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FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AND UNIVERSITY OF FLORIDA REVIEW OF DRAFT TECHNICAL MEMORANDUM FOR NO FURTHER ACTION AT POTENTIAL SOURCE OF CONTAMINATION 51 NAS CECIL FIELD FL
7/22/2003
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

FLORIDA

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

July 22, 2003

Commanding Officer
Mr. Mark Davidson, Code ES33
SOUTHNAVFACENGCOM
Post Office Box 190010
North Charleston, SC 29419-9010

RE: Draft Technical Memorandum for No Further Action, Facility 239, Potential Source of Contamination 51 (PSC 51)- Golf Course, Naval Air Station Cecil Field, Florida.

Dear Mr. Davidson:

The Department and its risk assessors with the University of Florida's Center for Environmental & Human Toxicology have reviewed the Draft Technical Memorandum for No Further Action, Facility 239, Potential Source of Contamination 51 (PSC 51)- Golf Course, Naval Air Station Cecil Field, dated May 2002 (received May 24, 2002), and Tetra Tech NUS's response to our risk assessor's comments of July 20, 2002. I have enclosed their three review letters. Currently, our risk assessors are attempting to calculate ecological risks based on a comment they made in their June 12, 2002 letter. They disagreed that the calculation of hazard quotients for each management type area of the golf course gave an accurate picture of ecological risks. The calculations they are attempting should be with regard to the home-ranges of particular receptors of interest. They also will be calculating these risks in light of the city of Jacksonville's stated intention of placing one foot of clean cover over the greens.

Based upon contaminant concentrations detected on the golf course, the Department cannot agree that No Further Action is required on the golf course. The Department is amenable to allowing the property to continue to be used as a golf course with no cleanup required other than placing a land use restriction on the property to disallow other uses in the future unless site rehabilitation has been conducted and documented to verify that the property is suitable for other uses than as a golf course.

I believe that by addressing the various concerns raised in the attached letters, a final document may be constructed. If you have any concerns regarding this letter, please contact me at (850) 245-8997.

Sincerely,

David P. Grabka

David P. Grabka, P.G.
Remedial Project Manager

CC: Debbie Vaughn-Wright, USEP, Atlanta
John Flowe, City of Jacksonville
Jeff Meyers, SOUTHNAVFACENGCOM
Mark Speranza, TtNUS, Pittsburgh
Mike Halil, J.A. Jones, Jacksonville
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for
TJB JJC ESN

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June 20, 2003

Ligia Mora-Applegate
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Florida Department of Environmental Protection
Room 471A, Twin Towers Office Building
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United States of America

Dear Ms. Mora-Applegate,

At your request, we have reviewed responses to comments prepared by Tetra Tech NUS (TTN) sent to us in an e-mail dated June 6, 2003. These responses were directed to comments we made in a June 12, 2002 letter addressed to you regarding the *Technical Memorandum for No Further Action, Facility 239, PSC 51 - Golf Course, Naval Air Station Cecil Field, Jacksonville, Florida*. In our June 12, 2002 letter, we made several comments on the human health and ecological risk assessment for this golf course site. We have the following comments to these responses:

In their response to our first comment regarding acceptable cancer risks applicable to the site, TTN acknowledges that much of the site exceeds residential SCTLs, and that, under Florida guidelines, the site in its current state is not acceptable for residential development. The response also suggests that the site would have to remain a golf course in the future.

Our second comment dealt with the use of data from the entire site to evaluate residential risks that may occur at any potential residential lot in the event the golf course is converted to residential use. We pointed out that this approach relied heavily on the assumption that variability among management type areas (e.g., greens) was at least as large as variability within greens. The response to our comments describes a study designed to compare the variability within two greens to the variability of the entire dataset. Unfortunately, the short discussion provides little information to assess the reliability of its results, although the limited information provided suggests that some results were not completely conclusive. In a June 5, 2003 letter, one of us (SMR) reviewed handouts from a PowerPoint presentation by Dr. Ted Simon in which this procedure was also explained, but a lack of detailed documentation also precluded a review.

In our third point, we questioned the approach of apportioning risk estimates from each management area to calculate a total risk for the site. Residents are expected to be exposed to soils at their lot only, and for a person occupying a contaminated lot it may be of little comfort to know all other neighboring lots are clean. This is why FDEP expects that residential risk goals be met not just at some or most, but all potential residential lots. The response by TTN states that "The proportionality of the areas of the site was used to represent the probability of defining a residential unit on any given area. Specifically, if greens only constitute 1 percent of the entire

site, then there is only a 1 percent chance of developing a residential EU on an area defined by the greens data. Hence, the probabilistic risk assessment accounts for the application of this data based on the likelihood of being exposed to those areas." This approach may provide an overview of risks posed by various residential lots. However, if the site is converted to residential use, FDEP management of the site will no doubt require that risks at each and every residential lot are acceptable.

The letter also responds to comments we made regarding the ecological risk evaluation. TTN responses point that our concerns are somewhat addressed in the uncertainty section, and that the approach of estimating risks by assuming receptors are exposed to a single management type (e.g., greens) is only one of "several approaches that could have been taken to derive exposure point concentrations." Irrespective of the protectiveness of the outcome, we still think there are approaches that are more technically defensible than others. We also agree that PCBs are not likely to be related to site activities and are satisfied with the discussion in the text highlighted in the response to our comment. Finally, we stand corrected in that we apparently misread the original document with respect to the screening value used to screen surface water.

We hope that these comments are useful in resolving outstanding technical issues associated with the risk assessments for this site. Please don't to hesitate to contact us if you need further clarification regarding these issues.

Sincerely,

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

Stephen M. Roberts, Ph.D.

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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.

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June 5, 2003

Ligia Mora-Applegate
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Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399

Dear Ms. Mora-Applegate:

In a letter to you dated June 12, 2002, we were critical of an approach being used to estimate contaminant concentrations within exposure units (EUs) at the PSC 51 Golf Course, Naval Air Station, Cecil Field. As you may recall, exposure point concentrations were calculated as the 95% UCL for all samples taken within a management type area, e.g., for all samples taken from greens. The 95% UCL calculated in this way was taken as valid for each individual EU within that management type area. Using the green example, the 95% UCL for all greens was taken to represent the exposure point concentration for each individual green. We pointed out that the implicit assumption in this approach was that all EUs within a management type area had the same extent of contamination. We noted that different greens, for example, *appeared* to be contaminated to different extents, based on the limited sampling data available for individual greens. We acknowledged that this could be due to random sampling, but thought that it was also possible that the greens did in fact have different degrees of contamination. We recommended that unless additional sampling could be conducted to better characterize the variability in contaminant concentrations both within and among greens, that this approach should not be used.

It appears that additional sampling of greens was conducted. Dr. Ted Simon presented the results of a statistical analysis of these data during a Navy Tier 1/Tier 2 meeting on March 19, 2003. I did not attend the meeting, and have only his Powerpoint slides to evaluate. It appears from the slides that differences among the greens in the concentrations of some contaminants were observed. However, without more detail, I cannot be sure of the conclusions or effectively assess the methodology.

Also as part of his presentation, Dr. Simon attempted to address the question of whether contaminants present in soil at the greens posed an acute toxicity hazard for small children. His approach was to obtain a LOAEL or NOAEL for each of the chemicals of interest (arsenic, chlordane, dieldrin, and heptachlor epoxide) from the Hazardous Substance Data Bank, apply an appropriate safety factor to derive an acute toxicity-based reference dose, and calculated a soil concentration that would deliver that

dose to a small child if 10 g of soil were ingested during a pica episode. This is fundamentally the same methodology that the Florida Department of Environmental Protection uses to develop their acute toxicity-based SCTLs for Chapter 62-777, F.A.C. The only differences are: 1) source of information (Dr. Simon used HSDB, FDEP uses an open literature search); and 2) the body weight assumption for the child (Dr. Simon used 8 kg; FDEP uses 15 kg). Without conducting a thorough search of the literature, I am not able to say whether I would recommend the same acute toxicity based soil concentration limits as those presented during the March, 2003 meeting. I can, however, state that the basic approach was sound.

Finally, it has come to my attention that risk management options for this site might include covering contaminated areas with clean fill. Providing the depth of the "cap" is adequate (FDEP considers the depth of surface soil to be 2 feet) and institutional controls are in place to insure that the cap remains intact, it should provide an effective barrier to direct exposure. Of course, an analysis would be required to insure that areas that remain uncapped satisfy FDEP risk-based cleanup goals.

Sincerely,

Stephen M. Roberts, Ph.D.