Florida Department of Environmental Protection

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March 12, 2010

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NAS PENSACOLA
5090.3a

Ms. Patty Marajh-Whittemore
Naval Facilities Engineering Command Southeast
Post Office Box 30
Building 903
Naval Air Station Jacksonville
Jacksonville, Florida 32212-0030

RE: Technical Memorandum - Refined List of Chemicals of Concern for the Feasibility Study and Development of Preliminary Remediation Goals for Sediment, Site 41 - Combined Wetlands, Naval Air Station Pensacola, Pensacola, Florida.

Dear Ms. Marajh-Whittemore:

The Department has completed its review of the Technical Memorandum - Refined List of Chemicals of Concern for the Feasibility Study and Development of Preliminary Remediation Goals for Sediment, Site 41 - Combined Wetlands, Naval Air Station Pensacola, prepared by Tetra Tech NUS, Inc., received December 2, 2009 at the NAS Pensacola Partnering meeting. The Department's contracted risk assessors with the University of Florida have prepared comments on the Technical Memorandum and they are attached. Please address any specific risk assessment questions you may have with the risk assessor's comments to Ligia Mora-Applegate at ligia.mora-applegate@dep.state.fl.us or (850) 245-8992.

If you have any other concerns regarding this letter, please contact me at (850) 245-8997.

Sincerely,

David P. Grabka

David P. Grabka, P.G.
Remedial Project Manager
Federal Programs Section
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CC: Tim Bahr, FDEP
Greg Fraley, USEPA, Atlanta

Gerald Walker, TtNUS, Tallahassee
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March 8, 2010

Ligia Mora-Applegate
Bureau of Waste Cleanup
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Refined list of chemicals of concern for Naval Air Station Pensacola Site 41

Dear Ms. Mora-Applegate:

At your request we have reviewed the *Technical Memorandum – Refined List of Chemicals of Concern for the Feasibility Study and Development of Preliminary Remediation Goals for Sediment, Site 41 – Combined Wetlands, Naval Air Station Pensacola.* This document refines the list of chemicals of concern (COCs) submitted in the Remedial Investigation report (November 2007). It utilizes default sediment criteria and toxicity testing results to develop site-specific preliminary remediation goals (PRGs) for each wetland group. The wetland groups listed in the technical memorandum are: Group A – Wetland 64; Group B – Wetlands 3 and 5A; Group C – Wetlands 15, 16, 18A, and 18B; Group D – Wetland 5B; Group E – Wetland 48. Based on the wetland-specific PRGs, the list of COCs for each wetland was refined. We have the following comments regarding the refinement of COCs at this site:

1. Derivation of the wetland-specific PRGs was based on sediment toxicity testing. Table 2 states that samples 041M5A0501 and 041M640501 are not considered toxic despite significant reductions in growth for *C. tentans* and *N. arenaceodentata*, respectively, due to the high benthic diversity at those sample locations. Based on the sediment quality triad, if sediment samples exceed default chemistry criteria and show statistically significant toxicity to benthic organisms, the presence of a diverse benthic community does not preclude impacts to aquatic life. In fact, it suggests that the chemicals are likely stressing the ecosystem (MacDonald and Ingersoll, 2002, Table 23). Therefore, samples 041M5A0501 and 041M640501 should be considered toxic. This changes the no observed effects concentration (NOEC) and lowest observed effects concentration (LOEC) for antimony, cadmium, copper, lead, and zinc in Wetlands 3 and 5A (Table 3) and for all chemicals excluding endosulfan I in Wetland 64 (Table 6).

2. Table 2 presents a summary of the sediment toxicity tests. It is unclear from this table how the toxicity tests were performed. Notably, the length of the toxicity test is absent. The FDEP recommended method for determining chronic toxicity to fresh water whole sediment is the 42-day *Hyalella azteca* survival, growth,

and reproduction test and the *Chironomus tentens* life-cycle test. For salt-water whole sediment, the FDEP recommends the 42-day *H. azteca* survival, growth and reproduction test and the *Leptochirus plumulosus* growth and reproduction test. The organisms *N. arenicola* and *N. arenaceodentata* utilized for salt-water toxicity testing at NAS Pensacola Site 41 are not included in the organisms recommended for sediment toxicity testing by the FDEP (FDEP, 2004).

3. The sediment toxicity tests do not appear to have been interpreted correctly. Page 2 defines a NOEC as the greatest concentration that does not cause a toxic response. However, this definition allows the NOEC to be greater than concentrations that displayed sediment toxicity. For example, in Table 3 the greatest concentration of lead that did not cause a toxic response is 75.5 mg/kg in sample 041M5A0601. However, toxicity was seen in sample 041M030701 at a lead concentration of 35.6 mg/kg. Based on the above definition, 75.5 mg/kg is considered a NOEC despite the toxic response at 35.6 mg/kg lead. NOECs should not exceed the lowest toxic concentration in a sediment sample.

4. In Table 7, marine water sediment PELs are utilized as freshwater sediment probable effects concentrations (PECs). This is problematic for arsenic and 4,4'-DDE because their marine water PELs are not protective of benthic organisms in freshwater sediment. The marine water sediment PEL value for arsenic of 41.6 mg/kg exceeds the Florida sediment quality assessment guideline (SQAG) freshwater PEC of 33 mg/kg. The 4,4'-DDE marine water PEL of 0.374 mg/kg exceeds the Florida SQAG freshwater PEC of 0.031 mg/kg. PECs are utilized as not-to-exceed values. When the default PEC value is selected as the PRG, chemical concentrations at freshwater wetlands of concern (Wetlands 3, 5A, 18A, and 48) should not exceed the PEC values listed in MacDonald et al. (2003).

5. In Table 9, the proposed overall ecological PRG for aldrin (0.08 mg/kg) and manganese (1,100 mg/kg) for Wetlands 3, 5A, and 18A are severe effects levels (SELs). SELs should not be utilized as remedial goals since they are not protective of the benthic community. We recommend utilizing the US EPA Region III freshwater sediment screening benchmarks of 0.002 mg/kg for aldrin and 460 mg/kg for manganese. These values are lowest effect levels (LELs) and are likely to provide more adequate protection of the aquatic community.

6. In Tables 9-12, the overall wetlands PRGs are a mixture of average (screening level, NOEC, LOEC) and not-to-exceed (PEL and PEC) values. This does not present a problem as long as they are utilized correctly when interpreting site data. It may be more straightforward to separate them into two sets of PRGs: one set for comparison to the average concentration and the other as not-to-exceed values.

7. The human health PRGs listed in Table 13 for the maintenance worker and recreational fisherman are not apportioned. Per Chapter 62-780, F.A.C., alternative soil clean-up target levels (CTLs) should be apportioned.

8. Utilizing the equations and values in Attachment B, we calculate a non-apportioned benzene PRG of 453 mg/kg for the maintenance worker. In accordance with the procedure utilized in Chapter 62-777, F.A.C. (Table II), this

value should be rounded to 450 mg/kg as opposed to the 500 mg/kg given in the document. We recommend utilizing the value of 450 mg/kg as the non-apportioned PRG because it is the more conservative value and is based on default criteria development for the State of Florida. This value should subsequently be apportioned per Chapter 62-780, F.A.C.

9. In the calculation of PRGs for sediment protective of ingestion of fish, the fraction of intake from the site (FI) is 0.1. This assumes that on the day a child trespasser consumes fish from the site (52 d/y), the fish caught on-site will only account for 10% of the fish ingestion that day. Instead, it appears likely that all fish ingested on that day would originate from the site. Therefore, we recommend utilizing an FI of 1. This would decrease the recreational fisherman PRGs listed in Table 13 by a factor of 10.

10. Page 10 states that the exposure frequency for maintenance workers was decreased from 52 d/y in the Remedial Investigation report to 26 d/y. No explanation is given for this change and it is unclear if this assumption remains protective of maintenance workers at the site.

11. Table 22 lists the refined COCs for NAS Pensacola Site 41. We have the following comments on the refinement:

    a. Wetland 3: The refinement is satisfactory.

    b. Wetland 5A: The refinement is satisfactory.

    c. Wetland 15:

        i. Lead, 4,4'-DDD, 4,4'-DDT, and total DDT were listed as ecological COCs in the remedial investigation report (RI) Table 16-1 but were omitted as ecological COCs in the technical memorandum. Because these chemicals exceed refinement criteria in the RI, they should remain ecological COCs for Wetland 15.

        ii. Delta-BHC was listed as an ecological COC in the RI report Table 16-1 (delta-BHC HQ = 5.6). Although it was eliminated in this technical memorandum as a COC for human health, it remains an ecological COC for this wetland.

    d. Wetland 16: The refinement is satisfactory.

    e. Wetland 18A: Table 16-1 of the RI lists beta-BHC, total BHC, 4,4'-DDD, 4,4'-DDT, and total DDT as ecological COCs. They are considered COCs due to exceedance of the refinement COCs and through food chain modeling (DDT HQ=9.7). However, they are absent from Tables 18 and 22 of this report. These chemicals should be retained as ecological COCs based on criteria exceedances. We recommend conducting toxicity bioassays to determine if these ecological COCs are having adverse effects on wildlife in Wetland 18A.

f. Wetland 18B: Arsenic should be retained as a COC for human health. Arsenic was omitted as a COC based on resampling at one sample site. One sample is not adequate to characterize the wetland. It is premature to eliminate arsenic as a COC for human health based on one sample. We suggest additional sampling to confirm arsenic is not of concern for this wetland.

g. Wetland 48: The refinement is satisfactory.

h. Wetland 64:

i. Aroclor 1254 and 1260 were eliminated as human health COCs based on the FI of 0.1. Amending the FI to 1 (which appears reasonable based on the limited exposure frequency) changes the recreational fisherman PRGs to 0.066 mg/kg for both chemicals. The maximum detected concentration of Aroclor 1254 (0.37 mg/kg) and Aroclor 1260 (0.3 mg/kg) exceed this PRG. Additionally, apportionment needs to be considered for these chemicals per Chapter 62-780, F.A.C. Therefore, Aroclor 1254 and 1260 should remain human health COCs for this wetland.

ii. Copper should be retained as an ecological COC. In Table 6, sample 41M6405 should be considered toxic and 102 mg/kg should be utilized as the LOEC for copper. The maximum Phase II (255 mg/kg), Phase III (146 mg/kg), and Phase IV (200 mg/kg) copper concentrations exceed the LOEC. Therefore, copper should be retained as an ecological COC for this wetland.

iii. Silver should be retained as an ecological COC. In Table 6, sample 41M6405 should be considered toxic and 1.9 mg/kg should be utilized as the LOEC for silver. The maximum Phase II (5.1 mg/kg), Phase III (3 mg/kg), and Phase IV (4 mg/kg) silver concentrations exceed the LOEC. Therefore, silver should be retained as an ecological COC for this wetland.

iv. Table 16-1 of the RI states that mercury should be retained as a bioaccumulative COC for this wetland. The refinement PRGs presented in this document did not address bioaccumulation. Therefore, mercury should be retained as an ecological COC for this wetland.

Please let us know if you have any questions regarding this review.

Sincerely,

Stephen M. Roberts, Ph.D.

Leah D. Stuchal, Ph.D.

References:

FDEP (2004) Toxicity test methods. Bureau of Waste Cleanup.

MacDonald, D.D. and Ingersoll, C.G. (2002) A Guidance Manual to Support the Assessment of Contaminated Sediments in Freshwater Ecosystems, Volume III – Interpretation of the Results of Sediment Quality Investigations. US EPA. Chicago, Illinois.

MacDonald, D.D., Ingersoll, C.G., Smorong, D.E., Lindskoog, R.A., Sloane, G., and Biernacki, T. (2003) Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Florida Department of Environmental Protection.