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NAS CECIL FIELD, FL
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LETTER REGARDING U S EPA REGION IV COMMENTS ON DRAFT ECOLOGICALLY-
BASED REMEDIATION GOALS FOR LEAD AND POLYCYCLIC AROMATIC
HYDROCARBONS IN SOIL AT SITE 15 BLUE 10 ORDNANCE DISPOSAL AREA NAS CECIL
FIELD FL
12/18/2001
U S EPA REGION IV



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

December 18, 2001

4WD/FFB

Commander Department of the Navy
SOUTHNAVFACENGCOM
Attn: Mark Davidson
Mail Code ES339
P.O. Box 190010
North Charleston, South Carolina 29419-9010

Subject: Draft Ecologically-Based Remediation Goals for Lead and PAHs in Soil, Site 15, Blue 10 Ordnance Disposal Area, Naval Air Station Cecil Field, Jacksonville, Florida

Dear Mr. Davidson:

The U.S. Environmental Protection Agency has reviewed the subject draft document as well as additional information provided by the University of Florida regarding bioavailability of lead in mammals. Generally the risk assessment and development of PRGs was very well done. The analysis included a site-specific bioavailability factor developed from samples of terrestrial invertebrates at the site. Our comments are provided in two areas: (1) the choice of a bioavailability factor (BAF) based on the data; and (2) whether the information provided by the University of Florida could be used to modify either the BAF or the toxicity reference value (TRV).

The Choice of Bioavailability Factor: Previous agreements reached by the Cecil Field partnering team included the use of the linear regression coefficient for the soil-to-invertebrate bioavailability factor. The regression coefficient calculated from the data was 0.04. This BAF was calculated with the y-intercept set at zero, the assumption being that any amount of lead in soil, however small, will be absorbed.

The alternative view is that absorption occurs above a threshold concentration of lead in soil. Using a regression that is not constrained to pass through the point (0,0) yields a y-intercept of -21 and a slope of 0.47. The slope is not significantly different than 0.04 using a t-test and the assumption of normality.

The expected value of the regression is 0.4 with a standard error of 0.008. Thus, the 90% confidence interval (again, assuming normality) is 0.026 - 0.053

To explore this confidence interval more thoroughly, lognormal distributions were fitted

to both the soil lead data and the invertebrate lead data. A correlation coefficient of 0.772 between the two samples was assumed and 10,000 samples were generated with Crystal Ball software in a bootstrap simulation. For each sample, the slope of the regression line was calculated, assuming a zero intercept. The 90% confidence interval estimated with this bootstrap approach was 0.0035 to 0.072.

Using the percentile values from this bootstrap simulation, the table below shows the percentiles at which the various values of the BAF used in PRG development occur. The grey background indicates values used in the document for developing PRGs.

Value of BAF	Percentile of Uncertainty
0.0035	5%
0.014	47%
0.016	50%
0.04	86%
0.05	90%
0.071	94%
0.072	95%

EPA's understanding of the use of the regression slope as the BAF was to obtain a central value. The subject document also points out that 0.04 is a number near the upper end of the distribution. The work plan for invertebrate sampling was carefully thought out and the median value obtained from the data as 0.014 or from the simulation as 0.016 can be expected to approximate the true median BAF at the site. Therefore, this value would be preferred for determination of remedial goals.

Application of University of Florida Suggestions for BAF/TRV Modification: The TRVs for both mammalian and avian receptors were chosen based on previous discussions of the partnering team and were agreed upon at an earlier Cecil Field team meeting. The TRV were selected from the Oak Ridge compilation of NOAEL and LOAEL information (attached in electronic form).¹

The most common critical endpoint for non-threatened species is reproduction. Clearly, this is to ensure population sustainability. The choice of other endpoints has significant policy

¹B. E. Sample, D. M. Opresko, G. W. Suter II, Toxicological Benchmarks for Wildlife: 1996 Revision, Risk Assessment Program, Health Sciences Research Division ORNL, Oak Ridge, Tennessee 37831

implications because of the stated goal of population stability/sustainability.²

The information about effects such as kidney edema and enzyme changes at levels of 48 $\mu\text{g/g}$ in rat kidneys³ is interesting and should be used as an additional line of evidence for the assessment of risk. However, the reproductive effects used to develop the TRV used in PRG calculation are more appropriate.

Similarly, the information of lead accumulation in kidneys is interesting, but it is difficult to determine how to apply a soil-to-kidney BAF to assess a reproductive endpoint.

If you have any questions please contact myself at 404/562-8539 or Ted Simon at 404/562-8642.

Sincerely,



Deborah A. Vaughn-Wright
Remedial Project Manager

cc: Scott Glass, SOUTHDIV
Mark Speranza, TTNUS
Sam Ross, J.A. Jones
David Grabka, FDEP

²Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, EPA 540-R97-006, 1997.

³Ma WC (1989) Effect of soil pollution with metallic lead pellets on lead bioaccumulation and organ/body weight alterations in small mammals. Arch Env Contam Toxicol 28, 617-622