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NAS CECIL FIELD, FL
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LETTER REGARDING UNIVERSITY OF FLORIDA COMMENTS ON ECOLOGICAL ISSUES IN DRAFT TECHNICAL MEMORANDUM FOR NO FURTHER ACTION AT POTENTIAL SOURCE OF CONTAMINATION 51 NAS CECIL FIELD FL
7/25/2003
UNIVERSITY OF FLORIDA

UNIVERSITY OF
FLORIDA

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July 25, 2003

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
United States of America

Dear Ms. Mora-Applegate,

This letter discusses ecological risk issues that may need to be addressed for the Cecil Field PSC-51 Golf course site. As you may recall, we commented on the approach used to calculate risks for ecological receptors included in the May 2002 *Technical Memorandum for No Further Action, Facility 239, Potential Source of Contamination 51, Golf Course, Naval Air Station, Cecil Field, Florida* prepared by Tetra Tech NUS (TTN). The approach presented concentrated on calculating hazard quotients (HQ) for ecological receptors separately for each management type area. Different management type areas are interspersed throughout the golf course, and we pointed out it should be assumed that ecological receptors will be exposed (depending on their habitat preferences and home range) to a mixture of management type areas. We have calculated site-wide average HQs for the most exposed avian and mammalian receptors, the northern mockingbird, and the least shrew (see attached table). HQs calculated for individual management type areas presented in Tables 6-18 through 6-22 of the TTN report were averaged using the proportion of the site that is covered by each management type (from Table 6-4 of the TTN report) as weighing factors.

As it can be seen in the attached table, HQs greater than 1.0 are still calculated for the entire site for DDR [for the mockingbird] and for dieldrin and arsenic [for the shrew], even after assuming that the greens areas will be covered by clean fill (see the two rightmost columns). For birds, the ecological concern due to exposure to DDR is reduced hatchability caused by egg breakage during incubation. This effect is mediated by DDR disruption of calcium metabolism leading to eggshell thinning. The toxicity value protective of this effect used by TTN is the default value commonly used for all birds and is based on a field study of brown pelican populations (*1*). Other studies suggest that higher exposures are required to produce eggshell thinning in smaller birds. Laboratory studies using American kestrels have determined a No Adverse Effect Concentration

(NOAEC) of 1.13 mg/kg DW in food (*2*). The average body weight and food consumption values for this species are 117 g and 19 g/d, respectively. Therefore, the No Adverse Effect Level (NOAEL) is 1.13 x 0.019 / 0.117 = 0.18 mg/kg-d. This NOAEL is more than 60-fold higher than the NOAEL used by TTN, suggesting that risks to terrestrial birds due to exposure to DDR at this site are within acceptable limits. With respect to risks to the shrew due to exposure to dieldrin and arsenic, NOAEL values are less than 2.0, suggesting that adverse effects (i.e., those associated with exposures at or above the respective LOAELs) are unlikely at the site.

Please do not hesitate to contact us if you need further assistance regarding the evaluation of this Site.

Sincerely,

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

Stephen M. Roberts, Ph.D.

Reference List

1. Anderson D., Jehl J., Risebrough R., Woods L., Deweese L., Edgecomb W. Brown pelicans: Improved reproduction off the southern California coast. Science 190:806-808 (1975).

2. Lincer J. DDE-induced eggshell-thinning in the American kestrel: A comparison of the field situation and laboratory results. Journal of Applied Ecology 12:781-793 (1975).

Table 1. Hazard Quotients (HQ) for the Mockingbird and Least Shrew for each Management Type Area, and for the Site as a Whole

		Greens Included		Greens Excluded	
Management Type Area	Contaminants	Mockingbird NOAEL Mean HQ	Shrew NOAEL Mean HQ	Mockingbird NOAEL Mean HQ	Shrew NOAEL Mean HQ
Tees	DDR[1]	5.9E+01	2.5E-01	5.9E+01	2.5E-01
	Chlordanes	8.2E-01	4.7E-01	8.2E-01	4.7E-01
	Dieldrin	8.0E+00	3.8E+01	8.0E+00	3.8E+01
	Heptachlor Hep	0.0E+00	5.8E-01	0.0E+00	5.8E-01
	Arsenic	2.2E-01	5.4E+00	2.2E-01	5.4E+00
Greens	DDR	1.6E+03	1.9E+00	0	0
	Chlordanes	1.4E+01	7.2E+00	0	0
	Dieldrin	3.2E+00	1.5E+01	0	0
	Heptachlor Hep	0.0E+00	3.8E+00	0	0
	Arsenic	6.9E-01	1.7E+01	0	0
Fairways	DDR	2.7E+00	1.2E-02	2.7E+00	1.2E-02
	Chlordanes	3.9E-03	1.7E-02	3.9E-03	1.7E-02
	Dieldrin	4.8E-01	2.3E+00	4.8E-01	2.3E+00
	Heptachlor Hep	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Arsenic	2.3E-01	5.5E+00	2.3E-01	5.5E+00
Rough	DDR	2.3E+01	9.9E-02	2.3E+01	9.9E-02
	Chlordanes	3.7E-02	2.1E-02	3.7E-02	2.1E-02
	Dieldrin	5.3E-01	2.5E+00	5.3E-01	2.5E+00
	Heptachlor Hep	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Arsenic	8.0E-02	2.0E+00	8.0E-02	2.0E+00
Wooded	DDR	1.6E+01	6.9E-02	1.6E+01	6.9E-02
	Chlordanes	1.3E-02	7.3E-03	1.3E-02	7.3E-03
	Dieldrin	1.6E-01	7.5E-01	1.6E-01	7.5E-01
	Heptachlor Hep	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Arsenic	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Percent of Site Represented by Each Management Type	Tees	1%	1%	1%	1%
	Greens	1%	1%	1%	1%
	Fairways	10%	10%	10%	10%
	Rough	34%	34%	34%	34%
	Wooded	54%	54%	54%	54%
		Mockingbird NOAEL Mean HQ	Shrew NOAEL Mean HQ	Mockingbird NOAEL Mean HQ	Shrew NOAEL Mean HQ
All Areas Combined	DDR	33.818	0.093766	17.618	0.074566
	Chlordanes	0.172088	0.08932	0.028088	0.01742
	Dieldrin	0.4266	2.015	0.3946	1.865
	Heptachlor Hep	0	0.0438	0	0.0058
	Arsenic	0.0593	1.454	0.0524	1.284

[1]Sum of DDT, DDE, and DDD average concentrations.