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NAS PENSACOLA  
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LETTER REGARDING RESPONSE TO COMMENTS FROM UNIVERSITY OF FLORIDA AND  
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION ON THE REVISED DRAFT  
SAMPLING AND ANALYSIS PLAN, WETLAND SEDIMENT AND SURFACE WATER  
SAMPLING FOR OPERABLE UNITS 1, 2 AND 16 SITE 41 NAS PENSACOLA FL  
5/13/2014  
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION



**FLORIDA DEPARTMENT OF  
ENVIRONMENTAL PROTECTION**

BOB MARTINEZ CENTER  
2600 BLAIRSTONE ROAD  
TALLAHASSEE, FLORIDA 32399-2400

RICK SCOTT  
GOVERNOR

CARLOS LOPEZ-CANTERA  
LT. GOVERNOR

HERSCHEL T. VINYARD JR.  
SECRETARY

May 13, 2014

Ms. Patty Marajh-Whittemore  
Remedial Project Manager  
ITP Gulf Coast  
Naval Facilities Engineering Command Southeast  
Attn: AJAX Street, Building 135N  
P.O. Box 30A  
Jacksonville, FL 32212-0030

RE: Responses to Comments made by UF and the Department on the Revised Draft Sampling and Analysis Plan, Wetland Sediment and Surface Water Sampling for Operable Units 1, 2 and 16, Site 41, Naval Air Station Pensacola, Pensacola

Dear Patty:

The Department and the Department's contracted risk assessors with the University of Florida (UF) Center for Environment & Human Toxicology have reviewed the Responses to Comments made by UF and the Department on the Revised Draft Sampling and Analysis Plan, Wetland Sediment and Surface Water Sampling for Operable Units 1, 2 and 16, Site 41, Naval Air Station Pensacola, dated April 11, 2014 (received April 11, 2014), prepared by Resolution Consultants. Our responses are attached. Please provide responses to any remaining comments so that the Sampling and Analysis Plan can be approved and field work commenced.

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

Sincerely,

David P. Grabka, P.G.  
Remedial Project Manager  
DoD and Brownfields Partnerships  
Waste Cleanup Program

Cc: Tim Woolheater, EPA Region 4  
Greg Campbell, NAS Pensacola  
Allison Harris, Resolution Consultants

KAW

DOD\_11\_1852

[www.dep.state.fl.us](http://www.dep.state.fl.us)



# FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

BOB MARTINEZ CENTER  
2600 BLAIRSTONE ROAD  
TALLAHASSEE, FLORIDA 32399-2400

RICK SCOTT  
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SECRETARY

## MEMORANDUM

**TO:** David Grabka, PG II  
DoD and Brownfields Partnerships Section, WCP

**THROUGH:** Brian Dougherty, Administrator  
Office of District and Business Support  
Division of Waste Management

5/6/2014  
X   
B/D  
Signed by: Brian Dougherty

**FROM:** Ligia Mora-Applegate, Environmental Consultant  
Office of District and Business Support  
Division of Waste Management

5/6/2014  
X   
Signed by: MoraApplegate\_L

**SUBJECT:** Responses to Comments made by UF and FDEP on the Revised Draft Sampling and Analysis Plan, Wetland Sediment and Surface Water Sampling for Operable Units 1, 2 and 16, Site 41, Dated November 2013, Responses dated 4/11/14  
NAS Pensacola Site 41 Wetlands  
Pensacola, Escambia County, Florida  
Site ID#: DOD\_11\_1852

**DATE:** May 6, 2014

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At your request, the University of Florida (UF) and I have reviewed the Responses to Comments on the Revised Draft Sampling and Analysis Plan, for the Wetland Sediment and Surface Water, Operable Units 1, 2, and 16 – Site 41, at the Naval Air Station in Pensacola dated November 2013. The responses are dated April 11, 2014.

As expressed in February 3, 2014, in general we agree with the additional locations for sampling; nevertheless, the proposed methodology for development of remedial goals is still a concern to us (see UF comment #2).

In addition we have repeatedly stated that sediment delineation needs to be to the TELs/TECs not the PELs/PECs and the Navy has agreed to it, in the responses their position has been reversed.

The University of Florida's comments are attached. I concur with them.

If you have any questions, please contact me at 5-8992.



Center for Environment & Human Toxicology

PO Box 110885  
Gainesville, FL 32611-0885  
352-392-2243 Tel  
352-392-4707 Fax

May 5, 2014

Ligia Mora-Applegate  
Office of District and Business Support  
Division of Waste Management  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

Re: Responses to comments on the Revised Draft Sampling and Analysis Plan for NAS Pensacola Site 41

Dear Ms. Mora-Applegate:

At your request, we have reviewed the *Responses to Florida Department of Environmental Protection and University of Florida, Technical Review of the Revised Draft Sampling and Analysis Plan, Wetland Sediment and Surface Water Sampling, Operable Units 1, 2, and 16 – Site 41, Dated November 2013*. The document (dated April 11, 2014) is in response to our comment letter dated February 3, 2014. Our primary concern with the November 2013 Sampling and Analysis Plan is that it is inconsistent with the Navy's previous responses to comments, which indicate that old toxicity data will not be used in the development of site-specific PRGs and that PELs will not be used for delineation purposes. Based on the responses to comments below, it appears the Navy has changed position on these issues. We continue to assert that the PRGs are technically flawed and that PELs should not be utilized for delineation purposes. In order to follow the comments and responses regarding these issues, we have appended our previous comment letters and technical comments regarding the development of the PRGs (March 8, 2010 – February 3, 2014).

**UF Comment 1:**

The document proposes the use of six reference wetlands: two freshwater (Wetlands 32 and 70A), two estuarine (Wetlands 27B and 33), and two Hurricane series soil (Wetlands 25A and 27A). The previous document, Draft Sampling and Analysis Plan (SAP), Wetland Sediment Sampling, OU16, Site 41, dated July 24, 2013 proposed the use of four reference wetland: two freshwater (Wetlands 25B and 32) and two estuarine (Wetlands 27 and 33).

**Navy Response to Comment 1:**

The Navy added the additional Hurricane series wetland to assess iron concentrations that may be associated with the soil type. Wetland 3 which has consistently had elevated iron concentrations is also in Hurricane series soil.

**Follow-up to Comment 1: The response is satisfactory.**

UF Comment 1a:

Freshwater Wetland 25B has been excluded as a reference wetland, and replaced with 70A. Some explanation for this change in reference wetland location should be provided.

Navy Response to Comment 1a:

It was determined that Wetland 25B is a Hurricane Sands wetland, as such it was eliminated and replaced a reference wetland not in Hurricane Sands.

**Follow-up to Comment 1a: The response is satisfactory.**

UF Comment 1b:

Reference Wetlands 25A and 27A, and Wetland 3 are proposed for use as reference wetlands with Hurricane Series Soil. The U.S. Department of Agriculture (1997) document Soil Survey of Escambia County Florida, recognizes the different soil series based on specific characteristics for each family. The soil series are identified by USDA (1997) as "horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile". The current SAP characterized the wetlands as Hurricane Series Soil based on "poorly drained soil, pH (3.5 to 6) and high masses of iron accumulation." These criteria are not adequate for characterization of a soil type within a series. Further explanation should be provided regarding the soil assessment done for classification of these soils as Hurricane Series soils.

Navy Response to Comment 1b:

The characterization of the Hurricane Series Soil was intended to identify appropriate wetlands to assess iron concentrations. The soil survey map shows that Wetland 3 (a wetland of consistently elevated iron concentrations) is in the Hurricane Series Soil. The criteria provided are a general description of the Hurricane Series Soil, not a complete characterization.

**Follow-up to Comment 1b: The response is satisfactory.**

UF Comment 2:

This comment is a reiteration of one we have made previously, in the Review of the SAP for OU 16 (Site 41, Wetlands), dated November 26, 2012 (Comment 4). The document states that site-specific preliminary remedial goals (PRGs) will be reassessed using data collected during this sampling event. However, Worksheet 15 states that if a PRG was calculated as part of the SAP (TetraTech, 2012) or FS (TetraTech, 2010), the PRG from those documents will be utilized as the project action level (PAL). Interpretation of the old toxicity data is flawed and the previously developed PRGs should not be used to determine the extent of contamination at the site.

Nave Response to Comment 2:

The Navy does not understand the concern on the toxicity tests because no specific technical comments have been provided.

PALs will be used in the field to determine if step-out samples will be analyzed. PALs for antimony (27.7 mg/kg), barium (87 mg/kg), lead (258 mg/kg), and selenium (5.4 mg/kg) are based on the site-specific toxicity results, which, while not preferred by the U.S. EPA, are similar to the U.S. EPA recommended PALs for these chemicals (25 mg/kg, 60

mg/kg, 130 mg/kg, and 3.45 mg/kg, respectively). The PAL for iron (245,000 mg/kg), while supported by the Navy, will be changed to the U.S. EPA recommended value of 40,000 mg/kg based on a Severe Effects Level. The change to the iron PAL is made in recognition of the order of magnitude discrepancy between the Navy-recommended and U.S. EPA-preferred values, and in an effort to move the process forward. Worksheet #15 tables will be updated.

**Follow-up to Comment 2:**

**Specific technical comments on the development of site-specific PRGs were provided in a letter dated March 8, 2010 (Comments 1-6, 11c, 11e, and 11h; attached). Navy responses to these comments were included in a document dated April 14, 2010 (attached). Follow-up comments were provided by the University of Florida in a letter dated June 7, 2010 (Comments 1-6, 11c, and 11h; attached). Additional comments regarding the development of the site-specific PRGs were included in letters dated March 15, 2012 (Comments 1 and 2; attached) and November 26, 2012 (Comment 4; attached). It was agreed at a Partnering Meeting on May 9, 2012 (Draft Sampling and Analysis Plan, Appendix B, September 2012), a Navy response to comment letter dated February 22, 2013 (Comment 4; attached) and in a University of Florida letter dated March 27, 2013 (Comment 4; attached) that the old toxicity testing data would not be used for the development of PRGs at the site. The proposed PRGs in the November 2013 Sampling and Analysis Plan (SAP) were not updated, which is not in agreement with the Navy's previous comments. We continue to assert that the 2009 PRGs are flawed and should be excluded from the assessment.**

**UF Comment 3:**

Worksheet 15 also proposes to utilize the FDEP probable effect levels (PELs) for delineation purposes when PRGs are not available. This comment is a reiteration of one we have made previously in a letter dated November 26 2012 (Comment 5). Using the PEL for delineation may result in average contaminant concentrations that exceed the threshold effect levels (TELs), and should not be used. The Navy's response (Revised Responses to Comments, July 24, 2013; Second Navy Response 5) to our previous comments indicated agreement with our recommendations, that the PELs should not be utilized for delineation purposes.

**Navy Response to Comment 3:**

The Navy reiterates its position that comparisons will be made to the PEL/ PEC. The RI report and risk assessment are complete; therefore, the screening level TELs are not appropriate for this phase of the investigation. In addition, as stated in Approach to the Assessment of Sediment Quality in Florida Coastal Waters, "These guidelines are intended to be used as one tool in a toolbox of companion interpretive approaches..." and that the TELs and PELs "should not be used in lieu of water quality criteria, nor should they be used as sediment quality criteria". Moreover, use of PELs as not-to-exceed values is not appropriate, since empirical data from the site has been and will be used to calculate PRGs, as recommended by the Florida Sediment Quality Guidance.

**Follow-up to Comment 3:**

**This response is not consistent with previous comments made by the Navy. Specifically, in a letter dated July 24, 2013 (Comment 5; attached), Response 5 states "The Navy agrees to provide comparison of the detected concentrations to site-specific PRGs, PELs, and background concentrations for assessment and**

discussion by the Team. Remedial goals for the OU 16 FS will be based on the analytical chemistry and/or toxicity testing results that will be obtained as part of the fieldwork and testing planned for this investigation.” Based on this comment, it was our understanding that PELs would not be the only criteria used for delineation and that new toxicity testing would be conducted to develop updated site-specific PRGs (letter dated August 28, 2013, Comment 5; attached). Comments advising against the use of PELs as delineation criteria are included in a letter dated November 26, 2012 (Comment 5; attached) and in follow-up comments dated March 27, 2013 (Comment 5; attached) and June 10, 2013 (Comment 5; attached).

UF Comment 4:

U. S. EPA technical comments on the revised draft sampling and analysis plan (dated January 23, 2014) suggests shortening sediment toxicity tests to a 14-day exposure period for both *Leptocheirus* and *Hyalella*. It is important to note that 14-day toxicity testing for these species does not include reproduction. We strongly recommend retaining the 28-day chronic exposure period to include reproductive endpoints as well as growth and survival. Reproductive endpoints may be more sensitive to some contaminants, and therefore contaminant concentrations protective of growth and mortality may not be protective of reproductive effects. Chronic reproductive endpoints are indicative of population level effects and should be evaluated unless there is evidence that reproduction is not the most sensitive endpoint for the contaminants of concern.

Navy Response to Comment 4:

Comment noted. Toxicity testing will remain 28 days for *Leptocheirus plumulosus* and 42 days for *Hyalella azteca*.

**Follow-up to Comment 4: The response is satisfactory.**

UF Comment 5:

The U.S. Department of Agriculture (1997) document Soil Survey of Escambia, County Florida was incorrectly referenced on page WS10-7 as USDA 2007.

Navy Response to Comment 5:

The reference will be corrected.

**Follow-up to Comment 5: The response is satisfactory.**

UF Comment 6:

Figure 10-8 illustrates the CSM for Wetland 5A, but it is labeled as 58.

Navy Response to Comment 6:

The Navy was unable to locate a label “58” on Figure 10-8 or in associated text in section 10.5.1. No edits will be made to the figure.

**Follow-up to Comment 6: The response is satisfactory.**

UF Comment 7:

On page WS 11-18, second-last paragraph contains the following incomplete sentence: “Wetlands 32 and 70A are”.

Navy Response to Comment 7:  
This fragment will be removed from the report.

**Follow-up to Comment 7: The response is satisfactory.**

Please let us know if you have any questions regarding these responses.

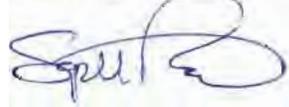
Sincerely,

A handwritten signature in black ink that reads "Leah Stuchal". The signature is written in a cursive style with a large initial 'L'.

Leah D. Stuchal, Ph.D.

A handwritten signature in black ink that reads "Roxana Weil". The signature is written in a cursive style with a large initial 'R'.

Roxana E. Weil, Ph.D.

A handwritten signature in blue ink that reads "Stephen M. Roberts". The signature is written in a cursive style with a large initial 'S'.

Stephen M. Roberts, Ph.D.

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 tentans* 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

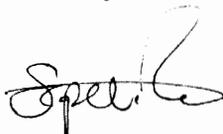
value should be rounded to 450 mg/kg as opposed to the 500 mg/kg given in the document. We recommend utilizing the value of 450 mg/kg as the non-apportioned PRG because it is the more conservative value and is based on default criteria development for the State of Florida. This value should subsequently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

**FDEP Ecological Risk Review Comments: 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  
March 8, 2010**

**Comments:**

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).

**Response:**

The conclusion of Section 11.1.4.4 of the RI report states that “Based on the evaluation of Wetland 5A to date, previous levels of constituents caused statistically significant reduction of growth at one sampling station, 041M5A05. However, the community index indicated that this location indicated the highest levels of diversity in Wetland 5A.” The conclusion of Section 11.3.4.3 of the RI report states that “Based on the results of the chemistry and toxicity data, sample locations 041M640401 and 041M640601 exhibited conditions in which toxic chemicals were probably stressing the system.” The report did not conclude that 041M640501 was a toxic location. Therefore, the Navy does not believe that neither location should be considered toxic for purposes of setting PRGs.

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 tentans* 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).

**Response:**

Section 8.7.3 and Table 8-4 of the RI report describes the toxicity testing that was conducted, including the length of the tests. No regulator comments were received on the RI report regarding the length of the test or the test species selected.

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.

**Response:**

By definition, the NOEC can be greater than concentrations of the same chemical in samples that are considered to be toxic because a NOEC is defined as the greatest concentration of a chemical in a non-toxic sample. The LOEC is defined as the lowest concentration in a toxic sample provided that the concentration is greater than the NOEC. Therefore, the NOECs can 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).

**Response:**

The saltwater refinement values from the RI were used, when available, because they were agreed to by the ecological technical sub-group as documented in the November 16, 2007 responses to EPA comments dated April 5, 2006 "The Tier I Partnering Team agreed to use only the EPA Region 4 Screening values and the FDEP PELs and TELs" in the RI. Also, as documented in the November 16, 2007 responses to FDEP comments dated January 23, 2006 "The Navy's approach for evaluating sediment data were based on the professional judgment of the NAS Pensacola Partnering Team. In addition the Team included ecological experts from the University of Florida, NOAA, and EPA Region 4 Ecological Services Division." However, if refinement values were not available then freshwater refinement values were preferentially used for the freshwater

wetlands and saltwater refinement values were preferentially used for the freshwater wetlands, when available.

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.

**Response:**

The Navy does not agree that screening levels should be used as PRGs. The SELs are similar in definition to the PELs that were used to refine the list of COPCs in the RI report, and were also used as one of the criteria for setting PRGs in the Technical Memorandum.

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.

**Response:**

The comment needs clarified. It is not clear why the reviewer believes that screening levels, NOECs, and LOECs are average values while the PEL and PEC are not to exceed values. The Navy believes that all of the PRGs for the chemicals remaining as COCs after the refinement presented in Tables 14 through 20 are 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.

**Response:**

The Navy would like to discuss this comment further with the State. If the PRGs are apportioned according to the number of carcinogenic/noncarcinogenic chemicals at each area, several of the sediment PRGs will result in fish tissue concentrations that are much lower than what is used to set fish advisories in the State of Florida. This is because the State of Florida sets fish advisories using a 10E-4 risk level, whereas apportioning the PRGs results in fish tissue levels based on a less than 10E-7 risk level. The resulting fish tissue concentrations would likely be less than background concentrations. This would also occur if the PRGs were not apportioned, but the impacts would not be as severe. Note that there was an error in the fraction of organic carbon values that were used to calculate the PRGs at Wetlands 15 and 64 so those corrections will be made when the PRGs are re-calculated.

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.

**Response:**

In accordance with Chapter 62-777 F.A.C. using default dermal absorption (DA) value of 0.01 (Table 3) and a GI absorption of 0.9 (Table 5) for benzene along with the equations and other input assumptions presented in Attachment B the non-apportioned PRG for the maintenance worker would be 448 mg/kg. This value would round to 450 mg/kg. This value will be proportioned per Chapter 62-780, F.A.C. See above table for revised PRG.

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.

**Response:**

The PRG for the recreational fisherman will be modified as follows. It is assumed the recreational fisherman eats one fish meal a week over a course of the year or 52 meals a year. Not all of the fish that the recreational fisherman eats will come from the wetlands. It is assumed that only 10 percent or 5 meals consists of fish caught at any one wetlands, therefore the exposure frequency would be 5 meals per year. Since the entire meal would come from the site a value of 1 will be used for the fraction ingested.

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.

**Response:** As presented in a response to an EPA comment on the RI report, "52 days per was assumed to be the total time a maintenance worker would spend performing maintenance in wetlands during a year, whether that is applicable to only one wetland or more than one. If a worker is assumed to spend time in more than one wetland, the exposure frequency should be divided by the number of wetlands to account for their exposure during that year, unless site-specific information is available." Maintenance in any one wetland throughout the year, and subsequent exposure to sediment is expected to be minimal, and much less than 52 times per year in any one wetland. Therefore, even the assumption of 26 times per year (once every two weeks) is conservative, because there is little maintenance that would require a worker to actually enter the wetland. Therefore, the Navy believes that wetting PRGs based on an

exposure frequency of 26 times per year for any one wetland is still conservative, and 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.

**Response:**

Comment noted.

b. Wetland 5A: The refinement is satisfactory.

**Response:**

Comment noted.

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.

**Response:**

Lead, 4,4'-DDD, 4,4'-DDT, total DDT, and delta-BHC were not listed as ecological COCs at Wetland 15 in the revised Table 16-1 (see Attachment A of the Technical Memorandum). Therefore, they were not evaluated as ecological COCs in the Technical Memorandum.

d. Wetland 16: The refinement is satisfactory.

**Response:**

Comment noted.

- 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.

**Response:**

Beta-BHC, total BHC, 4,4'-DDD, 4,4'-DDT, and total DDT, were not listed as ecological COCs at Wetland 18A in the revised Table 16-1 (see Attachment A of the Technical Memorandum). Therefore, they were not evaluated as ecological COCs in the Technical Memorandum.

- 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.

**Response:**

The Navy will agree to retain arsenic as a COC for human health for the FS. However, the only alternative that will be evaluated for this Wetland 18B in the FS will be long-term monitoring to determine whether arsenic is really a concern at the wetland.

- g. Wetland 48: The refinement is satisfactory.

**Response:**

Comment noted.

- 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.

**Response:**

Please see the Navy's response to Comment 7. Aroclor-1254 will not be added as final COCs for Wetland 64 because it was not detected in any of the Phase III of Phase IV samples.

- 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.

**Response:**

Please see the Navy's response to Comment 1. The Navy does not agree that the LOEC for copper needs revised.

- 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.

**Response:**

Please see the Navy's response to Comment 1. The Navy does not agree that the LOEC for silver needs revised.

- 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.

**Response:**

Mercury was eliminated from further evaluation for reasons provided on Page 7, 1<sup>st</sup> paragraph of the Technical Memorandum. This was primarily because risks to the red drum were marginal and most of the mercury concentrations were lower than reference concentrations. The red drum model is discussed in Section 8.7.1.3 of the RI report. Actual tissue concentrations were used, when available. Mercury is a common metal that is in most fish across the State of Florida, much of which is present from atmospheric deposition. In fact, the State of Florida has a fish advisory for the state that prohibits or limits the amount of fish that pregnant or nursing women and women who may become pregnant should consume. Therefore, mercury contamination in fish appears to be a statewide problem.

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June 7, 2010

Ligia Mora-Applegate  
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2600 Blair Stone Road  
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Re: Response to Comments on the NAS Pensacola Site 41 Technical Memorandum

Dear Ms. Mora-Applegate:

At your request we have reviewed the *FDEP Ecological Risk Review Comments: 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*. The document is undated. This document responds to University of Florida comments on the Technical Memorandum provided in a letter dated March 8, 2010. The original University of Florida Comments and the Navy's response are copied below in italics. Additional comments follow in normal font.

**University of Florida Comment #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).*

**Navy response to Comment #1:** *The conclusion of Section 11.1.4.4 of the RI report states that "Based on the evaluation of Wetland 5A to date, previous levels of constituents caused statistically significant reduction of growth at one sampling station, 041M5A05. However, the community index indicated that this location indicated the highest levels of diversity in Wetland 5A." The conclusion of Section 11.3.4.3 of the RI report states that "Based on the results of the chemistry and toxicity data, sample locations 041M640401 and 041M640601 exhibited conditions in which toxic chemicals were probably stressing the system." The report did not conclude that 041M640501 was*

a toxic location. Therefore, the Navy does not believe that either location should be considered toxic for purposes of setting PRGs.

**Follow-up response to Comment #1:** It is understood that samples 041M5A05 and 041M640501 were not considered toxic in the RI report. However, the weight-of-evidence approach suggests that chemicals at these two locations are stressing the ecosystem. Chemical concentrations that adversely affect the ecosystem should be taken into consideration when deriving PRGs even if a particular sample location was not labeled as toxic in the RI report.

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**University of Florida Comment #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 *Hyaella azteca* survival, growth, and reproduction test and the *Chironomus tentans* 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).

**Navy response to Comment #2:** Section 8.7.3 and Table 8-4 of the RI report describes the toxicity testing that was conducted, including the length of the tests. No regulator comments were received on the RI report regarding the length of the test or the test species selected.

**Follow-up response to Comment #2:** The 42-day *H. azteca* survival, growth, and reproduction test is recommended by the FDEP for assessment of the chronic toxicity of sediments to benthic invertebrates. Wetlands 64, 16, and 18 utilized a 20-day marine *N. arenacoedentata* chronic toxicity test and Wetlands 5A and 3 utilized a 28-day *C. tentans* toxicity test (Table 8-4 of the RI). Chronic toxicity may occur at lower concentrations when the organisms are exposed for longer periods of time. The 42-day chronic toxicity test recommended by the FDEP may reveal toxicity at lower concentrations than is visualized during a 20- or 28-day toxicity test. Use of these shorter tests increases the uncertainty in the toxicity results and may leave toxic sediments on-site.

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**University of Florida Comment #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.

**Navy response to Comment #3:** By definition, the NOEC can be greater than concentrations of the same chemical in samples that are considered to be toxic because

*a NOEC is defined as the greatest concentration of a chemical in a non-toxic sample. The LOEC is defined as the lowest concentration in a toxic sample provided that the concentration is greater than the NOEC. Therefore, the NOECs can exceed the lowest toxic concentration in a sediment sample.*

**Follow-up response to Comment #3:** Sediment toxicity tests evaluate the toxicity of the mixture of chemicals present within the sediment. The benefit to these tests is that they account for the possible non-additive toxic effects of mixtures and for changes in site-specific bioavailability. Because many site-specific characteristics are affecting the toxicity of the samples, it is difficult to determine what combination of sediment characteristics is responsible for the toxic effect. Therefore, the LOEC of 35.6 mg/kg lead should have greater weight than the NOEC of 75.5 mg/kg. In addition, the LOEC (Wetland 3) and NOEC (Wetland 5A) concentrations for lead come from two separate wetlands in Wetland Group B. It appears that the grouping of these two wetlands may not be appropriate.

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**University of Florida Comment #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).*

**Navy response to Comment #4:** *The saltwater refinement values from the RI were used, when available, because they were agreed to by the ecological technical sub-group as documented in the November 16, 2007 responses to EPA comments dated April 5, 2006 "The Tier I Partnering Team agreed to use only the EPA Region 4 Screening values and the FDEP PELs and TELs" in the RI. Also, as documented in the November 16, 2007 responses to FDEP comments dated January 23, 2006 "The Navy's approach for evaluating sediment data were based on the professional judgment of the NAS Pensacola Partnering Team. In addition the Team included ecological experts from the University of Florida, NOAA, and EPA Region 4 Ecological Services Division." However, if refinement values were not available then freshwater refinement values were preferentially used for the freshwater wetlands and saltwater refinement values were preferentially used for the freshwater wetlands, when available.*

**Follow-up response to Comment #4:** It is unclear why marine water PELs were utilized for freshwater sediment when freshwater PECs are available. As stated above, marine water PELs for arsenic and 4,4'-DDE exceed the freshwater PECs and are not protective of freshwater benthic invertebrates. Use of the marine water PELs for freshwater is likely to result in toxic sediments remaining in freshwater wetlands.

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**University of Florida Comment #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.

**Navy response to Comment #5:** *The Navy does not agree that screening levels should be used as PRGs. The SELs are similar in definition to the PELs that were used to refine the list of COPCs in the RI report, and were also used as one of the criteria for setting PRGs in the Technical Memorandum.*

**Follow-up response to Comment #5:** SELs are defined as the concentration at which a pronounced disturbance of the sediment-dwelling community can be expected. The SEL represents approximately the 90<sup>th</sup> percentile of the effects data. The PEL represents the geometric mean of the 50<sup>th</sup> percentile of the effects data and the 85<sup>th</sup> percentile of the no effect data. We therefore disagree that SELs are similar to PELs (MacDonald et al, 2003). SELs suggest significant adverse impacts to the benthic community and should not be utilized as PRGs.

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**University of Florida Comment #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.*

**Navy response to Comment #6:** *The comment needs clarified. It is not clear why the reviewer believes that screening levels, NOECs, and LOECs are average values while the PEL and PEC are not to exceed values. The Navy believes that all of the PRGs for the chemicals remaining as COCs after the refinement presented in Tables 14 through 20 are not-to-exceed values.*

**Follow-up response to Comment #6:** The use of all refinement values as not-to-exceed values is acceptable.

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**University of Florida Comment #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.*

**Navy response to Comment #7:** *The Navy would like to discuss this comment further with the State. If the PRGs are apportioned according to the number of carcinogenic/noncarcinogenic chemicals at each area, several of the sediment PRGs will result in fish tissue concentrations that are much lower than what is used to set fish advisories in the State of Florida. This is because the State of Florida sets fish advisories using a 10E-4 risk level, whereas apportioning the PRGs results in fish tissue levels based on a less than 10E-7 risk level. The resulting fish tissue concentrations would likely be less than background concentrations. This would also occur if the PRGs were not apportioned, but the impacts would not be as severe. Note that there was an*

*error in the fraction of organic carbon values that were used to calculate the PRGs at Wetlands 15 and 64 so those corrections will be made when the PRGs are re-calculated.*

**Follow-up response to Comment #7:** In the State of Florida, human health risk-based CTLs are derived using a target risk level of  $10^{-6}$ . This includes CTLs based on the consumption of fish (Chapter 62-302, F.A.C.), which have a health protection goal very different from a fish advisory level. Additionally, whenever alternative CTLs are utilized, apportionment is required per Chapter 62-780, F.A.C. This ensures the total risk from chemicals present at the site does not exceed the FDEP target risk of  $10^{-6}$ .

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**University of Florida Comment #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.*

**Navy response to Comment #8:** *In accordance with Chapter 62-777 F.A.C. using default dermal absorption (DA) value of 0.01 (Table 3) and a GI absorption of 0.9 (Table 5) for benzene along with the equations and other input assumptions presented in Attachment B the non-apportioned PRG for the maintenance worker would be 448 mg/kg. This value would round to 450 mg/kg. This value will be proportioned per Chapter 62-780, F.A.C. See above table for revised PRG.*

**Follow-up response to Comment #8:** The response is satisfactory. A table was not included in the response to comments.

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**University of Florida Comment #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.*

**Navy response to Comment #9:** *The PRG for the recreational fisherman will be modified as follows. It is assumed the recreational fisherman eats one fish meal a week over a course of the year or 52 meals a year. Not all of the fish that the recreational fisherman eats will come from the wetlands. It is assumed that only 10 percent or 5 meals consists of fish caught at any one wetlands, therefore the exposure frequency would be 5 meals per year. Since the entire meal would come from the site a value of 1 will be used for the fraction ingested.*

**Follow-up response to Comment #9:** The above response modifies the exposure frequency of the recreational fisherman to 5 d/y. This exposure frequency appears low for a recreational fisherman scenario. We recommend using a value of 52 d/y as proposed in the technical memorandum. This exposure frequency represents a value of approximately once a week and appears more reasonable.

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**University of Florida Comment #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.

**Navy response to Comment #10:** As presented in a response to an EPA comment on the RI report, "52 days per was assumed to be the total time a maintenance worker would spend performing maintenance in wetlands during a year, whether that is applicable to only one wetland or more than one. If a worker is assumed to spend time in more than one wetland, the exposure frequency should be divided by the number of wetlands to account for their exposure during that year, unless site-specific information is available." Maintenance in any one wetland throughout the year, and subsequent exposure to sediment is expected to be minimal, and much less than 52 times per year in any one wetland. Therefore, even the assumption of 26 times per year (once every two weeks) is conservative, because there is little maintenance that would require a worker to actually enter the wetland. Therefore, the Navy believes that wetting PRGs based on an exposure frequency of 26 times per year for any one wetland is still conservative, and remains protective of maintenance workers at the site.

**Follow-up response to Comment #10:** The response is satisfactory.

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**University of Florida Comment #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.

**Navy response to Comment #11a:** Comment noted.

**Follow-up response to Comment #11a:** The response is satisfactory.

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- b. Wetland 5A: The refinement is satisfactory.

**Navy response to Comment #11b:** Comment noted.

**Follow-up response to Comment #11b:** The response is satisfactory.

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- 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.*

**Navy response to Comment #11c:** *Lead, 4,4'-DDD, 4,4'-DDT, total DDT, and delta-BHC were not listed as ecological COCs at Wetland 15 in the revised Table 16-1 (see Attachment A of the Technical Memorandum). Therefore, they were not evaluated as ecological COCs in the Technical Memorandum.*

**Follow-up response to Comment #11c:** Revised Table 16-1 excludes total DDT and total BHC as ecological COCs based on food chain modeling results that conclude the hazard quotient is less than one for concentrations present in Wetland 15. However, it is not clear why lead was excluded as an ecological COC. Revised Table 16-1 lists an HQ of 1.9 for lead in Wetland 15 and it appears to remain of concern.

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d. Wetland 16: *The refinement is satisfactory.*

**Navy response to Comment #11d:** *Comment noted.*

**Follow-up response to Comment #11d:** The response is satisfactory.

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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.*

**Navy response to Comment #11e:** *Beta-BHC, total BHC, 4,4'-DDD, 4,4'-DDT, and total DDT, were not listed as ecological COCs at Wetland 18A in the revised Table 16-1 (see Attachment A of the Technical Memorandum). Therefore, they were not evaluated as ecological COCs in the Technical Memorandum.*

**Follow-up response to Comment #11e:** The response is satisfactory.

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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.*

**Navy response to Comment #11f:** *The Navy will agree to retain arsenic as a COC for human health for the FS. However, the only alternative that will be evaluated for this Wetland 18B in the FS will be long-term monitoring to determine whether arsenic is really a concern at the wetland.*

**Follow-up response to Comment #11f:** The response is satisfactory.

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g. Wetland 48: The refinement is satisfactory.

**Navy response to Comment #11g:** Comment noted.

**Follow-up response to Comment #11g:** The response is satisfactory.

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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.

**Navy response to Comment #11h(i):** Please see the Navy's response to Comment 7. Aroclor-1254 will not be added as final COCs for Wetland 64 because it was not detected in any of the Phase III or Phase IV samples.

**Follow-up response to Comment #11h(i):** Please see the follow-up response to Comment #7. The omission of Aroclor-1254 as a COC for the protection of human health from Wetland 64 is satisfactory.

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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.

**Navy response to Comment #11h(ii):** Please see the Navy's response to Comment 1. The Navy does not agree that the LOEC for copper needs revised.

**Follow-up response to Comment #11h(ii):** Please see the follow-up response to Comment #1. Copper should be retained as an ecological COC for Wetland 64.

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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.

**Navy response to Comment #11h(iii):** Please see the Navy's response to Comment 1. The Navy does not agree that the LOEC for silver needs revised.

**Follow-up response to Comment #11h(iii):** Please see the follow-up response to Comment #1. Silver should be retained as an ecological COC for Wetland 64.

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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.

**Navy response to Comment #11h(iv):** Mercury was eliminated from further evaluation for reasons provided on Page 7, 1<sup>st</sup> paragraph of the Technical Memorandum. This was primarily because risks to the red drum were marginal and most of the mercury concentrations were lower than reference concentrations. The red drum model is discussed in Section 8.7.1.3 of the RI report. Actual tissue concentrations were used, when available. Mercury is a common metal that is in most fish across the State of Florida, much of which is present from atmospheric deposition. In fact, the State of Florida has a fish advisory for the state that prohibits or limits the amount of fish that pregnant or nursing women and women who may become pregnant should consume. Therefore, mercury contamination in fish appears to be a statewide problem.

**Follow-up response to Comment #11h(iv):** The response suggests that mercury concentrations in fish tissue at Wetland 64 are representative of background. To our knowledge, a site-specific background mercury concentration in fish tissue was not obtained. Although mercury concentrations in fish tissue may be elevated in some areas of the state, it is not possible to determine if the fish tissue concentrations at Wetland 64 are representative of background without a site-specific background study.

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There is a difference in the ecological COCs listed in Table 16-1 of the Final RI dated August 17, 2005 and the revised Table 16-1 listed as Attachment A of the technical memorandum. It is unclear why these tables differ or how the revised Table 16-1 was derived. Information regarding the elimination of COCs from the revised Table 16-1 should be provided.

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

Sincerely,



Leah D. Stuchal, Ph.D.



Stephen M. Roberts, Ph.D.

Reference:

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. Tallahassee, Florida.

March 15, 2012

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

Re: Review of the Preliminary Remediation Goals (PRGs) for the NAS Pensacola, OU 16, Site 41 Wetlands Human Health and Ecological Risk Assessment (Escambia County, ID# 100335)

Dear Ms. Mora-Applegate:

At your request, we have reviewed the *Feasibility Study Report, Operable Unit (OU) 16, Site 41 Wetlands, Naval Air Station Pensacola, Pensacola, Florida, Comprehensive Long-Term Environmental Action Navy (Clean) Contract*. This document was prepared by Tetra Tech NUS, Inc. and is dated December 29, 2010. The report reviews data from the Remedial Investigation (RI) Phases I, II, and III and evaluates possible remedial/management solutions for the site. This review focuses on the proposed PRGs for the wetlands and does not address remedial options. PRGs are proposed for both human health and ecological receptors for chemicals of concern (COCs) in Wetlands 3, 5A, 15, 18A, 18B, 48, and 64. We agree that the proposed PRGs will be protective of human health under a maintenance worker scenario and protective of ecological receptors in Wetlands 3, 5A, and 15. However, we have some concerns regarding the PRGs proposed for Wetlands 48 and 64. It should be re-emphasized that the proposed PRGs are to be used as not-to-exceed values (per the Navy response letter dated March 8, 2010) for protection of the wetlands. We have the following comments on the document.

1. As stated in our letter dated June 7, 2010, samples 041M5A0501 and 041M640501 exhibit significant reductions in growth for *C. tentans* and *N. arenaceodentata*. These samples were not considered toxic due to high benthic diversity. 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 ecological PRGs for sediment in Wetland 64 to 17.7 mg/kg for cadmium, 592 mg/kg for chromium, 108 mg/kg for copper, 330 mg/kg for lead, 1.9 mg/kg for silver, and 306 mg/kg for zinc. While we acknowledge that these values are

similar to the PRGs proposed in the Feasibility Study, we believe the above-listed criteria are more defensible based on the results of the sediment toxicity tests.

2. It is unclear why the PRGs for 4,4'-DDT and total DDT (DDX) in Wetland 48 changed between the Technical Memorandum and the Feasibility Study. The Technical Memorandum uses a PRG equal to twice the site-wide average background values (0.02 mg/kg DDT and 0.11 mg/kg DDX) while the Feasibility Study proposed a PRG of 0.063 mg/kg for DDT and 0.57 mg/kg for DDX. No explanation could be found for the derivation of PRGs proposed in the Feasibility Study or for the difference in criteria.
3. Based on Figures 2-1 through 2-7, it does not appear that horizontal delineation of contamination has been completed for Wetlands 3, 15, 18A, and 48. Therefore, the true nature and extent of contamination at these wetlands is unknown. Further delineation for these wetlands could be completed during a monitoring program.
4. Vertical delineation of contamination at the site does not extend below one foot below ground surface (bgs) and appears incomplete. Contamination in sediments deeper than one-foot bgs can serve as a continuing source to shallow sediment (0-6 inches bgs) or surface water. This is especially true in Florida where hurricanes and tropical storms can frequently mix and re-suspend sediment. These storms may bring deeper sediment layers to the surface, exposing additional contamination. Therefore, deeper sediment contamination should also be addressed in the remedial alternatives.
5. The sediment data utilized for the Feasibility Study is over 15 years old (1994-1997). Significant biotransformation or redistribution due to tropical storms and Hurricane Ivan has likely occurred in these wetlands since the last sampling event. Therefore, it is unlikely that the data presented in this report reflect current conditions at the site. It is important to resample the wetlands to obtain a defensible estimation of the current contaminant concentrations and distribution.
6. Page 1-5 states that Wetland 15 is fed from the south by surface water runoff from the golf course. Golf courses in Florida frequently contain arsenicals due to pesticide application. Arsenic is also a contaminant of concern in Wetland 15 for human and ecological health. It is unclear if the golf course is a continuing source to Wetland 15 or if the contamination in the wetland will decrease over time.

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

Sincerely,



Leah D. Stuchal, Ph.D.



Stephen M. Roberts, Ph.D.

Reference:

MacDonald, D.D., Ingersoll, C.G., Smorong, D.E., Lindskoog, R.A., Sloane, G., and Biernacki, T. (2002) *Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters*. Florida Department of Environmental Protection. Tallahassee, Florida.

November 26, 2012

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

Re: Review of the Sampling and Analysis Plan for OU 16 (Site 41, Wetlands) for NAS Pensacola (Escambia County, DOD\_11\_1852)

Dear Ms. Mora-Applegate:

At your request, we have reviewed the *Draft Sampling and Analysis Plan (SAP), Wetland Sediment Sampling, Operable Unit 16 – Site 41, Naval Air Station Pensacola, Pensacola, Florida*. This document was prepared by Resolution Consultants and is dated September 2012. The plan summarizes wetlands and contaminants selected for further sampling, proposes additional sampling locations, and develops project action levels (PALs) for the contaminants of concern (COCs). It also develops decision rules for data analyses to determine when samples are considered contaminated and when further evaluation (such as toxicity testing) is necessary. The plan utilizes comments and suggestions made during Partnering Meetings held on March 27-28, 2012 and May 9, 2012 to direct sampling locations and data analyses. Overall, we agree with the additional sampling and locations proposed in this document. However, we continue to have concerns regarding the development of remedial goals for the site. We have the following comments regarding the document.

1. In the final Remedial Investigation (RI; August 2005), iron was listed as a contaminant of potential concern (COPC) in surface water and sediment for Wetland 4D. During a site visit on September 20, 2012, it was noted that iron continues to be a concern for this wetland. We recommend that proposed additional sampling in Wetland 4D include iron to better determine the extent of iron contamination in sediment and surface water.
2. During a Partnering Meeting on March 27-28, 2012, field verification was proposed for Wetland 6 to determine if additional sampling for DDT is necessary (Appendix A). A site visit on September 20, 2012 verified fish and piscivorous birds are present in this wetland. Further sampling to delineate the extent of contamination appears necessary to determine whether DDT is of concern to higher trophic levels species foraging in Wetland 6.
3. Worksheet 11 states that twice the mean detected concentration in the reference area will be utilized as an upper-end estimate of background concentrations at

the site. The upper-end of the range of background concentrations is usually defined as the lower of twice the mean or the maximum detected concentration. This methodology prevents an overestimation of the upper limit of background that could result from a few elevated reference samples.

4. The use of PALs in Sections 11.3 and 11.5 is unclear (Worksheet 11). The document states that site-specific preliminary remedial goals (PRGs) will be reassessed using chemistry and toxicity data collected during this sampling event. However, it also states that if a PRG was calculated as part of the feasibility study (FS), the PRG from the FS will be utilized as the PAL. The PALs are then utilized to determine the extent of contamination. At the March 2012 Partnering Meeting (Appendix A), both the University of Florida and the US EPA expressed concern regarding the interpretation of toxicity testing and derivation of the PRGs in the FS. It was also agreed in a Partnering Meeting on May 9, 2012 (Appendix B) that the old toxicity testing data would not be utilized for determining ecological toxicity at the site. These values should not be proposed for determining the extent of contamination in the SAP.
5. The sediment screening level hierarchy (page WS 11-5) proposes to utilize the FDEP probable effect levels (PELs) for delineation purposes. Usually the threshold effect levels (TELs) are utilized for screening as well as delineation purposes. Use of the PEL for delineation could result in an average wetland contaminant concentration that exceeds the TEL.
6. Only three samples are proposed per reference wetland for a total of six freshwater and six estuarine reference samples. Six samples are not adequate to determine upper background concentrations with any certainty. The small number of proposed background samples is likely to result in a data set that will overestimate upper background concentrations. We recommend two additional samples per wetland for a total of ten samples per environment.
7. Sample 041M3306 in Wetland 33 (Figure 17-12) is the only sample proposed outside of a wetland boundary. It is unclear why a proposed reference sample does not actually lie within the boundaries of a wetland. Further explanation is necessary to clarify the placement of this sample.
8. The duration of the proposed sediment toxicity tests is unclear. However, the draft *Response to USEPA Technical Comments* (dated July 30, 2012) suggests the tests will be shortened to a 14-day exposure period for both *Leptocheirus* and *Hyalella*. It is important to note that 14-day toxicity testing for these species does not include reproduction. We recommend a chronic exposure period (28-60 days) to include reproductive endpoints as well as growth and survival. Reproductive endpoints may be more sensitive to some contaminants, and therefore contaminant concentrations protective of growth and mortality may not be protective of reproductive effects. Chronic reproductive endpoints are indicative of population level effects and should be evaluated unless there is evidence that reproduction is not the most sensitive endpoint for the contaminants of concern.
9. Page WS 11-4 states the PRGs in the FS were derived from the higher of the reference/background concentrations, sediment screening levels, and sediment

refinement levels. The PRGs were actually the higher of the reference/background, sediment screening levels, sediment refinement levels, and site-specific toxicity levels developed from sediment toxicity testing.

As requested, we have reviewed the reference citations, tables, figures, Table of Contents, List of Tables, and List of Figures for accuracy. All of these elements were correctly represented in the document. Typographical, formatting, and other editorial errors were noted in the above comments. "Conclusion" and "Recommendations" sections were not included in the document so a review of these sections did not apply. Please let us know if you have any questions regarding this review.

Sincerely,



Leah D. Stuchal, Ph.D.



Roxana E. Weil, Ph.D.



Stephen M. Roberts, Ph.D.

**RESPONSES TO UNIVERSITY OF FLORIDA COMMENTS  
DRAFT SAMPLING AND ANALYSIS PLAN (SAP)  
WETLAND SEDIMENT SAMPLING, OPERABLE UNIT 16 — SITE 41  
NAVAL AIR STATION PENSACOLA  
PENSACOLA, FLORIDA  
(Comments Received via electronic mail on December 18, 2012)  
FEBRUARY 22, 2013**

**Comment 1:**

In the final Remedial Investigation (RI; August 2005), iron was listed as a contaminant of potential concern (COPC) in surface water and sediment for Wetland 4D. During a site visit on September 20, 2012, it was noted that iron continues to be a concern for this wetland. We recommend that proposed additional sampling in Wetland 4D include iron to better determine the extent of iron contamination in sediment and surface water.

**Response 1:**

The Navy agrees that iron floc is observed in Wetland 3; however, Wetland 3 is being addressed under OU 1 and Wetland 3 is not part of this investigation. Iron was not identified at Wetland 4D for further sampling in sediment in the SAP. This finding was based on the COC refinement presented as Appendix A in the Feasibility Study Report. A site-specific no observed effects concentration (NOEC) for freshwater wetlands of 246,000 milligrams per kilogram (mg/kg) was calculated for iron based on site-specific results in Wetland 3 (041M0302) at a location with no lethal or sublethal toxicity. The NOEC was discussed in the March 2012 meeting. Concentrations of iron reported in sediment are less than the NOECs, and therefore, iron was eliminated for further consideration. As discussed during partnering meetings, in the memorandum and in the response above, the scope of the memorandum was limited to sediment sampling, so surface water and other media were not discussed in the memorandum and are beyond the scope of this follow-up work for the Feasibility Study, unless information indicates that partnering team decisions regarding those media should be reconsidered.

If performed, toxicity testing will address the mixture of contaminants in the samples and would not exclude iron. Consequently, separately analyzing samples for iron was not proposed.

As discussed during partnering meetings and in the memorandum, the scope of the memorandum was limited to sediment sampling, so surface water and other media were not discussed in the memorandum and are beyond the scope of this follow-up work for the Feasibility Study.

**Comment 2:**

During a Partnering Meeting on March 27-28, 2012, field verification was proposed for Wetland 6 to determine if additional sampling for DDT is necessary (Appendix A). A site visit on September 20, 2012 verified fish and piscivorous birds are present in this wetland. Further sampling to delineate the extent of contamination appears necessary to determine whether DDT is of concern to higher trophic levels species foraging in Wetland 6.

**Response 2:**

As stated in the Final Remediation Investigation Report, November 2007, Wetland 6 was eliminated from further sampling during the Phase III investigation because it is a channelized ditch within the NAS Pensacola storm water drainage system which receives

**continual impacts from storm water and is actively maintained by base maintenance personnel. As shown on Figure 11-1 from the Remedial Investigation Report, storm water from across the southeastern portion of NAS Pensacola discharges to Wetland 6.**

**In the May 2012 Partnering meeting, a participant was concerned with the source of DDT. Total DDT was detected above its basewide concentration of 110 ppb at only 2 of 12 locations. The highest location was 260 ppb at 041M060101 and the second highest was 52 ppb at 041M060301. The fate and transport analysis for Wetland 6 did not indicate that OU 6 soil or groundwater was a source of the DDT in sediment. Detected DDT concentrations are not indicative of a spill and are likely from routine spraying of pesticides along the ditch. Food chain models do not indicate a risk to upper trophic level receptors from DDT.**

**The concern for sampling was to identify a source and evaluate potential migration rather than ecological risk. The Navy has cleared this partially lined and channelized ditch, and clearing activities to maintain the ditch will be performed by base personnel as needed to maintain flow in the future. Consequently, the Navy disagrees with adding Wetland 6 to the SAP.**

**Comment 3:**

Worksheet 11 states that twice the mean detected concentration in the reference area will be utilized as an upper-end estimate of background concentrations at the site. The upper-end of the range of background concentrations is usually defined as the lower of twice the mean or the maximum detected concentration. This methodology prevents an overestimation of the upper limit of background that could result from a few elevated reference samples.

**Response 3:**

**Background was established as part of the Final RI Report for NAS Pensacola wetlands, including substantial input from EPA, FDEP and other stakeholders as part of the partnering process with the Navy as well as the comment and response process typically used to finalize RI Reports. Consequently, revisiting background determinations and/or comparison methods as part of this sampling and analysis plan is beyond the scope of the memorandum.**

**Comment 4:**

The use of PALs in Sections 11.3 and 11.5 is unclear (Worksheet 11). The document states that site-specific preliminary remedial goals (PRGs) will be reassessed using chemistry and toxicity data collected during this sampling event. However, it also states that if a PRG was calculated as part of the feasibility study (FS), the PRG from the FS will be utilized as the PAL. The PALs are then utilized to determine the extent of contamination. At the March 2012 Partnering Meeting (Appendix A), both the University of Florida and the US EPA expressed concern regarding the interpretation of toxicity testing and derivation of the PRGs in the FS. It was also agreed in a Partnering Meeting on May 9, 2012 (Appendix B) that the old toxicity testing data would not be utilized for determining ecological toxicity at the site. These values should not be proposed for determining the extent of contamination in the SAP.

**Response 4:**

The site-specific PRGs are the no-observed effects concentration (NOEC) or the lowest observed effects concentration (LOEC) based on site-specific conditions and detected concentrations. The PRGs, reference concentrations, and other available ecological criteria were evaluated for development of the current PALs. Based on the data collected during the proposed investigation, the site-specific PRGs may be updated. The Navy agrees that the old toxicity test data will not be used with the proposed data for determining ecological toxicity at the site. Worksheet #11 will be reworded to show that new PRGs will be calculated as new data is obtained throughout the investigation.

**Comment 5:**

The sediment screening level hierarchy (page WS 11-5) proposes to utilize the FDEP probable effect levels (PELs) for delineation purposes. Usually the threshold effect levels (TELs) are utilized for screening as well as delineation purposes. Use of the PEL for delineation could result in an average wetland contaminant concentration that exceeds the TEL.

**Response 5:**

An RI Report has already been developed for NAS Pensacola wetlands, including substantial input from EPA, FDEP and other stakeholders as part of the partnering process with the Navy as well as the comment and response process typically used to finalize RI Reports. Consequently, findings in the RI Report and subsequent discussions were integrated into the sampling and analysis memorandum. It was noted the TECs and TELs would not be used because this investigation is not a screening level assessment as the sites are past that stage in the risk assessment process. The sampling approach was discussed with the partnering team while the memorandum was being developed.

**Comment 6:**

Only three samples are proposed per reference wetland for a total of six freshwater and six estuarine reference samples. Six samples are not adequate to determine upper background concentrations with any certainty. The small number of proposed background samples is likely to result in a data set that will overestimate upper background concentrations. We recommend two additional samples per wetland for a total of ten samples per environment.

**Response 6:**

**Two additional samples per reference wetland will be added.**

**Comment 7:**

Sample 041M3306 in Wetland 33 (Figure 17-12) is the only sample proposed outside of a wetland boundary. It is unclear why a proposed reference sample does not actually lie within the boundaries of a wetland. Further explanation is necessary to clarify the placement of this sample.

**Response 7:**

**Sample location will be changed to inside Wetland 33 boundary.**

**Comment 8:**

The duration of the proposed sediment toxicity tests is unclear. However, the draft *Response to USEPA Technical Comments* (dated July 30, 2012) suggests the tests will be shortened to a 14-day exposure period for both *Leptocheirus* and *Hyaella*. It is important to note that 14-day toxicity testing for these species does not include reproduction. We recommend a chronic exposure period (28-60 days) to include reproductive endpoints as well as growth and survival. Reproductive endpoints may be more sensitive to some contaminants, and therefore contaminant concentrations protective of growth and mortality may not be protective of reproductive effects. Chronic reproductive endpoints are indicative of population level effects and should be evaluated unless there is evidence that reproduction is not the most sensitive endpoint for the contaminants of concern.

**Response 8:**

**The chronic tests recommended by the reviewer may be appropriate for sites in the initial phases of investigation, but since the RI has been completed and finalized using shorter durations (7 to 28 day toxicity tests), it is critical that the same test organism and duration be used to ensure that consistent decisions be made during the FS process. The 14-day acute toxicity tests proposed for both test organisms will provide survival as an assessment endpoint, although with *Hyaella azteca*, growth will be measured and may be evaluated as a secondary sublethal assessment endpoint.**

**Comment 9:**

Page WS 11-4 states the PRGs in the FS were derived from the higher of the reference/background concentration, sediment screening levels, and sediment refinement levels. The PRGs were actually the higher of the reference/background, sediment screening levels, sediment refinement levels, and site-specific toxicity levels developed from sediment toxicity testing.

**Response 9:**

**Section 11.3, page 11-4 will be reworded to state that PRGs were developed as part of the FS and the overall PRG was the highest value among the reference/background concentrations, sediment refinement levels, and site-specific NOEC or LOEC.**

Center for Environment & Human Toxicology

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March 27, 2013

Ligia Mora-Applegate  
Bureau of Waste Cleanup  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, FL 32699

Re: Response to Comments, SAP for Wetland Sediment Sampling, OU 16, Site 41, NAS Pensacola (Escambia County, DOD\_11\_1852)

Dear Ms. Mora-Applegate:

We have reviewed at your request responses to our comments on the *Draft Sampling and Analysis Plan (SAP), Wetland Sediment Sampling, Operable Unit 16, Site 41, Naval Air Station Pensacola, Pensacola, Florida*. Our comments were provided to you in a letter dated November 26, 2012. The responses to these comments provided on behalf of the Navy are contained in document dated February 22, 2013.

To enable you to follow the discussion regarding our comments, we have reproduced each original comment and the Navy response below. Following each, we have made a follow-up comment.

#### **Comment 1**

Original Comment: In the final Remedial Investigation (RI; August 2005), iron was listed as a contaminant of potential concern (COPC) in surface water and sediment for Wetland 4D. During a site visit on September 20, 2012, it was noted that iron continues to be a concern for this wetland. We recommend that proposed additional sampling in Wetland 4D include iron to better determine the extent of iron contamination in sediment and surface water.

Navy Response: The Navy agrees that iron floc is observed in Wetland 3; however, Wetland 3 is being addressed under OU 1 and Wetland 3 is not part of this investigation. Iron was not identified at Wetland 4D for further sampling in sediment in the SAP. This finding was based on the COC refinement presented as Appendix A in the Feasibility Study Report. A site-specific no observed effects concentration (NOEC) for freshwater wetlands of 246,000 milligrams per kilogram (mg/kg) was calculated for iron based on site-specific results in Wetland 3 (041M0302) at a location with no lethal or sublethal toxicity. The NOEC was discussed in the March 2012 meeting. Concentrations of iron reported in sediment are less than the NOECs,

and therefore, iron was eliminated for further consideration. As discussed during partnering meetings, in the memorandum and in the response above, the scope of the memorandum was limited to sediment sampling, so surface water and other media were not discussed in the memorandum and are beyond the scope of this follow-up work for the Feasibility Study, unless information indicates that partnering team decisions regarding those media should be reconsidered.

If performed, toxicity testing will address the mixture of contaminants in the samples and would not exclude iron. Consequently, separately analyzing samples for iron was not proposed.

As discussed during partnering meetings and in the memorandum, the scope of the memorandum was limited to sediment sampling, so surface water and other media were not discussed in the memorandum and are beyond the scope of this follow-up work for the Feasibility Study.

*Follow-up Comment:* The intent of our comment was to encourage further evaluation of iron in Wetland 4D based upon observations during the September 2012 site visit, as well as the discussions held during the March 2012 meeting. Observations of iron floc in Wetland 4D appear to be inconsistent with a conclusion of no toxicity, at least in some areas. This could perhaps be addressed by toxicity testing if properly conducted and inclusive of samples from areas with the highest iron/iron floc.

## **Comment 2**

*Original Comment:* During a Partnering Meeting on March 27-28, 2012, field verification was proposed for Wetland 6 to determine if additional sampling for DDT is necessary (Appendix A). A site visit on September 20, 2012 verified fish and piscivorous birds are present in this wetland. Further sampling to delineate the extent of contamination appears necessary to determine whether DDT is of concern to higher trophic levels species foraging in Wetland 6.

*Navy Response:* As stated in the Final Remediation Investigation Report, November 2007, Wetland 6 was eliminated from further sampling during the Phase III investigation because it is a channelized ditch within the NAS Pensacola storm water drainage system which receive continual impacts from storm water and is actively maintained by base maintenance personnel. As shown on Figure 11-1 from the Remedial Investigation Report, storm water from across the southeastern portion of NAS Pensacola discharges to Wetland 6.

In the May 2012 Partnering meeting, a participant was concerned with the source of DDT. Total DDT was detected above its basewide concentration of 110 ppb at only 2 of 12 locations. The highest location was 260 ppb at 041M060101 and the second highest was 52 ppb at 041M060301. The fate and transport analysis for Wetland 6 did not indicate that OU 6 soil or groundwater was a source of the DDT in sediment. Detected DDT concentrations are not indicative of a spill and are likely from routine spraying of pesticides along the ditch. Food chain models do not indicate a risk to upper trophic level receptors from DDT.

The concern for sampling was to identify a source and evaluate potential migration

rather than ecological risk. The Navy has cleared this partially lined and channelized ditch, and clearing activities to maintain the ditch will be performed by base personnel as needed to maintain flow in the future. Consequently, the Navy disagrees with adding Wetland 6 to the SAP.

*Follow-up Comment:* Based upon field observations during the September 2012 visit, Wetland 6 certainly *appears* to be habitat for a number of fish species and piscivorous birds. If it is considered viable habitat for management purposes, then we maintain that better characterization of contaminants in this wetland is needed. If not, then issue is moot.

### **Comment 3**

*Original Comment:* Worksheet 11 states that twice the mean detected concentration in the reference area will be utilized as an upper-end estimate of background concentrations at the site. The upper-end of the range of background concentrations is usually defined as the lower of twice the mean or the maximum detected concentration. This methodology prevents an overestimation of the upper limit of background that could result from a few elevated reference samples.

*Navy Response:* Background was established as part of the Final RI Report for NAS Pensacola wetlands, including substantial input from EPA, FDEP and other stakeholders as part of the partnering process with the Navy as well as the comment and response process typically used to finalize RI Reports. Consequently, revisiting background determinations and/or comparison methods as part of this sampling and analysis plan is beyond the scope of the memorandum.

*Follow-up Comment:* Our comment is a reiteration of one we have made previously that the method of determining the upper limit of background is inconsistent with the approach typically used by the FDEP.

### **Comment 4**

*Original Comment:* The use of PALs in Sections 11.3 and 11.5 is unclear (Worksheet 11). The document states that site-specific preliminary remedial goals (PRGs) will be reassessed using chemistry and toxicity data collected during this sampling event. However, it also states that if a PRG was calculated as part of the feasibility study (FS), the PRG from the FS will be utilized as the PAL. The PALs are then utilized to determine the extent of contamination. At the March 2012 Partnering Meeting (Appendix A), both the University of Florida and the US EPA expressed concern regarding the interpretation of toxicity testing and derivation of the PRGs in the FS. It was also agreed in a Partnering Meeting on May 9, 2012 (Appendix B) that the old toxicity testing data would not be utilized for determining ecological toxicity at the site. These values should not be proposed for determining the extent of contamination in the SAP.

*Navy Response:* The site-specific PRGs are the no-observed effects concentration (NOEC) or the lowest observed effects concentration (LOEC) based on site-specific conditions and detected concentrations. The PRGs, reference concentrations, and other available ecological criteria were evaluated for development of the current

PALs. Based on the data collected during the proposed investigation, the site-specific PRGs may be updated. The Navy agrees that the old toxicity test data will not be used with the proposed data for determining ecological toxicity at the site. Worksheet #11 will be reworded to show that new PRGs will be calculated as new data is obtained throughout the investigation.

Follow-up comment: The response indicates agreement with our (and U.S. EPA's) recommendation that the old toxicity data not be used in the development of site-specific PRGs. This response is satisfactory.

#### **Comment 5**

Original Comment: The sediment screening level hierarchy (page WS 11-5) proposes to utilize the FDEP probable effect levels (PELs) for delineation purposes. Usually the threshold effect levels (TELs) are utilized for screening as well as delineation purposes. Use of the PEL for delineation could result in an average wetland contaminant concentration that exceeds the TEL.

Navy Response: An RI Report has already been developed for NAS Pensacola wetlands, including substantial input from EPA, FDEP and other stakeholders as part of the partnering process with the Navy as well as the comment and response process typically used to finalize RI Reports. Consequently, findings in the RI Report and subsequent discussions were integrated into the sampling and analysis memorandum. It was noted the TECs and TELs would not be used because this investigation is not a screening level assessment as the sites are past that stage in the risk assessment process. The sampling approach was discussed with the partnering team while the memorandum was being developed.

Follow-up Comment: Our comment was intended to address the use of the PEL for delineation purposes specifically. There are at least two potential problems with using the PEL for delineation: 1) Concentrations below the PEL can have negative impacts on benthic invertebrates, and consequently a wetland delineated using a PEL underestimates the size of the affected area; and 2) Delineation using the PEL can result in an average concentration within the delineated area that exceeds the TEL.

#### **Comment 6**

Original Comment: Only three samples are proposed per reference wetland for a total of six freshwater and six estuarine reference samples. Six samples are not adequate to determine upper background concentrations with any certainty. The small number of proposed background samples is likely to result in a data set that will overestimate upper background concentrations. We recommend two additional samples per wetland for a total of ten samples per environment.

Navy Response: Two additional samples per reference wetland will be added.

Follow-up Comment: The response is satisfactory.

### **Comment 7**

Original Comment: Sample 041M3306 in Wetland 33 (Figure 17-12) is the only sample proposed outside of a wetland boundary. It is unclear why a proposed reference sample does not actually lie within the boundaries of a wetland. Further explanation is necessary to clarify the placement of this sample.

Navy Response: Sample location will be changed to inside the Wetland 33 boundary.

Follow-up comment: The response is satisfactory.

### **Comment 8**

Original Comment: The duration of the proposed sediment toxicity tests is unclear. However, the draft Response to USEPA Technical Comments (dated July 30, 2012) suggests the tests will be shortened to a 14-day exposure period for both *Leptocheirus* and *Hyaella*. It is important to note that 14-day toxicity testing for these species does not include reproduction. We recommend a chronic exposure period (28-60 days) to include reproductive endpoints as well as growth and survival. Reproductive endpoints may be more sensitive to some contaminants, and therefore contaminant concentrations protective of growth and mortality may not be protective of reproductive effects. Chronic reproductive endpoints are indicative of population level effects and should be evaluated unless there is evidence that reproduction is not the most sensitive endpoint for the contaminants of concern.

Navy Response: The chronic tests recommended by the reviewer may be appropriate for sites in the initial phases of investigation, but since the RI has been completed and finalized using shorter durations (7 to 28 day toxicity tests), it is critical that the same test organism and duration be used to ensure that consistent decisions be made during the FS process. The 14-day acute toxicity tests proposed for both test organisms will provide survival as an assessment endpoint, although with *Hyaella azteca*, growth will be measured and may be evaluated as a secondary sublethal assessment endpoint.

Follow-up Comment: We understand the point regarding consistency. Using 28-day tests would be consistent with testing conducted during the RI and arguably better capture reproductive endpoints than the 14-day tests proposed.

### **Comment 9**

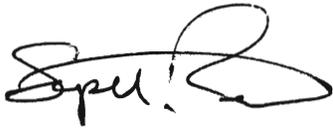
Original Comment: Page WS 11-4 states the PRGs in the FS were derived from the higher of the reference/background concentration, sediment screening levels, and sediment refinement levels. The PRGs were actually the higher of the reference/background, sediment screening levels, sediment refinement levels, and site-specific toxicity levels developed from sediment toxicity testing.

Navy Response: Section 11.3, page 11-4 will be reworded to state that PRGs were developed as part of the FS and the overall PRG was the highest value among the reference/background concentrations, sediment refinement levels, and site-specific NOEC or LOEC.

Follow-up Comment: The response is satisfactory.

Our comments above address the extent to which the proposed approach, as discussed in the responses to comments, are applicable to the problem being addressed. The document cited no references and contained no figures, tables, or numerical data or calculations. Conclusions and recommendations are implicit in the Navy responses to comments, and we have provided our comments and recommendations in the form of follow-up comments. Minor typographical errors in the presentation of our original comments and Navy responses have been corrected while reproducing them in the section above.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen M. Roberts". The signature is fluid and cursive, with a large, stylized initial "S" and "R".

Stephen M. Roberts, Ph.D.

A handwritten signature in black ink, appearing to read "Leah D. Stuchal". The signature is cursive and elegant, with a prominent "L" and "S".

Leah D. Stuchal, Ph.D.

A handwritten signature in black ink, appearing to read "Roxana Weil". The signature is cursive and stylized, with a large "R" and "W".

Roxana Weil, Ph.D.

June 10, 2013

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

Re: Review of the responses to comments regarding the Ecological Risk Assessment and Sampling Plan for NAS Pensacola, Site 41 (Escambia County, DOD\_11\_1852)

Dear Ms. Mora-Applegate:

At your request, we have reviewed the *Comments on the Responses to Technical Comments, Florida Department of Environmental Protection provided by University of Florida, Draft Sampling and Analysis Plan (SAP), Wetland Sediment Sampling, Operable Unit 16, Site 41, Naval Air Station Pensacola, Pensacola, Florida, Site ID#: DOD 11 1852*. The responses were submitted by the Department of the Navy and are dated May 16, 2013. They are in response to our comments provided in a letter dated March 27, 2013. To enable you to follow the discussion, we have reproduced our comments and the Navy responses below. Following each comment, we have included an additional response in bold text.

**Comment 1:**

*UF Comment:* The intent of our comment was to encourage further evaluation of iron in Wetland 4D based upon observations during the September 2012 site visit, as well as the discussions held during the March 2012 meeting. Observations of iron floc in Wetland 4D appear to be inconsistent with a conclusion of no toxicity, at least in some areas. This could perhaps be addressed by toxicity testing if properly conducted and inclusive of samples from areas with the highest iron/iron floc.

*Response:*

Because the Navy is currently preparing a Focused Feasibility Study Report and subsequently a Record of Decision Amendment for OU 1, The Navy proposes to transfer Wetlands 3, 4D, 15, 16, and 18 from OU 16 to OU 1. All investigations associated with these wetlands will now be performed as part of OU 1. The collection of surface water samples and possible toxicity testing in Wetlands 3 and 4D will be addressed in an update to the OU 1 UFP-SAP.

**Follow-up Response:** The acceptability of transferring Wetlands 3, 4D, 15, 16, and 18 from OU 16 to OU 1 is up to the FDEP. We look forward to plans for additional sampling and toxicity testing in these wetlands.

**Comment 2:**

*UF Comment:* Based upon field observations during the September 2012 visit, Wetland 6 certainly appears to be habitat for a number of fish species and piscivorous birds. If it is considered viable habitat for management purposes, then we maintain that better characterization of contaminants in this wetland is needed. If not, then issue is moot.

*Response:*

The Navy agrees to collect a sediment sample near the weir feature where Wetland 6 crosses under the road. The Navy will add two sediment samples to Wetland 7 where the wetlands are contiguous.

**Follow-up Response: The response is satisfactory.**

**Comment 3:**

*UF Comment:* Our comment is a reiteration of one we have made previously that the method of determining the upper limit of background is inconsistent with the approach typically used by the FDEP.

*Response:*

The Navy acknowledges that this approach is not consistent with FDEP's current calculations of background. However, this approach was the agreed upon method with FDEP and U.S. EPA for determining reference concentrations or background in the RI report. Therefore, the Navy will continue to follow this method. Additional reference data will be collected during this investigation. If warranted by the chemistry results, background will be evaluated.

**Follow-up Response: The intent of this comment is to point out that the methodology for determining background in the 2005 RI report is not consistent with the approach currently used by the FDEP and may overestimate background concentrations. Because screening against site-specific background is proposed for future sediment sampling, the methodology for determining background should be updated. Updating the methodology would consist of changing the calculation for background and would not require additional sampling. Although it is not likely to change many background concentrations, changing the methodology to be consistent with the current FDEP approach would increase the likelihood of correctly identifying contaminated areas.**

**Comment 5:**

*UF Comment:* Our comment was intended to address the use of the PEL for delineation purposes specifically. There are at least two potential problems with using the PEL for delineation: 1) Concentrations below the PEL can have negative impacts on benthic invertebrates, and consequently a wetland delineated using a PEL underestimates the size of the affected area; and 2) Delineation using the PEL can result in an average concentration within the delineated area that exceeds the TEL.

*Response:*

The RI report and risk assessment are complete; therefore, the screening level TELs are not appropriate for this phase of the investigation. In addition, as stated in Approach to the Assessment of Sediment Quality in Florida Coastal Waters, "These guidelines are intended to be used as one tool in a toolbox of companion interpretive approaches..." and that the TELs and PELs "should not be used in lieu of water quality criteria, nor

should they be used as sediment quality criteria". Therefore use of PELs as not-to-exceed values is not appropriate, since empirical data from the site has been and will be used to calculate PRGs, as recommended by the Florida Sediment Quality Guidance.

The Navy agrees to provide comparison of the detected concentrations to site-specific PRGs, PELs, and background concentrations for assessment and discussion by the Team. Final remedial goals for OU 16 will be based on the findings of this current investigation.

**Follow-up Response: Page WS 11-5 of the SAP proposes to use FDEP PELs for delineation purposes. As discussed in our above comment, there are problems with this methodology. Additionally, it would not provide a comprehensive data set for toxicity testing since none of the selected sediments would be below the PEL. If these sediment concentrations were predominantly toxic, there would be no suitable methodology for determining a site-specific PRG. The use of site-specific values in lieu of FDEP sediment quality criteria does not preclude no-effect or low-effect levels from being utilized for delineation purposes. PELs are probable effect levels and, therefore, not valid criteria for delineation.**

Additionally, the Navy response to Comment 5 states, "empirical data from the site has been and will be used to calculate PRGs". However, the response to Comment 4 states, "The Navy agrees that the old toxicity test data will not be used with the proposed data for determining ecological toxicity at the site". These statements appear contradictory. It is our understanding that the old toxicity test data will not be utilized to calculate PRGs. Unless or until site-specific PRGs are derived based on new toxicity testing, TEL and PEL values should be utilized for this site.

**Comment 8:**

*UF Comment:* We understand the point regarding consistency. Using 28-day tests would be consistent with testing conducted during the RI and arguably better capture reproductive endpoints than the 14-day tests proposed.

*Response:*

The Navy agrees to perform chronic toxicity to assess survival, growth and reproduction endpoints if warranted based on comparison of sediment chemistry data to the criteria identified in the SAP (Background, PRGs, PELs) including number of samples with exceedances, number of chemicals that exceed, spatial distribution of samples with exceedances, and magnitude of exceedances. The sediment chemistry data will be presented to the Pensacola Partnering Team with proposed toxicity sample locations before collection. Final toxicity sample locations will be discussed and agreed upon by the Pensacola Team before collection. The decision rules for toxicity testing are presented on Worksheet #11 in the SAP.

**Follow-up Response: The decision to perform chronic toxicity testing should not be based on the previously determined site-specific PRGs identified in the SAP. As discussed in our comment letter dated November 26, 2012, both the University of Florida and the US EPA have expressed concern regarding the derivation of these values. It is our understanding that the old toxicity testing data will not be utilized for determining ecological toxicity at the site. This would include using the PRGs to determine whether chronic toxicity assays are warranted.**

No typographical, formatting, or other editorial errors were noted. Reference citations, tables, figures, Table of Contents, List of Tables, List of Figures, recommendations, and conclusions were not included in the document so a review of these elements did not apply. Please let us know if you have any questions regarding this review.

Sincerely,

A handwritten signature in black ink, appearing to read "Leah Stuchal". The signature is fluid and cursive, with the first name "Leah" and last name "Stuchal" clearly distinguishable.

Leah D. Stuchal, Ph.D.

A handwritten signature in black ink, appearing to read "Stephen M. Roberts". The signature is cursive and somewhat stylized, with the first name "Stephen" and last name "Roberts" being the most legible parts.

Stephen M. Roberts, Ph.D.

**Revised Responses to Comments on the Responses to Technical Comments**  
**Florida Department of Environmental Protection**  
**provided by University of Florida**  
**Draft Sampling and Analysis Plan (SAP)**  
**Wetland Sediment Sampling**  
**Operable Unit 16, Site 41, Naval Air Station Pensacola, Pensacola**  
**Site ID#: DOD 11 1852**

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We have reviewed at your request responses to our comments on the *Draft Sampling and Analysis Plan (SAP), Wetland Sediment Sampling, Operable Unit 16, Site 41, Naval Air Station Pensacola, Pensacola, Florida*. Our comments were provided to you in a letter dated 26 November 2012. The responses to these comments provided on behalf of the Navy are contained in document dated 22 February 2013.

To enable you to follow the discussion regarding our comments, we have reproduced each original comment and the Navy response below. Following each, we have made a follow-up comment.

**Comment 1:**

Original Comment: In the final Remedial Investigation (RI; August 2005), iron was listed as a contaminant of potential concern (COPC) in surface water and sediment for Wetland 4D. During a site visit on 20 September 2012, it was noted that iron continues to be a concern for this wetland. We recommend that proposed additional sampling in Wetland 40 include iron to better determine the extent of iron contamination in sediment and surface water.

Navy Response: The Navy agrees that iron floc is observed in Wetland 3; however, Wetland 3 is being addressed under OU1 and Wetland 3 is not part of this investigation. Iron was not identified at Wetland 4D for further sampling in sediment in the SAP. This finding was based on the COC refinement presented as Appendix A in the Feasibility Study Report. A site-specific no observed effects concentration (NOEC) for freshwater wetlands of 246,000 milligrams per kilogram (mg/kg) was calculated for iron based on site-specific results in Wetland 3 (041M0302) at a location with no lethal or sublethal toxicity. The NOEC was discussed in the March 2012 meeting. Concentrations of iron reported in sediment are less than the NOECs, and therefore, iron was eliminated for further consideration. As discussed during partnering meetings, in the memorandum and in the response above, the scope of the memorandum was limited to sediment sampling, so surface water and other media were not discussed in the memorandum and are beyond the scope of this follow-up work for the Feasibility Study, unless information indicates that partnering team decisions regarding those media should be reconsidered.

If performed, toxicity testing will address the mixture of contaminants in the samples and would not exclude iron. Consequently, separately analyzing samples for iron was not proposed.

As discussed during partnering meetings and in the memorandum, the scope of the memorandum was limited to sediment sampling, so surface water and other media were not discussed in the memorandum and are beyond the scope of this follow-up work for the Feasibility Study.

*Follow-up Comment:* The intent of our comment was to encourage further evaluation of iron in Wetland 4D based upon observations during the September 2012 site visit, as well as the discussions held during the March 2012 meeting. Observations of iron floc in Wetland 4D appear to be inconsistent with a conclusion of no toxicity, at least in some areas. This could perhaps be addressed by toxicity testing if properly conducted and inclusive of samples from areas with the highest iron/iron floc.

**Response 1:**

**Because the Navy is currently preparing a Focused Feasibility Study Report and subsequently a Record of Decision Amendment for OU1, The Navy proposes to transfer Wetlands 1B, 3, 4D, 15, and 18 A/B from OU16 to OU1. All investigations associated with these wetlands will now be performed as part of OU1. The collection of surface water samples and possible toxicity testing in Wetlands 3 and 4D will be addressed in the OU1 UFP-SAP.**

**Comment 2:**

*Original Comment:* During a Partnering Meeting on 27-28 March 2012, field verification was proposed for Wetland 6 to determine if additional sampling for DDT is necessary (Appendix A). A site visit on 20 September 2012 verified fish and piscivorous birds are present in this wetland. Further sampling to delineate the extent of contamination appears necessary to determine whether DDT is of concern to higher trophic levels species foraging in Wetland 6.

*Navy Response:* As stated in the Final Remediation Investigation Report, November 2007, Wetland 6 was eliminated from further sampling during the Phase III investigation because it is a channelized ditch within the NAS Pensacola storm water drainage system which receives continual impacts from storm water and is actively maintained by base maintenance personnel. As shown on Figure 11-1 from the Remedial Investigation Report, storm water from across the southeastern portion of NAS Pensacola discharges to Wetland 6.

In the May 2012 Partnering meeting, a participant was concerned with the source of DDT. Total DDT was detected above its basewide concentration of 110 ppb at only 2 of 12 locations.

The highest location was 260 ppb at 041M060101 and the second highest was 52 ppb at 041M060301. The fate and transport analysis for Wetland 6 did not indicate that OU6 soil or groundwater was a source of the DDT in sediment. Detected DDT concentrations are not indicative of a spill and are likely from routine spraying of pesticides along the ditch. Food chain models do not indicate a risk to upper trophic level receptors from DDT.

The concern for sampling was to identify a source and evaluate potential migration rather than ecological risk. The Navy has cleared this partially lined and channelized ditch, and clearing activities to maintain the ditch will be performed by base personnel as needed to maintain flow in the future. Consequently, the Navy disagrees with adding Wetland 6 to the SAP.

*Follow-up Comment:* Based upon field observations during the September 2012 visit, Wetland 6 certainly *appears* to be habitat for a number of fish species and piscivorous birds. If it is considered viable habitat for management purposes, then we maintain that better characterization of contaminants in this wetland is needed. If not, then issue is moot.

**Response 2:**

**The Navy agrees to collect a sediment sample near the weir feature (northern portion of Wetland 6) where Wetland 6 crosses under the road. This proposed sampling area is between Wetland 5B and the Wetland 64 complex. The Navy will add two sediment samples to Wetland 7 where the wetlands are contiguous.**

**Comment 3:**

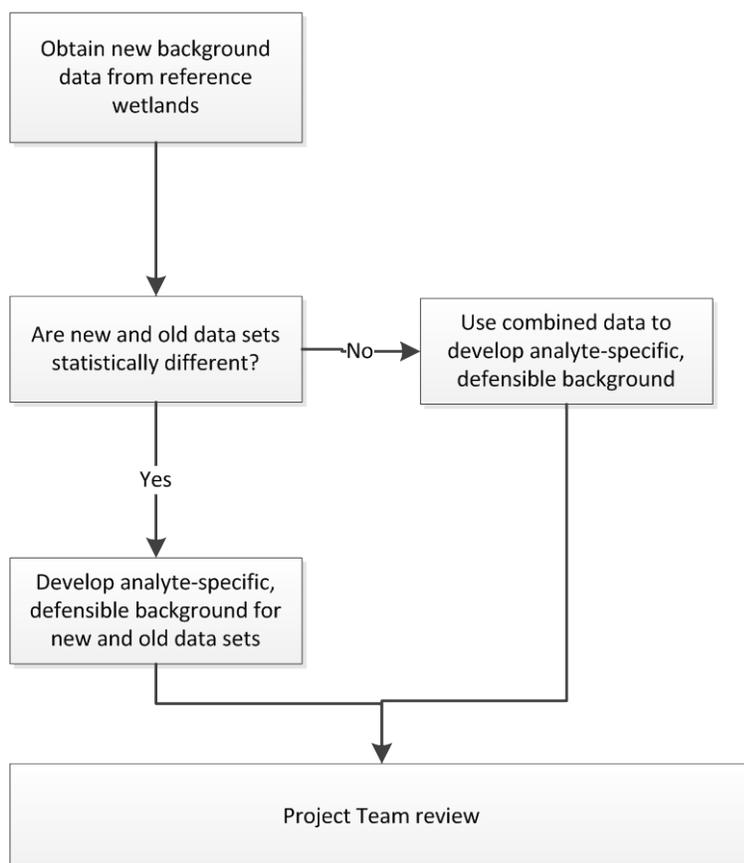
*Original Comment:* Worksheet 11 states that twice the mean detected concentration in the reference area will be utilized as an upper-end estimate of background concentrations at the site. The upper-end of the range of background concentrations is usually defined as the lower of twice the mean or the maximum detected concentration. This methodology prevents an overestimation of the upper limit of background that could result from a few elevated reference samples.

Navy Response: Background was established as part of the Final RI Report for NAS Pensacola wetlands, including substantial input from EPA, FDEP and other stakeholders as part of the partnering process with the Navy as well as the comment and response process typically used to finalize RI Reports. Consequently, revisiting background determinations and/or comparison methods as part of this sampling and analysis plan is beyond the scope of the memorandum.

Follow-up Comment: Our comment is a reiteration of one we have made previously that the method of determining the upper limit of background is inconsistent with the approach typically used by the FDEP.

### Response 3:

While the Navy appreciates and understands the approach typically used by FDEP, based on a review of all of the data and the multiple physical settings of the wetlands, the Navy intends to follow a best management approach to evaluating background. The Navy will utilize the following approach: (1) new reference data will be collected; (2) both new and old reference data will be evaluated to generate a revised background data set; and (3) the revised background data set will be used to determine whether chemicals detected at OU16 wetlands are site-related following the methods contained in Navy's Background Guidance (Guidance for Environmental Background Analysis, Volume II: Sediment, April 2003).



**Comment 4:**

Original Comment: The use of PALs in Sections 11.3 and 11.5 is unclear (Worksheet 11). The document states that site-specific preliminary remedial goals (PRGs) will be reassessed using chemistry and toxicity data collected during this sampling event. However, it also states that if a PRG was calculated as part of the feasibility study (FS), the PRG from the FS will be utilized as the PAL. The PALs are then utilized to determine the extent of contamination. At the March 2012 Partnering Meeting (Appendix A), both the University of Florida and the U.S. EPA expressed concern regarding the interpretation of toxicity testing and derivation of the PRGs in the FS. It was also agreed in a Partnering Meeting on 9 May 2012 (Appendix B) that the old toxicity testing data would not be utilized for determining ecological toxicity at the site. These values should not be proposed for determining the extent of contamination in the SAP.

Navy Response: The site-specific PRGs are the no-observed effects concentration (NOEC) or the lowest observed effects concentration (LOEC) based on site-specific conditions and detected concentrations. The PRGs, reference concentrations, and other available ecological criteria were evaluated for development of the current PALs. Based on the data collected during the proposed investigation, the site-specific PRGs may be updated. The Navy agrees that the old toxicity test data will not be used with the proposed data for determining ecological toxicity at the site. Worksheet #11 will be reworded to show that new PRGs will be calculated as new data is obtained throughout the investigation.

Follow-up comment: The response indicates agreement with our (and U.S. EPA's) recommendation that the old toxicity data not be used in the development of site-specific PRGs. **This response is satisfactory.**

**Comment 5:**

Original Comment: The sediment screening level hierarchy (page WS 11-5) proposes to utilize the FDEP probable effect levels (PELs) for delineation purposes. Usually the threshold effect levels (TELs) are utilized for screening as well as delineation purposes. Use of the PEL for delineation could result in an average wetland contaminant concentration that exceeds the TEL.

Navy Response: An RI Report has already been developed for NAS Pensacola wetlands, including substantial input from EPA, FDEP and other stakeholders as part of the partnering process with the Navy as well as the comment and response process typically used to finalize RI Reports. Consequently, findings in the RI Report and subsequent discussions were integrated into the sampling and analysis memorandum. It was noted the TECs and TELs would not be used because this investigation is not a screening level assessment as the sites are past that stage in the

risk assessment process. The sampling approach was discussed with the partnering team while the memorandum was being developed.

Follow-up Comment: Our comment was intended to address the use of the PEL for delineation purposes specifically. There are at least two potential problems with using the PEL for delineation: 1) Concentrations below the PEL can have negative impacts on benthic invertebrates, and consequently a wetland delineated using a PEL underestimates the size of the affected area; and 2) Delineation using the PEL can result in an average concentration within the delineated area that exceeds the TEL.

**Response 5:**

**The RI report and risk assessment are complete; therefore, the screening level TELs are not appropriate for this phase of the investigation. In addition, as stated in Approach to the Assessment of Sediment Quality in Florida Coastal Waters, “These guidelines are intended to be used as one tool in a toolbox of companion interpretive approaches...” and that the TELs and PELs “should not be used in lieu of water quality criteria, nor should they be used as sediment quality criteria”. Therefore use of PELs as not-to-exceed values is not appropriate, since empirical data from the site has been and will be used to calculate PRGs, as recommended by the Florida Sediment Quality Guidance.**

**The Navy agrees to provide comparison of the detected concentrations to site-specific PRGs, PELs, and background concentrations for assessment and discussion by the Team. Remedial goals for the OU 16 FS will be based on the analytical chemistry and/or toxicity testing results that will be obtained as part of the field work and testing planned for this investigation. Planned testing and corresponding DQOs will be documented in the SAP.**

**Comment 6:**

Original Comment: Only three samples are proposed per reference wetland for a total of six freshwater and six estuarine reference samples. Six samples are not adequate to determine upper background concentrations with any certainty. The small number of proposed background samples is likely to result in a data set that will overestimate upper background concentrations. We recommend two additional samples per wetland for a total of ten samples per environment.

Navy Response: Two additional samples per reference wetland will be added.

Follow-up Comment: **The response is satisfactory.**

**Comment 7:**

Original Comment: Sample 041M3306 in Wetland 33 (Figure 17-12) is the only sample proposed outside of a wetland boundary. It is unclear why a proposed reference sample does not actually lie within the boundaries of a wetland. Further explanation is necessary to clarify the placement of this sample.

Navy Response: Sample location will be changed to inside the Wetland 33 boundary.

Follow-up comment: **The response is satisfactory.**

**Comment 8:**

Original Comment: The duration of the proposed sediment toxicity tests is unclear. However, the draft Response to U.S. EPA Technical Comments (dated 30 July 2012) suggests the tests will be shortened to a 14-day exposure period for both *Leptocheirus* and *Hyaella*. It is important to note that 14-day toxicity testing for these species does not include reproduction. We recommend a chronic exposure period (28-60 days) to include reproductive endpoints as well as growth and survival. Reproductive endpoints may be more sensitive to some contaminants, and therefore contaminant concentrations protective of growth and mortality may not be protective of reproductive effects. Chronic reproductive endpoints are indicative of population level effects and should be evaluated unless there is evidence that reproduction is not the most sensitive endpoint for the contaminants of concern.

Navy Response: The chronic tests recommended by the reviewer may be appropriate for sites in the initial phases of investigation, but since the RI has been completed and finalized using shorter durations (7 to 28 day toxicity tests), it is critical that the same test organism and duration be used to ensure that consistent decisions be made during the FS process. The 14-day acute toxicity tests proposed for both test organisms will provide survival as an assessment endpoint, although with *Hyaella azteca*, growth will be measured and may be evaluated as a secondary sublethal assessment endpoint.

Follow-up Comment: We understand the point regarding consistency. Using 28-day tests would be consistent with testing conducted during the RI and arguably better capture reproductive endpoints than the 14-day tests proposed.

**Response 8:**

The Navy agrees to perform chronic toxicity to assess survival, growth and reproduction endpoints if warranted based on comparison of sediment chemistry data to the criteria identified in the SAP (Background, PRGs, PELs) including number of samples with exceedances, number of chemicals that exceed, spatial distribution of samples with exceedances, and magnitude of exceedances. The sediment chemistry data will be presented to the Pensacola Partnering Team with proposed toxicity sample locations before collection. Final toxicity sample locations will be discussed and agreed upon by the Pensacola Team before collection. The decision rules for toxicity testing are presented on Worksheet #11 in the SAP. The Standard Operating Procedures for the toxicity tests from Hydrosphere are attached.

**Comment 9:**

Original Comment: Page WS 11-4 states the PRGs in the FS were derived from the higher of the reference/background concentration, sediment screening levels, and sediment refinement levels. The PRGs were actually the higher of the reference/background, sediment screening levels, sediment refinement levels, and site-specific toxicity levels developed from sediment toxicity testing.

Navy Response: Section 11.3, page 11-4 will be reworded to state that PRGs were developed as part of the FS and the overall PRG was the highest value among the reference/background concentrations, sediment refinement levels, and site-specific NOEC or LOEC.

Follow-up Comment: **The response is satisfactory.**

Our comments above address the extent to which the proposed approach, as discussed in the responses to comments, are applicable to the problem being addressed. The document cited no references and contained no figures, tables, or numerical data or calculations. Conclusions and recommendations are implicit in the Navy responses to comments, and we have provided our comments and recommendations in the form of follow-up comments. Minor typographical errors in the presentation of our original comments and Navy responses have been corrected while reproducing them in the section above.



Center for Environment & Human Toxicology

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August 28, 2013

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

Re: Responses to comments on the Draft Sampling and Analysis Plan for OU 16, Site 41, NAS Pensacola (Escambia County, DOD\_11\_1852)

Dear Ms. Mora-Applegate:

At your request, we have reviewed the *Revised Responses to Comments on the Responses to Technical Comments, Florida Department of Environmental Protection, provided by University of Florida, Draft Sampling and Analysis Plan (SAP), Wetland Sediment Sampling, Operable Unit 16, Site 41, Naval Air Station Pensacola, Pensacola*. This document is dated July 24, 2013 and is a response to our comments provided to you in a letter dated March 27, 2013.

To enable you to follow the discussion, we have reproduced the comments from the March 27, 2013 letter and the Navy response below. Only comments that received responses from the Navy were included. After each response, we have made a follow-up comment.

Comment 1: In the final Remedial Investigation (RI; August 2005), iron was listed as a contaminant of potential concern (COPC) in surface water and sediment for Wetland 4D. During a site visit on 20 September 2012, it was noted that iron continues to be a concern for this wetland. We recommend that proposed additional sampling in Wetland 40 include iron to better determine the extent of iron contamination in sediment and surface water.

Navy Response 1: The Navy agrees that iron floc is observed in Wetland 3; however, Wetland 3 is being addressed under OU1 and Wetland 3 is not part of this investigation. Iron was not identified at Wetland 4D for further sampling in sediment in the SAP. This finding was based on the COC refinement presented as Appendix A in the Feasibility Study Report. A site-specific no observed effects concentration (NOEC) for freshwater wetlands of 246,000 milligrams per kilogram (mg/kg) was calculated for iron based on site-specific results in Wetland 3 (041M0302) at a location with no lethal or sublethal toxicity. The NOEC was discussed in the March 2012 meeting. Concentrations of iron reported in sediment are less than the NOECs, and therefore, iron was eliminated for further consideration. As discussed during partnering meetings, in the memorandum and in the response above, the scope of the memorandum was limited to sediment sampling,

so surface water and other media were not discussed in the memorandum and are beyond the scope of this follow-up work for the Feasibility Study, unless information indicates that partnering team decisions regarding those media should be reconsidered.

If performed, toxicity testing will address the mixture of contaminants in the samples and would not exclude iron. Consequently, separately analyzing samples for iron was not proposed.

As discussed during partnering meetings and in the memorandum, the scope of the memorandum was limited to sediment sampling, so surface water and other media were not discussed in the memorandum and are beyond the scope of this follow-up work for the Feasibility Study.

Follow-up Comment 1: The intent of our comment was to encourage further evaluation of iron in Wetland 4D based upon observations during the September 2012 site visit, as well as the discussions held during the March 2012 meeting. Observations of iron floc in Wetland 4D appear to be inconsistent with a conclusion of no toxicity, at least in some areas. This could perhaps be addressed by toxicity testing if properly conducted and inclusive of samples from areas with the highest iron/iron floc.

Second Navy Response 1: Because the Navy is currently preparing a Focused Feasibility Study Report and subsequently a Record of Decision Amendment for OU1, The Navy proposes to transfer Wetlands 1B, 3, 4D, 15, and 18 A/B from OU16 to OU1. All investigations associated with these wetlands will now be performed as part of OU1. The collection of surface water samples and possible toxicity testing in Wetlands 3 and 4D will be addressed in the OU1 UFP-SAP.

**Follow-up Comment 1: The response is satisfactory.**

Comment 2: During a Partnering Meeting on 27-28 March 2012, field verification was proposed for Wetland 6 to determine if additional sampling for DDT is necessary (Appendix A). A site visit on 20 September 2012 verified fish and piscivorous birds are present in this wetland. Further sampling to delineate the extent of contamination appears necessary to determine whether DDT is of concern to higher trophic levels species foraging in Wetland 6.

Navy Response 2: As stated in the Final Remediation Investigation Report, November 2007, Wetland 6 was eliminated from further sampling during the Phase III investigation because it is a channelized ditch within the NAS Pensacola storm water drainage system which receives continual impacts from storm water and is actively maintained by base maintenance personnel. As shown on Figure 11-1 from the Remedial Investigation Report, storm water from across the southeastern portion of NAS Pensacola discharges to Wetland 6.

In the May 2012 Partnering meeting, a participant was concerned with the source of DDT. Total DDT was detected above its basewide concentration of 110 ppb at only 2 of 12 locations. The highest location was 260 ppb at 041M060101 and the second highest was 52 ppb at 041M060301. The fate and transport analysis for Wetland 6 did not indicate that OU6 soil or groundwater was a source of the DDT in sediment. Detected DDT concentrations are not indicative of a spill and are likely from routine spraying of pesticides along the ditch. Food chain models do not indicate a risk to upper trophic level

receptors from DDT.

The concern for sampling was to identify a source and evaluate potential migration rather than ecological risk. The Navy has cleared this partially lined and channelized ditch, and clearing activities to maintain the ditch will be performed by base personnel as needed to maintain flow in the future. Consequently, the Navy disagrees with adding Wetland 6 to the SAP.

Follow-up Comment 2: Based upon field observations during the September 2012 visit, Wetland 6 certainly appears to be habitat for a number of fish species and piscivorous birds. If it is considered viable habitat for management purposes, then we maintain that better characterization of contaminants in this wetland is needed. If not, then issue is moot.

Second Navy Response 2: The Navy agrees to collect a sediment sample near the weir feature (northern portion of Wetland 6) where Wetland 6 crosses under the road. This proposed sampling area is between Wetland 5B and the Wetland 64 complex. The Navy will add two sediment samples to Wetland 7 where the wetlands are contiguous.

**Follow-up Comment 2: The response is satisfactory.**

Comment 3: Worksheet 11 states that twice the mean detected concentration in the reference area will be utilized as an upper-end estimate of background concentrations at the site. The upper-end of the range of background concentrations is usually defined as the lower of twice the mean or the maximum detected concentration. This methodology prevents an overestimation of the upper limit of background that could result from a few elevated reference samples.

Navy Response 3: Background was established as part of the Final RI Report for NAS Pensacola wetlands, including substantial input from EPA, FDEP and other stakeholders as part of the partnering process with the Navy as well as the comment and response process typically used to finalize RI Reports. Consequently, revisiting background determinations and/or comparison methods as part of this sampling and analysis plan is beyond the scope of the memorandum.

Follow-up Comment 3: Our comment is a reiteration of one we have made previously that the method of determining the upper limit of background is inconsistent with the approach typically used by the FDEP.

Second Navy Response 3: While the Navy appreciates and understands the approach typically used by FDEP, based on a review of all of the data and the multiple physical settings of the wetlands, the Navy intends to follow a best management approach to evaluating background. The Navy will utilize the following approach: (1) new reference data will be collected; (2) both new and old reference data will be evaluated to generate a revised background data set; and (3) the revised background data set will be used to determine whether chemicals detected at OU16 wetlands are site-related following the methods contained in Navy's Background Guidance (Guidance for Environmental Background Analysis, Volume II: Sediment, April 2003).

**Follow-up Comment 3: The response is satisfactory.**

Comment 5: The sediment screening level hierarchy (page WS 11-5) proposes to utilize the FDEP probable effect levels (PELs) for delineation purposes. Usually the threshold effect levels (TELs) are utilized for screening as well as delineation purposes. Use of the PEL for delineation could result in an average wetland contaminant concentration that exceeds the TEL.

Navy Response 5: An RI Report has already been developed for NAS Pensacola wetlands, including substantial input from EPA, FDEP and other stakeholders as part of the partnering process with the Navy as well as the comment and response process typically used to finalize RI Reports. Consequently, findings in the RI Report and subsequent discussions were integrated into the sampling and analysis memorandum. It was noted the TECs and TELs would not be used because this investigation is not a screening level assessment as the sites are past that stage in the risk assessment process. The sampling approach was discussed with the partnering team while the memorandum was being developed.

Follow-up Comment 5: Our comment was intended to address the use of the PEL for delineation purposes specifically. There are at least two potential problems with using the PEL for delineation: 1) Concentrations below the PEL can have negative impacts on benthic invertebrates, and consequently a wetland delineated using a PEL underestimates the size of the affected area; and 2) Delineation using the PEL can result in an average concentration within the delineated area that exceeds the TEL.

Second Navy Response 5: The RI report and risk assessment are complete; therefore, the screening level TELs are not appropriate for this phase of the investigation. In addition, as stated in Approach to the Assessment of Sediment Quality in Florida Coastal Waters, "These guidelines are intended to be used as one tool in a toolbox of companion interpretive approaches..." and that the TELs and PELs "should not be used in lieu of water quality criteria, nor should they be used as sediment quality criteria". Therefore use of PELs as not-to-exceed values is not appropriate, since empirical data from the site has been and will be used to calculate PRGs, as recommended by the Florida Sediment Quality Guidance.

The Navy agrees to provide comparison of the detected concentrations to site-specific PRGs, PELs, and background concentrations for assessment and discussion by the Team. Remedial goals for the OU 16 FS will be based on the analytical chemistry and/or toxicity testing results that will be obtained as part of the fieldwork and testing planned for this investigation. Planned testing and corresponding DQOs will be documented in the SAP.

**Follow-up Comment 5: The response indicates agreement with our recommendation that the PELs not be utilized for delineation purposes. The response is satisfactory.**

Comment 8: The duration of the proposed sediment toxicity tests is unclear. However, the draft Response to U.S. EPA Technical Comments (dated 30 July 2012) suggests the tests will be shortened to a 14-day exposure period for both *Leptocheirus* and *Hyalella*. It is important to note that 14-day toxicity testing for these species does not include reproduction. We recommend a chronic exposure period (28-60 days) to include reproductive endpoints as well as growth and survival. Reproductive endpoints may be more sensitive to some contaminants, and therefore contaminant concentrations

protective of growth and mortality may not be protective of reproductive effects. Chronic reproductive endpoints are indicative of population level effects and should be evaluated unless there is evidence that reproduction is not the most sensitive endpoint for the contaminants of concern.

Navy Response 8: The chronic tests recommended by the reviewer may be appropriate for sites in the initial phases of investigation, but since the RI has been completed and finalized using shorter durations (7 to 28 day toxicity tests), it is critical that the same test organism and duration be used to ensure that consistent decisions be made during the FS process. The 14-day acute toxicity tests proposed for both test organisms will provide survival as an assessment endpoint, although with *Hyalella azteca*, growth will be measured and may be evaluated as a secondary sublethal assessment endpoint.

Follow-up Comment 8: We understand the point regarding consistency. Using 28-day tests would be consistent with testing conducted during the RI and arguably better capture reproductive endpoints than the 14-day tests proposed.

Second Navy Response 8: The Navy agrees to perform chronic toxicity to assess survival, growth and reproduction endpoints if warranted based on comparison of sediment chemistry data to the criteria identified in the SAP (Background, PRGs, PELs) including number of samples with exceedances, number of chemicals that exceed, spatial distribution of samples with exceedances, and magnitude of exceedances. The sediment chemistry data will be presented to the Pensacola Partnering Team with proposed toxicity sample locations before collection. Final toxicity sample locations will be discussed and agreed upon by the Pensacola Team before collection. The decision rules for toxicity testing are presented on Worksheet #11 in the SAP. The Standard Operating Procedures for the toxicity tests from Hydrosphere are attached.

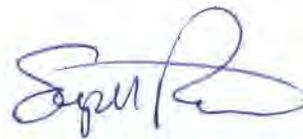
**Follow-up Comment 8: The proposed chronic toxicity testing methodology is satisfactory.**

The document contained no Table of Contents, tables, or calculations. Conclusions and recommendations are implicit in the Navy responses to comments, and we have provided our comments and recommendations in the form of follow-up comments. Minor typographical errors in the presentation of our original comments and the Navy responses have been corrected while reproducing them in the section above.

Sincerely,



Leah D. Stuchal, Ph.D.



Stephen M. Roberts, Ph.D.