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LETTER REGARDING UNIVERSITY OF FLORIDA REVIEW OF TECHNICAL MEMORANDUM FOR NO FURTHER ACTION AT FACILITY 239 POTENTIAL SOURCE OF CONTAMINATION 51 GOLF COURSE NAS CECIL FIELD FL
6/12/2002
UNIVERSITY OF FLORIDA

UNIVERSITY OF FLORIDA

Center for Environmental and Human Toxicology

P.O Box 110885
Gainesville, Florida 32611-0885
Tel: (352) 392-4700, ext. 5500
Fax : (352) 392-4707

June 12, 2002

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

Dear Ms. Mora-Applegate:

We have reviewed at your request the May 2002 *Technical Memorandum for No Further Action, Facility 239, Potential Source of Contamination (PSC) 51 – Golf Course, Naval Air Station Cecil Field.* The document presents both human and ecological risk assessments for this site, based on 313 soil, 26 surface water, six groundwater, and 28 sediment samples. The document states that impacts from organochlorine pesticides and arsenic documented for several media are the result of permitted pesticide application during golf course maintenance activities. The report analyzes each of the main management type areas (i.e., greens, tees, fairways, rough, and woods) separately, based on the assumption that pest management practices will result in similar concentrations within each of these different areas of the golf course. The human health evaluation is based on dividing the entire site, which encompasses approximately 250 acres, into one-acre exposure units (EUs). A surface soil sample was obtained from each of these EUs, in addition to samples collected from the center of both tees and greens (which were assumed to be the most affected areas). Although each EU is represented by at least one soil sample, the assessment uses site-wide averages for each of the management type areas to calculate risks. Specifically, if an EU area falls within a greens area, then the exposure point concentration (EPC) is assumed to be represented by the results from all greens areas. For the ecological risk assessment (ERA), a similar approach is used, calculating hazard quotients for each management type area based on conservative and alternative ESVs, or based on food chain modeling. The document concludes, for human health, that the "range of risks from residential exposure on the entire golf course is between 2.1×10^{-7} and 1.2×10^{-4}." For the maintenance worker scenario, a maximum risk of 2.0×10^{-6} was also calculated, whereas the average and 95th percentile risks were both 1.8×10^{-6}. With respect to the ERA, the document concludes that potential risks to soil invertebrates exist around numerous soil samples, and that

risks to higher receptors are also present. Based on this analysis, a recommendation is made for no further action at this site.

We have the following comments regarding the human health risk portion of the analysis:

1. A substantial percentage of soil samples taken from greens, tees, fairways, and to a lesser extent rough and wooded areas, have contaminants in concentrations that exceed FDEP residential SCTLs, implying that much of the site may be unsuitable for residential development in its present condition. The analysis concludes otherwise, largely by employing the EPA's risk range, which allows excess cancer risks up to 10^{-4}. If the FDEP excess cancer risk goal of 10^{-6} is applied, a no further action recommendation without site use restrictions is not supported.

2. The exposure point concentration for each EU is derived from the 95% UCL of data from all samples taken from that management type area.[1] For example, if the EU includes a green, the exposure point concentration is calculated from all of the samples taken from greens across the site. The idea is apparently that data from all samples taken from a given management area type are more representative of the average concentration within an EU than the one or two actual measurements taken there. The validity of this approach is questionable. It is based on the premise that historical pest management practices have resulted in essentially equivalent contaminant concentrations across the site within the various management type areas. This may or may not be the case. Some areas of the golf course may have been more prone to weed or insect problems than others, resulting in more frequent or intense pesticide applications. Empirically, there is substantial variability of contaminant concentrations from one area of the golf course to another within the same management area type — perhaps more than can be accounted for by variability from random sampling. The report indicates that samples from within specific management type areas appeared to come from a single distribution. This suggests, as the authors indicate, that the samples come from a single population. It does not, however, necessarily mean that the concentrations are equivalent across the site for various EUs within a management type area. This latter assumption — equivalence across the site — is critical to the use of this approach. Unless this approach can be validated through additional sampling, we do not recommend its use.

3. The analysis also includes an estimate of the overall risks from the site using information on the risks posed by each management type area and the proportion of the total area occupied by each area. The information value of this estimate is

[1] The 95% UCL is described in the report as 95th percentile value. This is potentially misleading. It is an upper confidence limit estimate of the average concentration, not a value that represents the upper end of the distribution of values.

unclear, since the entire site does not represent an EU. Some of the text implies that it might be acceptable if some residential EUs have risks greater than target risk values as long as the number or percentage of such EUs is small. In our experience, FDEP expects all residential EUs to achieve its risk goals.

The ERA calculated significant risks for many receptors (invertebrates, birds, and mammals), but downplayed them by asserting that the current configuration of the site provides little cover for animals to use the most contaminated areas (greens and tees). However, it acknowledged that "If the golf course is eventually converted to more natural habitat conditions, pesticide concentrations in soil at current concentrations would pose significant potential risk to many receptors." Although the ERA presented seems for the most part appropriate, we have the following concerns:

1. Contaminant screening and food-chain modeling were conducted for each contaminant separately. This procedure might result in an underestimation of risks if some of the contaminants present (notably DDT, DDE, and DDD) act through the same toxic mode of action. The assumption of a common mode of action is implicit in Region IV's use of an ecological screening value of 2.5 μg/kg for total DDT/DDE/DDD.

2. The ERA is based on calculating hazard quotients for each of the management type areas. We do not think this approach brings an accurate picture of risks. Highly contaminated areas such as greens and tees are dispersed throughout the entire golf course, so it is hard to make a case that any receptor will be exposed solely to a given management type area. We think it is more appropriate to define ecological exposure units with regard to the receptors of interest (shrew and mockingbird, for example). For the shrew, an appropriate exposure concentration might be an upper-end value (maximum or 95th percentile) of the concentration data for the entire golf course. This is justified in that this species (and similar species such as the eastern mole) have relatively small home-ranges (1-2 acres). For birds, it may be assumed that risks modeled for the mockingbird are more adequately portrayed using a central tendency estimate of the concentration for the entire golf course.

3. The document states, "PCBs are not believed to be a significant source of contaminants at PSC 51" (page 6-17). Although we do not see a reason to expect PCBs are a problem at this site, we think the data are too limited to reach a firm conclusion regarding the likelihood of impacts posed by these compounds. Only three samples have been analyzed for Aroclor-1254 and one of these was 0.468 mg/kg, or 53 times the ecological screening value.

4. For evaluation of groundwater potentially discharging into surface water, the document uses a screening value for dieldrin of 0.0027 μg/L. However, Chapter

62-302, F.A.C. lists lower values for this compound (0.00014 µg/L annual average; 0.0019 µg/L maximum).

In conclusion, the document under review shows that target risks are exceeded in at least some potential residential exposure units. The ERA also shows that potential risks are significant, especially if the site is no longer maintained as a golf course.

We hope these comments are helpful. Please do not hesitate to contact us if you have any questions.

Sincerely,

Hugo G. Ochoa, D.V.M., Ph.D.

Bernard K. Gadagbui, Ph.D.

Stephen M. Roberts, Ph.D.