weak in that earthworms were the endpoint evaluated and they do not exist at our site.

The bioavailability range of 100% to 70% for ingestion and absorption of lead may be our best estimate but the applicability of oyster and quail studies to Cecil Field is questionable. Any additional information that might clarify the bioavailability values would assist risk managers in characterizing lead toxicity.

Specific Comments:

1. Page 2: Soil-dwelling invertebrates are absent. Does this mean that no invertebrates exist below the top two inches? I don't understand if there are invertebrates present other than "soil-dwelling" ones (sand-dwelling for example) or no invertebrates at all.
2. Page 3: If there are no invertebrates in the soil but they exist in the duff layer and the duff-soil interface, perhaps calling them "soil invertebrates" is misleading. Duff-invertebrates might be more appropriate.
3. Page 4: If there are no worms on site, then why are vermivores included in the discussion of exposure pathways?
4. Page 5: Since amphibians and reptiles are listed as site receptors, it would be appropriate to include a sentence or two on how the evaluation of more conservative (sensitive) endpoints will cover the assessment of these species. This argument would be similar to the argument about eliminating herbivores, fungi, and other arthropods from assessment made on pages 4 and 5.
5. Page 7: It would seem more logical relative to the food chain to discuss the measurement endpoints starting with invertebrates than going to birds and mammals.
6. Page 8: background and reference are not synonymous terms. Eliminating background from this sentence would be appropriate.
7. Page 8: If invertebrates only exist in the top two inches, why are 3 inches being collected?

8. Page 10: The PAH assessment endpoint should be written out as a bullet the way lead assessment endpoints were for continuity.
9. Page 10: A sentence or two illuminating the rationale of collecting 5 lead samples and 6 PAH samples would be appropriate.
10. Page 14: A reference substantiating the conclusion that lead is absent in the fruit portion of the diet is important to the scenario being proposed.

University of Florida Comments:

1. Regarding the applicability of the earthworm bioassay - this is a point about which the Navy is well aware however more appropriate bioassays are lacking. The suggestion to measure invertebrate density and diversity would be relatively easy to add and could be helpful information. If this option is considered, I would recommend establishing the means by which the population density and diversity data would be interpreted before any field samples are collected.
2. Regarding the need for a soil to invertebrate bioconcentration factor (BCF) in order to calculate the dose to invertebrate predators - I understand that prey doses are being calculated directly which eliminates the need for a BCF.
3. One way to handle the controversy regarding plants as an endpoint is to drop them from the assessment endpoint list and add them to the species (herbivores, reptiles, etc) that are being "covered" by more conservative endpoints. I agree that seed germination of lettuce is not sensitive or perhaps relevant to our site and "site observations" regarding vegetation is a poor defense.