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Date: February 13, 1995

Ms. Brenda Norton, PE
 Atlantic Division, Naval Facilities Engineering Command
 Environmental Quality Division
 Code: 1822
 Building N 26, Room 54
 1510 Gilbert Street
 Norfolk, Va 23511-2699

Re: Naval Weapons Station, Yorktown, Va.
 Site 16 and SSA 16
 Review of draft *Approach for the Ecological Assessment*

Dear Ms. Norton:

The U.S. Environmental Protection Agency (EPA) has reviewed the Navy's draft *Approach for the Ecological Assessment* of Site 16 and Site-Screening Area (SSA) 16 located at the Naval Weapons Station-Yorktown (WPNSTA) NPL facility. Based upon that review, EPA has the following comments to offer on the draft document:

GENERAL COMMENTS

1. EPA suggests conducting the ecological risk assessment in two distinct, serial phases; (1) ecological risk screening first, followed by (2) ecological risk assessment. Ecological risk screening should be accomplished in accordance with EPA's letter of February 1, 1995, whereby the EPA-Region III BTAG Screening Levels (BSLs) were distributed to the Navy. The performance of ecological risk screening will enable the EPA and the Navy to direct the focus of the ecological risk assessment on those chemicals determined to pose the greatest threat to the environment at the WPNSTA.
2. Because of the nature of the soft sediments found at the WPNSTA, it maybe difficult to locate benthic macroinvertebrates. Please discuss if and how benthic macroinvertebrate information will be incorporated into the ecological risk assessment. Benthic macroinvertebrates were proposed as a measurement endpoint, however, there is no further discussion of this endpoint in the document.
3. The document does not discuss the areas being included in the study. In addition, the document does not identify what data will be used to develop exposure point concentrations, or the use of the Habitat Evaluation as a source of information for the ecological risk assessment.
4. EPA does not recommend using surrogates, and BTAG will most likely ignore surrogate modeling in favor of media/habitat risk potential. Basically, in order to utilize surrogates correctly, one would need to identify an appropriate surrogate species for each identified ecological contaminant of concern (ECOC) identified in the risk screening process. Thus, if one had 25 ECOCs for a particular area, one would also need to select an appropriate surrogate species to model for each ECOC. While there could be duplicative surrogate species selected for various ECOCs, the potential exists for identifying 25 distinct appropriate surrogate species for modeling at such an area. The modeling effort involved

with such an undertaking alone is an enormous and difficult task to complete, compounded by a lack of surrogate species information.

EPA suggests that, as a first step, the BSLs be utilized to determine the ECOCs for each media of concern at a site. Then, if surrogate modeling is to be used, the Habitat Evaluation should be consulted to determine which ecologically-sensitive species are present at the site(s) under evaluation. From there, BCFs should be calculated for those sensitive species selected to be impacted for each ECOC. After the BCFs are calculated, the species with the highest BCF should be selected as the appropriate surrogate species for that particular ECOC. This process should be accomplished for each ECOC, thus resulting in the selection of an appropriate surrogate species for each ECOC.

If surrogate modeling is not going to be used at a site, then the following general methodology, or similar, is recommended. Assume you have a "sensitive species" present at the site for each identified ECOC (worst case). Then, concentrate on establishing "clean up" levels based upon the bioaccumulating capability of the ECOCs and the species present at the site. For strongly bioaccumulating ECOCs (BCF > 100), one could use the ERL as a proposed clean-up level. For low probability bioaccumulating ECOCs, one could utilize the ERM value as a proposed clean-up level. For additional information on the performance of this methodology, please contact Bob Davis.

5. EPA suggests that there should be some statement as to the derivation of exposure point concentrations in various media. Will they be maximum values, averages values, or 95% UCL of the arithmetic mean.

SPECIFIC COMMENTS

1. Page 1, Paragraphs 3 and 4

The author discusses a screening level approach for terrestrial receptors. This is generally a good approach, but should be expanded to include the aquatic environment as well. Generally, the purpose of the screening level assessment is to determine if a potential risk exists, and to focus the ecological risk assessment on those chemicals and receptors that potentially are at risk. The screening level approach should consistently use conservative assumptions, with the understanding that if ECOCs are "screened-out", they are no longer relevant to the ecological risk assessment. The clear, concise description of the assessment endpoints is an important component of the ecological risk assessment, as the decisions made throughout the ecological risk assessment should address these endpoints.

At this screening level of assessment, the terrestrial assessment endpoint may be better defined as: "*the determination of surface soil contaminant concentrations that do not adversely affect the population of terrestrial receptors*". The measurement endpoint for this terrestrial assessment endpoint may be better described as: "*the intake (or uptake) of contaminated soil and food, by sensitive terrestrial receptors, that exceed adverse contaminant-specific reproductive effect doses*". A single assessment endpoint for aquatic receptors may be more appropriate at the screening level of assessment. This assessment endpoint may be better defined as: "*the determination of sediment and water concentrations that do not adversely affect the diversity and abundance of the benthic macroinvertebrate community or the population of the fish community*". The measurement endpoint for this aquatic assessment endpoint may be better described as: "*the exposure to potential chemicals of concern in sediment and surface water that exceed chemical-specific sediment or surface water toxicological effects concentrations*". These assessment and measurement endpoints provide a basis for meeting the goals of a screening level risk assessment. At this level, all assumptions should be conservative. Exposure point concentrations should be based on maximum detected values. The actual method for applying these measurement endpoints is discussed in subsequent comments.

2. Page 2, Paragraph 1

Based upon EPA-Region III BTAG recommendations, the sediments and surface soils should be

screened against the BSLs.

3. Page 2, Paragraph 1

This paragraph discusses aquatic receptor screening values; however, surface soil is also discussed. Please explain.

4. Page 2, Paragraph 1

Please describe in greater detail the criteria and rationale to be used (other than BSLs) for selecting ECOCs.

5. Page 2, Paragraph 2

EPA suggests the use of the BSLs for screening surface soils.

6. Page 2, Paragraph 3

The terrestrial food chain model does not estimate chronic daily intake. The *allometric equation* determines the total daily intake (or selected partial intake). This intake value is compared to a chronic toxicological value to determine (model) if the surrogate species has been exposed to known chronic concentrations.

7. Page 2, Paragraph 3

The assessment described in this paragraph is generally a more semi-quantitative or quantitative type of assessment. At the screening level of assessment, it may be premature to plan for food chain modeling and it is premature to propose surrogate terrestrial receptors without knowing the nature and exposure routes of the screening ECOCs. Food chain modeling, for example, may not be relevant if the ECOCs are not known to bioaccumulate or magnify through the food chain. In this case, direct exposure modeling may be more appropriate. The results of the ecological risk screening will determine the type of modeling that may be appropriate.

8. Page 3, Paragraph 1

If actual exposure modeling is to be done, TRVs should be modified in accordance with the body weight of the tested organisms. This is necessary to allow the comparison of these TRVs to various organisms. There is also a large body of literature concerning the use of safety factors when making comparisons between species or classes. EPA-Region III suggests the use of factors of 10 and 100 for extrapolation between species and classes, respectively. Other sources suggest the use of safety factors of 10 to convert LOAEL values to NOAEL values. Please discuss the use of these safety values.

9. Page 3, Paragraph 2

Travis and Arms (1988) studied the uptake of organics from soil in vegetation, but do not differentiate between plant parts. It is unclear how (or why?) the document proposes to make this distinction.

10. Page 3, Paragraph 2

Will the fish bioconcentration calculations be based on steady-state conditions? Please provide the equation or a reference for this calculation.

11. Page 4, Paragraph 2 (red fox)

The rationale behind the selection of the red fox as a surrogate and the use of small mammal as a

prey item has not been well defined in the document. The model proposes a herbivorous prey mammal that has a body concentration based on estimated vegetation concentration and estimated direct ingestion of soil. The small mammal model completely ignores rate of intake, excretion, metabolism, and body burden. It is nearly impossible to estimate a tissue concentration (and, thus, an exposure point concentration to the fox) in this manner. This model ignores the potential exposure to carnivorous small mammals, which may be subjected to much higher contaminant concentration than the herbivorous mammal.

Again, at the screening level of assessment, it is premature to propose modeling. A greater knowledge of the ECOC(s) will allow the selection of appropriate receptor surrogates.

12. Page 5, Paragraph 3

EPA agrees that it is difficult to screen groundwater for ecological risk given current guidance. However, vegetation may be exposed to groundwater near the wetland areas, and groundwater may become surface water at water bodies. BTAG suggests using a "worse case" scenario, where shallow groundwater concentrations are released to surface water. Assume no dilution or attenuation, unless a clear and concise case can be made and supported. As a result, it may be appropriate to compare shallow groundwater concentrations to phytotoxicological data (to address current risk) and to AWQC criteria or an equivalent (to address potential future risk to surface water receptors).

This concludes EPA's comments on the Navy's draft *Approach for the Ecological Assessment* of Site 16 and SSA 16 located at the WPNSTA. If you have any questions regarding the above, please feel free to call me at (215) 597-1110,

Sincerely,



Robert Thomson, PE
VA/WV Superfund Federal Facilities (3HW71)

cc: Steve Mihalko (VDEQ, Richmond)
Jeff Harlow (WPNSTA, 09E)
Andy Rola (BVWST, Phila.)