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U S EPA REGION IV RESPONSE TO COMMENTS ON DRAFT REMEDIAL INVESTIGATION
REPORT OPERABLE UNIT 16 SITE 41 WETLANDS NAS PENSACOLA FL
9/1/2000
U S EPA REGION IV

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**U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION IV
RESPONSE TO COMMENTS
DRAFT REMEDIAL INVESTIGATION REPORT
OPERABLE UNIT 16 - SITE 41 (NAS Pensacola Wetlands)
NAS PENSACOLA**

The U. S. Environmental Protection Agency (EPA), has completed its review of the above subject document.

The ecological risk assessment (ERA) for Site 41 at Pensacola Bay NAS has many serious problems that need to be addressed. First, the way the information is presented in this document makes the review process very difficult. To improve readability and clarity of the document, the information currently in this volume should be divided into several smaller documents. For example, Site 40 divided areas of the Bay into assessment zones. The same process could be used for Site 41. This division into assessment zones would allow for a more complete review of wetlands associated with specific OUs and would provide information to the Base on landscape level concerns. Additionally, use of assessment zones would allow for the basis of analyzing impacts along the terrestrial/aquatic interface.

Response:

The Site 41 RI is reorganized by wetland to more clearly show the relation between contaminants and risk by wetland. Those sections that pertain to all wetlands are included.

Second, it is unclear what rationale was used to select the reference wetlands. Considering the information provided in the document, it appears that at least one of the reference wetlands may not be appropriate for use as a reference site. Additionally, both reference wetlands were compared to wetlands of concern on an interchangeable basis, regards of whether wetlands were palustrine or estuarine in nature. The comparisons between wetlands of concern versus reference wetlands was often inappropriate.

Response:

The wetland selection rationale is clarified in the text. Wetland contaminants were compared to sediment and surface water screening criteria to prioritize these wetlands as either red, orange, or blue. Either freshwater or estuarine surface water criteria were evaluated against the wetlands of concern, depending on whether the wetland contained freshwater or estuarine surface water.

Third, surface water concentrations of iron were not appropriately dealt with in the ecological risk assessment. While issues of toxicity were addressed for iron, the other issue that needs to be addressed is that high concentration of iron in surface water may serve to make that wetland surface water undesirable for ecological development. The wetlands with elevated concentrations

of iron should have appropriate biological diversity tests performed to determine if surface water iron is impacting the environment.

Response:

Toxicity from surface water was evaluated in wetlands 3 and 5A for possible impacts from iron and other contaminants. A discussion of iron toxicity is included in the text.

Benthic community indices were evaluated in every Phase IIB/III wetland to evaluate the health of the benthic community.

Fourth, the ecological risk assessment fails to address issues concerning wetlands that are either co-located or basically contiguous in nature. It would seem appropriate that these wetlands be examined together in order to address impacts to wetlands receiving inputs from other wetlands. Since this risk assessment did not analyze wetlands that are contiguous with other wetlands, a major uncertainty is added to the risk assessment. This uncertainty was not addressed in the document.

Response:

The text discusses wetlands that are downgradient from wetlands shown to pose a risk.

1.0 GENERAL COMMENTS

Comment 1:

Section 3.4, Page 3-5, Paragraph 3 lists the sites associated with OU2. Text should be added to this paragraph providing a description of the sites and contamination associated with each site.

Response:

A table describing these sites and the contamination associated with them was included with the Site 41 Sampling and Analysis Plan (E/A&H, 1995) and site descriptions are included in the text of this report.

Comment 2:

Section 4.0, Page 4-1 presents the media that was sampled and the methods of sampling and analysis. However, groundwater contamination is not addressed in this report. It is acknowledged in this report that the wetland contamination is due to contaminant migration from OUs and other sites. The principal modes of contaminant transport are likely sediment transport, surface water

transport, and groundwater transport. It was acknowledged that there was possible groundwater discharge into the wetlands. It would be difficult to evaluate future contamination of remediation of the wetlands without information about local groundwater contamination. Therefore, it is recommended that consideration be given to assessing groundwater contamination. In addition, this report has no discussion of background sample studies. The rationale for not collecting background samples should be presented in this section.

Response:

Groundwater sampling was performed during the terrestrial site RIs. The conceptual model for Site 41 (included as Figure 3-2 in the Site 41 work plan) shows that groundwater was not considered as a potential pathway. Groundwater has been evaluated at the IR sites where groundwater contamination has been identified as a potential concern. The State of Florida requires that monitoring wells nearest to the surface water body, including wetlands, meet surface water quality standards.

Four reference wetlands (25, 27, 32, and 33) were selected for sampling during Phase IIA and sample results are discussed in Sections 10.26 through 10.29. The basis for selecting reference wetlands was discussed in Section 4.13 of the Sampling and Analysis Plan and are summarized in the text of this report. In addition, reference wetland 75 was selected for sampling during Phase IIB/III. Wetland 75 has since been deleted as a reference wetland, but will be discussed in Section 10.31.

Comment 3:

Section 4.1, Page 4-2, Paragraph 4 states that after sufficient biomass was collected, fish were bagged and transported to the laboratory. The text should be added to this paragraph stating the exact biomass of fish collected to be sufficient for analysis.

Response:

The number and range of length of fish collected is included in the report.

Comment 4:

Section 5.0 of this report is part of a massive document with large amounts of data. However, there is very little effort to integrate the individual wetlands into to common transport pathways. After reviewing this document and a previous document of Site 40, it is the reviewer's opinion that a different approach is needed. In the Site 40 document, the area was split into 4 assessment areas which were not completely evaluated as individual areas. A much better picture could be formed if four documents (one for each assessment area) were produced (one for each assessment area)

which would combine Site 40 data with Site 41 data. That way the relationship between the individual wetlands, transport pathways and the impact of the contaminant transport pathways on the off-shore sediments could be assessed.

There is also no attempt at organizing the wetlands into groups of common locations and transport pathways. This organization would facilitate the understanding of the impact (nature and extent) of contamination of the wetlands. In addition, the relationships of the individual wetlands to the OUs and Sites in terms of spatial and common contaminants should be discussed.

Response:

During the Site 41 remedial investigation, wetlands were grouped based on contaminant characteristics and other physical characteristics and classified based on potential excess risk. The red, orange, and blue designation system was considered the most effective and efficient means to organize all wetlands across Site 41.

The RI report has been reorganized, Section 10 details nature and extent, fate and transport, and ecological and human health risk assessments on a wetland specific basis. Please refer to Section 4 of the Final RI/FS Sampling and Analysis Plan (E/A&H, 1995) for a more detailed description of all IR sites and their associated wetlands of concern.

Comment 5:

Section 5.0 Summary Tables present the data summary for all data. However, the frequency of detection ratio does not reflect the number of rejected samples. It is customary to decrement the number of samples by the number of rejected samples. This includes the analytes for which the non-detects were rejected. This table should be corrected. This comment applies to all the summary tables. In addition, it is unclear why the average detected concentrations are presented in the tables. For the risk assessment, either 95% UCL or the maximum detected concentrations should be used. Therefore, the purpose of presenting the average detected concentrations in the tables should be discussed in this section.

Response:

The number of samples is decremented by the number of rejected samples. Please note that no positive results were rejected.

Comment 6:

Section 5.4.1, Page 5-99, Paragraph 2 provides information on chemicals detected in reference Wetland 25. The text should be amended to include the rationale used to select Wetland 25 as a

reference wetland. Additionally, other information that should be provided on Wetland 25 includes location on base, size, type (palustrine versus estuarine versus brackish), and general habitat/vegetation. This comment also applies to the same issue for Wetland 27.

Response:

The basis for selecting the Phase IIA reference wetlands is provided in Section 6 of the report.

Comment 7:

Section 6.0, Page 6-1 presents a very superficial discussion of the fate and transport of contaminants into and within Site 41. This discussion does not address the specific properties of the individual contaminants, does not discuss the biotransformation and bioaccumulation of the contaminants and does not discuss the sediment migration pathways. The above information is important since the major exposure pathways for both human and ecological concerns are via contaminated biota. In fact, this is the only exposure pathway for humans. Therefore, it is imperative that the pathways of contaminant transport be clearly stated in this report. This section should be re-written and specific comments on the subjects to be covered are in the following comments.

Response:

The report has been reorganized. The fate and transport section focuses only with the physical and chemical aspects of these pathways; biotransformation and bioaccumulation are more appropriately treated in the ecological risk assessment section. Section 9 describes how the fate and transport will be assessed. Wetland specific evaluations are presented in Section 10.

Comment 8:

Section 6.2, Page 6-1 presents a general discussion of contaminant migration. However, biotransformation and bioaccumulation are not discussed. In particular, the biotransformation of inorganic mercury into methyl mercury is an important factor of fate and transport of mercury compounds in the coastal marine environment. Discussions on biotransformation and bioaccumulation should be added to this section.

Response:

Discussion of biotransformation and bioaccumulation are more appropriately treated in the section dealing with ecological risk. The fate and transport section is limited to the physical and chemical aspects of the potential transport pathways.

Comment 9:

Section 6.7, Page 6-10, Paragraph 3, Sentence 3 discusses the migration pathways for the Site 40 contaminants and this sentence briefly mentions the concept of sediment movement. However, the magnitude of sediment movement and direction of sediment movement is not presented and the conclusions of this sentence are not justified. This section should be expanded to include a discussion of the transport of contaminants to Site 41 and the movement of sediment within Site 41. This discussion should be by assessment area combining wetlands as the sediment transport is likely to be different within each assessment area.

Response:

A discussion regarding sediment movement into and within Site 41 is included in Section 10. The discussion is focused on wetlands of concern (defined in Comment 7 response), and will rely primarily on landform and drainage potential analyses. Data regarding the rate and mass of sediment movement into and through the wetland systems are not available; therefore, in Section 10, this mechanism of transport is treated qualitatively by considering the physical configuration of the wetland system.

Comment 10:

Section 8.1, Page 8-1, Paragraph 2 states that sediment concentrations were screened by comparison to the Region 4 Sediment Screening Values and State of Florida Sediment Quality Assessment Guidelines. The text should be modified to include a discussion of the screening methods used for surface water concentrations of chemicals.

Response:

Surface water benchmark levels, both state and federal, are described.

Comment 11:

Section 8.2.2, Page 8-5, Paragraph 2 states that sediment data were chosen over surface water data because contaminants are more persistent in sediment and better correlate with long term effects and the development of remedial options. Surface water concentrations of contaminants are also important for consideration for the same issues that are stated for the sediments. By limiting selection of wetlands of concern solely to sediment concentrations, this risk assessment provides a major data gap. Although it is recognized that surface water data was analyzed on a wetland by wetland basis, the use of sediment data alone serves to bias the selection of wetlands of concern. Therefore, the wetlands of concern should be selected based on both surface water and sediment concentrations of contaminants. The text should be amended to include surface water contaminates concentrations in the selection of wetlands of concern.

Response:

The Tier I Partnering Team decided that sediment would be most appropriate for ranking particular wetlands because of its stability as a medium of analysis. Those wetlands considered to be a potential concern in Phase IIB/III were sampled for surface water chemical analysis. The analytical results were compared to appropriate surface water screening criteria.

Comment 12:

Section 8.2.4, Page 8-169, Paragraph 2, Sentence 1 states that after review of contaminant distribution and other characteristics of all the red- and orange-coded wetlands, wetlands were grouped based on nature and extent of contamination. However, this methodology appears to be a questionable way to group wetlands. The text should be expanded to include a more complete discussion of how the review of contaminant distribution was performed and what other characteristic of wetlands was considered.

Response:

The text states that physical characteristics were also selected, and these are listed on Table 7-1. Justification for these groupings was based on information provided in the Phase IIA Investigation Summary Technical Memorandum (E/A&H, 1996) and is summarized in the text.

Comment 13:

Section 8.2.5, Page 8-168, Paragraph 1 states that wetland groups D and E were removed from any further sampling and analysis. The rationale for excluding wetlands in groups D and E should be added to the text.

Response:

Justification for removing these wetlands from further sampling and analysis was added to the text.

Comment 14:

Section 8.2.5, Page 8-168, Paragraph 4 states that wetlands 64, 5A, 3, 16, and 18 were chosen to represent Groups A, B, and C. The text should provide the rationale used to select the five wetlands from the various groups.

Response:

The rationale used to select these wetlands is described in the report.

Comment 15:

Table 8.2-141, Page 8-176 presents a list of wetlands, assessment endpoints, and measurement endpoints. However, there are several problems associated with the assessment endpoints and selected measurement endpoints provided in this list. The assessment endpoints listed below are not valid based on the criteria set forth in the EPA Process Document (EPA, 1997). The four criteria in the document include: 1) contaminants present and their concentrations, 2) mechanisms of toxicity of the contaminants to different groups of organisms, 3) ecologically relevant receptor groups that are potentially sensitive or highly exposed to the contaminant and attributes of their natural history, and 4) potentially exposed pathways. For example, a better assessment endpoint to replace survival, growth, and reproduction of macroinvertebrates associated with the benthic environment would be "maintaining a healthy aquatic community composition and structure" (EPA, 1997). An additional problem with this table is the list of measurement endpoints provided for some of the assessment endpoints. While toxicity tests provide answers regarding the potential effects of contaminants, they are not in and of themselves, appropriate measurement endpoints. The EPA Process Document (EPA, 1997) states: "a measurement endpoint is defined as a measurable ecological characteristic that is related to the valued characteristic chosen as the assessment endpoint and is a measure of biological effects (i.e., mortality, reproduction, growth)." Therefore, one of the assessment endpoint currently listed is of "survival, growth, and reproduction of macroinvertebrates associated with the benthic environment." This assessment endpoint should, in fact, be the measurement endpoint. The list below specifically addresses the assessment endpoints that should be modified:

Group A (Wetland 64) has the second assessment endpoint of "survival, growth, and reproduction of macroinvertebrates associated with the benthic environment." This endpoint should become the measurement endpoint and a new assessment endpoint should be generated. The current measurement endpoints B1, B2, and B3 should be included as testing methods used to determine effects for the measurement endpoint.

Group A (Wetland 64) has the third assessment endpoint of "protection of fish viability." This assessment endpoint is too broad and a more focused endpoint should be developed. The C2 measurement endpoint is inappropriate and should be revised.

Group B (Wetlands 5A and 3) has the first assessment endpoint of "survival, growth, and reproduction of macroinvertebrates associated with the benthic environment." This endpoint should become the measurement endpoint and a new assessment endpoint should be generated.

The current measurement endpoints A and A1 should be included as testing methods used to determine effects for the measurement endpoint.

Group B (Wetlands 5A and 3) has the second assessment endpoint stated as "protection of fish viability." This assessment endpoint is too broad and a more focused endpoint should be developed.

Group C (Wetlands 16 and 18) has the first assessment endpoint of "survival, growth, and reproduction of macroinvertebrates associated with the benthic environment." This endpoint should become the measurement endpoint and a new assessment endpoint should be generated. The current measurement endpoints A1, A2, and A3 should be included as testing methods used to determine effects for the measurement endpoint.

Group C (Wetlands 16 and 18) has the second assessment endpoint of "health of birds and terrestrial fauna." This assessment endpoint is too broad and a more focused endpoint should be developed.

Response:

The four criteria noted above were used in selecting the appropriate measurement and assessment endpoints. Although "maintaining a healthy aquatic community composition and structure" could be used, "survival, growth, and reproduction of macroinvertebrates associated with the benthic environment" measures key indicators of the benthic community used to quantify risk to the benthos.

It is agreed that other measurement and assessment endpoints could be selected to quantify ecological risk. However, the measurement and assessment endpoints chosen were approved by the Tier I Partnering Team and were based on the contaminants, receptors, and effects considered most important and relevant to quantifying ecological risk. The measurement endpoints chosen provide a strong link from contamination to effects in the assessment endpoint species selected.

Comment 16:

Section 8.2.6, Page 8-179, Paragraph 3 states that wetlands 18 and 64 had significantly higher concentrations of biomagnifying pesticides. The text should be edited to include the range of concentrations of pesticides detected at these wetlands.

Response:

The range of pesticide concentrations is included in the Section 10 wetland specific discussions.

Comment 17:

Section 8.2.6, Page 8-179, Paragraph 4 and its associated bullets state that samples for sediment toxicity analysis, sediment chemistry, TOC, grain size, and benthic diversity were collected for the selected wetlands. A table should be included in the text listing these sample data for each wetland.

Response:

This information is included in the text as it pertains to each wetland.

Comment 18:

Section 8.2.6, Page 8-186, Paragraph 1 states that samples for chemical, toxicity, biodiversity, and bioaccumulation analysis were collected for the reference wetlands, where appropriate. A table should be included in the text listing the sample data for the reference wetlands.

Response:

This information is included in the text as it pertains to each wetland.

Comment 19:

Section 8.2.7, Page 8-227, Fish Community Section presents a summary of potential effects to fish based on surface water concentrations of some contaminants. However, it is unclear why the actual fish data collected and summarized in Table 8.2-180 are not discussed in the text. Additionally, the text fails to discuss potential impacts of sediment concentrations of contaminants on fish. The text should be edited to include a discussion of sediment and fish tissue data for each wetland.

Response:

Whole body contaminant residues in foraging fish were evaluated against a database of tissue concentrations known to cause toxic effects. A fish exposure model was performed to predict and evaluate impacts to higher trophic level fish based on ingestion of contaminated foraging fish tissue. Impacts from sediment contamination are shown based on the contaminant concentrations detected in the whole body samples of foraging level fish collected from certain Phase IIB/III wetlands.

Comment 20:

Section 8.2.7, Page 8-227, Fish Community Section presents a summary of potential effects to fish based on surface water concentrations of some contaminants. One apparent data gap that should be identified in this section is that fish were not sampled in any of the freshwater wetlands. This data gap presents a major uncertainty into the risk assessment and the text should be edited to discuss the lack of fish data for freshwater wetlands.

Response:

Surface water from wetlands 5A and 3, both freshwater, were analyzed for toxicity to the fathead minnow (*Pimephales promelas*). This distinction is clarified in the text.

Comment 21:

Section 8.2.7, Page 8-228, Paragraph 2 states that HQs for the great blue heron are based on oral ingestion of total DDT and total PCB in contaminated fish tissue. However, the text fails to address the effects of other contaminants that bioaccumulate, such as mercury. The text should be expanded to include a discussion of other bioaccumulating contaminants and provide the rationale for why these other contaminants were not examined.

Response:

Because mercury was not analyzed in the prey fish, a model was used to estimate the mercury concentrations in Level 4 fish. The model is provided in Appendix G.

Comment 22:

Section 8.2.7, Page 8-228, Piscivorous Birds Section discusses the results of the data presented in Table 8.2-180. However, the number of fish sampled per wetland should also be discussed as it appears that in some wetlands only one fish was sampled and in other wetlands only 2 fish were sampled. The number of fish sampled should be added to the text with a discussion of the limits of drawing conclusions based on such a limited fish sample.

Response:

The number and species of fish collected from each sample are described in the text. Each fish sample was a composite of many fish.

Comment 23:

Table 8.2-183, Page 8-233 presents the exposure estimates and hazard prediction of pesticides and PCBs to blue heron at Site 41. However, it is unclear why reference wetland 75 is included in this

table as the rest of the wetlands and reference wetland 33 are estuarine in nature. The table should be separated into estuarine and palustrine wetlands so that more appropriate conclusions can be developed from review of the data.

Response:

Wetland 75 has been removed from consideration as a reference wetland. The fish tissue sample from wetland 18B was collected at the freshwater/saltwater interface as it drains into the bayou. Therefore, data from wetland 75 were considered appropriate to include in this table.

Comment 24:

Section 8.2.7, Page 8-235, Paragraph 3 provides a list of uncertainties associated with this risk assessment. However, several uncertainties that should be added to this list deal with 1) reference wetlands and their selection process, 2) fish tissue data limitations due to small sampling size, and 3) issues concerning wetlands that are either co-located or basically contiguous in nature. It would seem appropriate that these wetlands be examined together in order to address impacts to wetlands receiving inputs from other wetlands. The three uncertainties listed here should be added to the text and appropriate discussion of their impacts should be added to the uncertainty section.

Response:

The sources of uncertainty are discussed in the text. Wetland 75 is no longer a reference wetland and is discussed in Section 10.31. Fish tissue samples are described in Section 10. Potential impacts to downgradient wetlands from those wetlands considered to pose an ecological risk are discussed. Wetland specific evaluations are presented in Section 10.

Comment 25:

Section 8.2.7, Page 8-235 does not present a summary and conclusion. This is a very important section that should not be omitted from the document. The text should be revised accordingly.

Response:

The "Conclusions and Recommendations" section is included as Section 11.

Comment 26:

Section 8.3, Page 8-237 presents what is called a screening human health risk assessment. However, a CERCLA format risk assessment is required for military facilities, and this risk

assessment does not follow the outline, format and procedures of a CERCLA risk assessment. The outline should be as follows:

- Introduction: Organization of wetlands and site setting
- Selection of COPCs according to the Region IV procedures
- Development of a conceptual site model for each group of wetlands
- Development of exposure equations and parameters
- Development of toxicological parameters
- Calculation of exposure does and risks
- Presenting Uncertainty Information
- Calculation of RGOs

The development of modified RBCs for screening purposes and the subsequent use of ratios to calculate risks is not acceptable. This risk assessment should be re-written. In addition, the text states that this report was written in accordance with EPA guidance documents including GRAS Volume 1, Part D issued in 1998. However, according to the review, this report was not written in accordance with Part D.

Response:

Section 2 is the introductory section that discusses organization of the wetlands. More detailed explanations of the wetlands are included in the Site 41 SAP and Work Plan (E/A&H, October 1995). The conceptual site model, exposure equations and parameters, and the use of modified RBCs to select COPCs were discussed in the approved Site 41 SAP and Work Plan.

The risk assessment provided for Site 41 was not a screening level risk assessment. The text in the introductory sections of the human health risk assessment was changed to reflect this. See response to general comment 29 regarding the application of RAGS Part D in this risk assessment.

Comment 27:

Section 8.3.1, Page 8-237, Paragraph 2, Sentences 2 and 3 discuss the general scope of the risk assessment. Sentence 2 states that the HHRA is limited to a screening assessment because exposure would not be expected to occur at these wetlands under chronic conditions. Sentence 3 then states that the Region IV guidelines Preliminary Risk Evaluation for Finding Suitability for Lease (FOSL) would be used for the risk assessment. However, it is not clear what is meant by "under chronic conditions." In addition, the appropriate guidance for conducting a risk assessment at a military facility is the Region IV Supplemental Guidance for RAGS. The FOSL guidance was

specifically targeted for BRAC sites with land under consideration for lease and addresses soils and groundwater. It does not address human exposure to surface water and sediment.

Response:

See response to general comment 26, above.

Comment 28:

Section 8.3.1, Page 8-238, Paragraph 2 presents the wetlands that were selected to be evaluated by the risk assessment. However, there is no rationale as to why these wetlands were selected.

Response:

All sampled wetlands are evaluated for human health risk.

Comment 29:

Section 8.3.3.1, Page 8-244, Paragraph 1, Sentence 3 presents the exposure setting for Site 41 and this sentence states that the exposure pathways are summarized in Table 8.3-2 in accordance with RAGS Part D. However, the format of Table 8.3-2 is not in accordance with RAGS Part D. One of the requirements of RAGS Part D is that the columns of the tables cannot be modified, which includes formatting. This table should be re-formatted according to the instructions in RAGS Part D. In addition, Exhibit 3-1 displays the Interim Deliverables for each site. All tables required by RAGS Part D must be included in this risk assessment.

Response:

The time frame for the Site 41 investigation and RI report spans the release of RAGS Part D. Accordingly, much of the preliminary work was completed prior to the release of RAGS Part D. The risk assessment attempted to incorporate aspects of RAGS Part D as possible without redoing work that had already been completed. In some instances this did not include aspects such as formatting, which would not add anything of technical substance to the risk assessment.

Comment 30:

Section 8.3.3.2, Page 8-244, Paragraph 2 describes the potential exposed populations and states that the only exposed population would be trespassers and recreational users. Part of the justification is that there are no anticipated changes for the next five years. This is an inadequate period of time. However, it is a basic principle that residential land use be considered for all risk assessments. In addition, there is a possibility that maintenance workers could visit these wetlands

for general upkeep. This is more likely for the wetlands close to the developed areas. It is to be noted that in Section 8.3.5.6.3 that it was stated that occasional workers could be exposed to contaminants at Wetland 19. This risk assessment should be revised to include residential use and maintenance workers.

Response:

It is unlikely that a wetland would be selected as a site suitable for residential use. This point will be clarified in the text in place of the 5-year time limit. Based on wetland locations, they are not expected to be an exposure route for maintenance workers. Under these circumstances, trespassers and recreational users are the most conservative exposure population. Risk-based PRGs will be developed for maintenance workers to provide a basis for comparison.

Comment 31:

Section 8.3.4.2, Page 8-262 presents the toxicity profiles for the COPCs. However, it was observed that the IRIS references are not up-to-date. For example, chlordane and PCBs are not updated. This section needs to be updated with the most recent IRIS references.

Response:

The toxicity assessment and associated toxicity profiles are updated.

Comment 32:

Section 8.3.5.1, Page 8-274, Paragraph 3 presents wetland specific site descriptions. However, it is unclear why this information is presented solely in the human health section of the risk assessment instead of in either Section 2 (Environmental Setting) or in the introduction portion of Section 8 (Baseline Risk Assessment). Placing this information solely in the human health risk assessment section of the document limits review of important wetland specific characteristics from many reviewers who normally do not review human health risk assessments. The text on the wetland specific site descriptions should be moved to either of the two recommended sections.

Response:

Wetlands are described in detail in the Site 41 Sampling and Analysis Plan. The wetlands descriptions were tailored specifically to account for potential human exposures. Wetland specific descriptions are provided in the site specific discussions (Section 10).

Comment 33:

Section 8.3.5.7.2, Page 8-322 shows that Wetland 33 had two samples from fish tissue, two from sediment, and two from surface water. However, there is no explanation why there are only two samples from each medium. Such low numbers of samples collection can also be found in other sites (Wetlands 4D, 13 and 19). The issue of low numbers of sampling and the impact on the results and conclusions should be addressed.

Response:

Sample locations and rationale are provided in the Site 41 Sampling and Analysis Plan and SAP Addendum. Sampling locations were biased to areas of high TOC and grain size.

Comment 34:

Section 8.3.5.9.1, Page 8-333, Paragraph 2 states that Wetland 75 begins as a palustrine emergent wetland and changes to an estuarine emergent wetland as it enters either Pensacola Bay or Bayou Grande. However, this description is misleading and should be revised. Considering the information presented in Figure 2-1, Wetland 75 appears to flow into Wetland 52B/52C that then flow into Wetland 55. The text should be edited to more appropriately describe the flow characteristics for Wetland 75.

Response:

As wetland 75 was not sampled during Phase IIA, a description of it was not provided in the sampling and analysis plan. A more detailed description of Wetland 75 is provided in Section 10-31.

Comment 35:

Section 8.3.6, Page 8-375 presents an uncertainty discussion of Site 41 in general. However, it does not discuss the wetland specific issues such as the adequacy of sampling, applicability of exposure scenarios and the data validation results. These items should be added to the uncertainty section.

Response:

These uncertainties are discussed with the other uncertainties of an ecological risk assessment.

Comment 36:

Section 8.3.7, Page 8-381, Paragraph 0 indicates that risk managers could consider game fish data at Wetlands 18, 19, and 64 to be a potential data gap due to unavailable game fish tissue data and

great uncertainty. However, the text does not mention Wetlands 33 and 75 where the fish tissue COPCs are also identified. The text needs to explain why Wetlands 33 and 75 are not considered to be potential data gap.

Response:

Wetland 33 and 75 cannot support game fish. This point will be clarified in the text. Foraging fish tissue data is incorporated into a food chain model for wetlands 18, 19, and 64 to evaluate tissue concentrations that may be present in game fish.

2.0 SPECIFIC COMMENTS

Comment 1:

For Section 2.0, a table should be developed listing each wetland with any associated OUs or sites that may contribute COPCs to that wetland.

Response:

This table was presented in the Site 41 Sampling and Analysis Plan and will be inserted into the text in Section 3.

Comment 2:

Section 3.4, Page 3-3, Paragraph 1. This section describes the site investigation update and this paragraph discusses potential sources of contamination from sites. It is implied that since a site is designated for remediation under the state petroleum program, there will be no further action at that site or that contamination from this site will not impact the wetlands. Once contamination has migrated from a site to another area it is immaterial to the risk assessment whether or not it is a petroleum related contaminant. This paragraph should be re-phrased to distinguish clearly between sites where there is no further action under any program and the sites where cleanup is to occur under any program.

Response:

This distinction has been made. However, the text in the next paragraph states that although these sites have been placed under different designations, including no further action, they still could have impacted wetlands from historical contamination. Wetlands will be remediated if required, no matter what program they may fall under.

Comment 3:

Section 4.0, Page 4-6, Paragraph 2. This section presents the field investigation methods for the report and this paragraph presents the analytical methods. However, it was noted in the data validation section (Section 7) that some of the sediment samples were digested for metals analyses using a specialized technique with hydrofluoric acid. This method of digestion is not discussed here and the purpose of the specialized digestion is not presented. The rationale for this digestion should be presented.

Response:

The digestion method using hydrofluoric acid and its rationale is discussed in Section 4.3, Analytical Parameters.

Comment 4:

Section 4.3, Page 4-6, Paragraph 2. This section discusses the analytical parameters used in this investigation and this paragraph states that biota, sediment and surface water samples were analyzed for the full TCL and TAL. However, there are several problems with this approach. First, it is not clear why aluminum, calcium, magnesium, potassium, and sodium were analyzed on the marine surface water, biota, and marine sediment. These parameters are very likely to be elevated and produce little additional information.

Secondly, there has been past detections of mercury in sediments and since mercury is biotransformed to methylmercury in marine environments, there should have been analyses for methylmercury. It is suggested that re-sampling be performed in the areas of high mercury levels for methylmercury. If elevated levels of methylmercury are found in the surface water or sediments, then consideration should be given to analyzing biota for methylmercury.

Thirdly, in Section 7.0, Page 7-2, Paragraph 2, it is stated that fish samples were analyzed for PAHs, pesticides/PCBs and lead. This is a deviation from what was stated in this section. The rationale for the restricted list of analytes should be presented and these analyses should be discussed in this section.

Response:

Aluminum, calcium, magnesium, potassium, and sodium are part of the TCL/TAL suite with the other contaminants of interest. These data can sometimes be used for other purposes, such as determining anthropogenic sources or in remedial design.

Whole body fish samples were not analyzed for some metals because of a sampling error.

Because mercury was not analyzed in the prey fish, a model was used to estimate the mercury concentrations in Level 4 fish. The model is provided in Appendix G.

Comment 5:

Section 6.2.1, Page 6-1, Paragraph 3, Sentence 3. This section presents the physical and chemical properties that affect fate and transport and this sentence states that the chemical and physical properties used to evaluate fate and transport are found in Table 6-1. However, the actual physical and chemical parameters for each contaminant are not displayed. A table should be added which includes the fate and transport properties for each contaminant.

Response:

Properties of the major contaminant classes and how these properties relate to interactions in the environment are described in Section 9.3.

Comment 6:

Section 6.2.2, Page 6-2. This section presents a general discussion of the media properties affecting fate and transport. However, it does not address the specific effects these properties will have on the fate and transport of the contaminants. This section should be expanded to discuss in detail the effects that the media properties have on the major contaminants.

Response:

General contaminant characteristics are evaluated in Section 9. Site specific evaluations are presented in Section 10.

Comment 7:

Section 7.0, Page 7-2, Paragraph 2, Sentence 6. This section and paragraph discuss the analytical methods used in this investigation. This sentence states that six fish samples were collected for the entire investigation. This seems to be an inadequate number for the number of wetlands investigated and the overall size of Site 41. It is doubted that is a representative sample. Consideration should be given to collecting additional fish and shellfish samples.

Response:

Each fish sample was a composite of many fish. A table has been added to Section 10 to detail the number of fish samples collected.

Comment 8:

Section 7.1.3, Page 7-6, Paragraph 0, Sentence 2. This section is a discussion of the results of the data validation review of the calibration data. This sentence states that these QC deficiencies represented common laboratory practices. However, it would be thought that laboratories routinely practice to have QC deficiencies. Rather, it should be stated that the QC deficiencies are within the normal fluctuations of laboratory function. This sentence should be revised with an equivalent statement.

Response:

The following sentence has been added to the text of the document:

These QC deficiencies are within the normal fluctuations of laboratory function.

Comment 9:

Section 7.1.4, Page 7-8, Paragraph 1. This section is a discussion of the blank contamination and this paragraph discusses the common laboratory blank contaminants. However, there is not a summary table of the blank contamination and the samples affected by blank contamination. Such a table should be added.

Response:

The validation summary reports prepared by EnSafe's subcontractor, Heartland Environmental Services, Inc., are provided as an attachment and referenced in the validation report text. The summary reports contain detailed information regarding blank contamination and affected samples.

Comment 10:

Section 7.2.3, Page 7-18, Paragraph 0. This section is a discussion of the metal data validation and this paragraph discusses the metal blank contaminants. However, there is not a summary table of the blank contamination and the samples affected by blank contamination. This table should be added.

Response:

The validation summary reports prepared by EnSafe's subcontractor, Heartland Environmental Services, Inc., are provided as an attachment and referenced in the validation report text. These summary reports contain detailed information regarding blank contamination and affected samples.

Comment 11:

Section 7.2.7, Page 7-19, Paragraph in text table. This section is a discussion of the matrix spikes and duplicates for the metal analyses. This table displays the QC exceedances and the samples affected. Apparently many of the antimony results are rejected. However, there is no discussion of this point. These laboratory discrepancies should be discussed further and a summation of how many antimony results are rejected should be included. In addition, this is a point for the uncertainty discussion.

Response:

The number of undetected results that were rejected is presented in Section 5.3.1. For the validation report this equation has been modified to examine the percentage of unusable samples per wetland. This information will be presented in Section 5.3.1 of the report. Additionally, the validation summary reports prepared by EnSafe's subcontractor, Heartland Environmental Services, Inc., are provided as an attachment to Section 5. The summary reports contain detailed information regarding the rationale for qualification as unusable.

Comment 12:

Section 7.3.1, Page 8-22, Paragraph 2. This section presents a data completeness summary and this paragraph states that there was a 98% completeness of all data. In addition, it states that no positive results were rejected. However, the presentation of percentage completeness in this manner does not describe the complete picture. The percentage completeness should be based on individual analytes or analytical fractions (VOCs, SVOCs, etc.). For example, there were some pesticide non-detects which were rejected. The percentage completeness of the pesticides should then be expressed. Another issue is if the rejections were concentrated in one wetland, then this is an important fact. The percentage completeness for each wetland should be stated.

It is important that no positive results were rejected, but the fact that a number of non-detects was rejected is also important because this lowers the confidence that all important analytes were detected. Some qualifying statement about this should also be made.

Response:

Based on *Guidance for Data Useability in Risk Assessment Part A*, (USEPA, 1992), completeness was calculated using the following equation:

$$\text{Percent Completeness} = \frac{\text{Number of Acceptable Samples}}{\text{Total Number of Samples Analyzed}} \times 100$$

For the validation report this equation has been modified to examine the percentage of unusable samples per wetland. This information is presented in Section 5.3.1 of the report. Additionally, the validation summary reports prepared by EnSafe's subcontractor, Heartland Environmental Services, Inc., is provided as an attachment to Section 5. The summary reports contain detailed information regarding the rationale for qualification as unusable.

Comment 13:

Section 8.1, Page 8-1, Paragraph 2, Sentence 3. This section and paragraph discuss the screening that was performed on the Phase IIA data to prepare for the Phase IIB/III data collection. This sentence states that the screening was performed using ecological criteria. However, there is no mention of screening for human health. It is quite possible that the ecological criteria may be lower than human health criteria, but there is no mention of this fact. A discussion should be added on the potential impact of not comparing media concentrations with human health criteria.

Response:

The Phase IIA data was screened for potential human health impacts. As none were predicted, there was no additional sampling solely for human health impacts. A discussion was added explaining why ecological screening criteria were considered most important.

Comment 14:

Section 8.2.3, Page 8-160. This section (Contaminant Results and Effect Characteristics) needs to have a discussion of iron toxicity and water quality issues added to the text.

Response:

A discussion on iron was added to the text.

Comment 15:

Figures 8-29 through 8-33, Page 8-171. The figures present the conceptual model for Wetlands 64, 5A, 3, 16, and 18. The title of these figures should be modified to state that which group each respective wetland is from (such as. Group A, B or C).

Response:

The figures have been modified accordingly.

Comment 16:

Table 8.2-141, Page 8-176. The table should be modified to include a column listing the generic receptors selected for each assessment endpoint.

Response:

The table has been amended such that each assessment endpoint has its common name, species, or group of species listed.

Comment 17:

Table 8.2-157, Page 8-206. The table lists Wetland 5A SVOC contaminants compared to sediment benchmark levels. The calculated HQs for benzo(a)anthracene, benzo(a)pyrene, and chrysene appear to be incorrect. The appropriate HQs should be added to the text.

Response:

The proper HQ values have been added to the text.

Comment 18:

Section 8.3.1, Page 8-239, Paragraph 2, Sentence 1. This section is the introduction to the risk assessment and this sentence states that this limited in scope and does not address groundwater because as contaminant sinks, the exposure routes for human and ecological risk are via the sediment and surface water. However, a more important reason for not addressing groundwater is that no groundwater samples were collected. In addition, the term "contaminant sinks" for exposure routes is not exactly appropriate. The rationale for selecting surface water and sediment as the exposure media is that these media represent the most likely point of exposure. It is suggested that this sentence be re-phrased.

Response:

This sentence has been rephrased to state that sediment and surface water are the most likely exposure routes. Groundwater was studied as it pertained to the IR sites of concern.

Comment 19:

Section 8.3.3.1, Page 8-244, Paragraph 1, Sentence 1. This section describes the exposure setting in one paragraph and this sentence states that the site setting and land use is detailed in Section 2. However, Section 2 only describes the site in two broad settings, western and eastern. It is not stated which wetlands are in these subdivisions. Therefore, it is hard to judge which wetlands are

likely to be used for recreational purposes. Additional detail should be provided for site settings of each wetland, including proximity to developed areas.

Response:

Each wetland was evaluated individually for recreational use based on the proximity to developed areas and accessibility. Wetland-specific evaluations are provided in Section 10.

Comment 20:

Table 8.3-2, Page 8-246. This column only lists adolescent trespassers as the exposed population. However, given that this is a military base with some form of restricted site access, it seems likely that the trespassers or recreational users would be adults not adolescents for the current land use. In the future, the adolescent may be a more frequent user if base restrictions ease. Therefore, the adult recreational user should be added for current land use. As noted in other comments and in the text of the report, the use of the individual wetlands varies from location to location and the receptors may change. Additional text is needed to explain the rationale for selecting the receptors.

Response:

It is unlikely that a wetland would be selected as a site suitable for residential use. Based on wetland locations, they are not expected to be an exposure route for maintenance workers. Under these circumstances, trespassers and recreational users are the most conservative exposure population.

Comment 21:

Table 8.3-2, Page 8-246. Groundwater exposure is eliminated from this risk assessment because groundwater is below the aquitard in Bayou Grande. However, it is customary to perform risk evaluations on the shallow groundwater and not just on the deep aquifers. This is not a valid reason to exclude the shallow site groundwater.

Response:

Groundwater sampling was not performed because receptors would not come into contact with the groundwater. The conceptual model for Site 41 (included as Figure 3-2 in the Site 41 work plan) shows that groundwater was not considered as a potential pathway. Groundwater is being evaluated at the appropriate IR site of concern.

Comment 22:

Section 8.3, Page 8-248, Paragraph 1. This section discusses the identification of the COPC and states that most chemicals pose little risk and would greatly increase the level of effort without adding much value for the risk management decision. However, such an approach does not follow the guidelines of the Region 4 guidance. The selection of COPCs must be performed according to Region 4 guidance. It is customary to use residential RBCs for sediment screening and to use Aquatic Water Quality Criteria (water consumption and fish consumption) for screening surface water. This is especially important for these wetlands as there is a wide range of possible exposure estimates. This selection of COPCs must be re-performed.

Response:

While the use of residential soil RBCs for sediment is a screening option, Region 4 supplement to RAGS also states that it is in most cases unnecessary to evaluate human exposure to sediment that is covered by surface water. Ambient Water Quality Criteria are an appropriate tool to use for screening. However, for fish consumption from Site 41 only AWQCs would be most appropriate since these wetlands are not primary drinking water sources.

Exposure pathways proposed in the approved SAP and Work Plan include incidental ingestion of and dermal contact with surface water. These pathways are more likely to model the magnitude of exposure to contaminants in surface water than are the models used to develop AWQCs for water and fish consumption. Actual fish tissue samples were used in the risk assessment to potential exposures to contaminants in surface water resulting from ingestion of fish tissue. This approach eliminates some of the uncertainty associated with extrapolating from surface water concentrations in fish tissue concentrations, as is done when developing AWQCs.

Comment 23:

Section 8.3.3.4.1, Page 8-249, Paragraph 2, Sentence 2. This section presents the methods of screening comparisons and this paragraph presents the methods for development of the screening comparisons for surface water and sediment data. This sentence states that the RBCs were converted to reflect an adolescent trespasser who is exposed to sediment and surface water. However, this application of the RBCs and the RBC equations goes beyond the intended application of the RBCs. Rather, what is happening at this point is the development of site specific screening levels. If the COPCs had been selected according to the Region 4 guidance, then at this point, the exposure assessment equations should be presented. It is acknowledged that the equations are the same, but the objective at this point is to calculate risks, not screening concentrations.

Response:

See response to general comment 26.

Comment 24:

Table 8.3-3, Page 8-251. This table presents the parameters used to estimate the CDI. The footnote "j" states that the fish ingestion rate of 54,000 mg/day is for a subsistence fisherman. However, this is incorrect. The rate is the 95th percentile national rate. This footnote and all discussion relating to this rate should be corrected.

Response:

This footnote has been corrected.

Comment 25:

Table 8.3-3, Page 2-51, Row: Skin Surface Area. This table presents the parameters used to estimate the CDI and this row presents the skin surface area. However, these values are not the recommended default values. The Dermal Guidance (EPA 1992) recommends using 25% of the 95th percentile skin surface area. For adults, this value is 5,100 cm². These values should be checked.

Response:

Skin surface area values were developed in cooperation with USEPA and upon consultation with USEPA's Exposure Factors Handbook, as discussed in the approved SAP and Work Plan.

Comment 26:

Section 8.3.3.4.1, Page 8-253, Paragraph 1. This section presents the exposure equations for the trespasser and this paragraph presents the modifications to the RBCs for surface water. However, the surface water dermal exposure is not presented. The dermal guidance (EPA, 1992) should be consulted and the dermal exposure added to the surface water exposure.

Response:

Risk-based PRGs for surface water were developed to include the incidental ingestion, and dermal contact pathways. These PRGs were used to screen the surface water data and select COPCs.

Comment 27:

Section 8.3.3.4.2, Page 8-254, Paragraph 2. This section presents a summary of the COPC selection and this paragraph states that the individual wetlands are discussed in Section 8.3.5. However, it is preferable to present the discussion of the individual wetlands first and then the COPC summary. This report should be re-organized.

Response:

The RI report has been reorganized, Section 10 details nature and extent, fate and transport, and ecological and human health risk assessments on a wetland specific basis.

Comment 28:

Section 8.3.5.1.8, Page 8-277, Paragraph 2, Sentence 3.

This section presents the RGOs for Wetland 3 and this sentence states that only cancer hazard-based RGOs were developed. However, according to the Region 4 policy, both carcinogenic and non-carcinogenic RGOs should be developed even though the cancer risk may be the controlling RGO. This comment applies to all RGOs.

Response:

Non-cancer RGOs were added as necessary.

Comment 29:

Section 8.3.5.5.3, Page 8-307, Paragraph 1, Sentence 1.

This section describes the current and future land use for Wetland 18. This sentence states that the wetland is near a Boy Scout and Family Recreation Area. However, the same exposure parameters are used as for the other wetlands. It is likely that exposure frequency and the amount of skin exposed will be greater at this site. It is suggested that a separate exposure scenario be developed for this wetland.

Response:

The adolescent trespasser scenario developed in the approved SAP and Work Plan was considered representative of potential exposures to Boy Scouts or other adolescent trespassers.

Comment 30:

Section 8.3.5.8.3, Page 8-327, Paragraph 6, Sentence 2. This section describes the current and future land use of Wetland 64 and this sentence states that Navy and civilian recreational users

could be exposed. However, the previous paragraph states that no surface water samples were collected. This is an area where large numbers of people could be exposed to the surface water and yet no surface water samples were collected. This represents a large data gap and should be rectified.

Response:

The surface water samples collected during Phase IIB were be used in the risk assessment.

Comment 31:

Section 8.3.6.1.2, Page 8-376, Paragraph 1, Sentence 3. This section discusses the uncertainty relating to the risk estimates due to sediment exposure and this sentence states that soil ingestion rates are riddled with uncertainties. However, this is an inappropriate statement. It is acknowledged that there is a high degree of uncertainty in soil and sediment ingestion, but the use of the term riddled is inappropriate. This sentence should be deleted.

Response:

The sentence was deleted.

3.0 SPECIFIC COMMENTS - RESPONSE NOT REQUIRED

Comment 1:

Section 8.3, Tables. The tables in this section show that concentration units for some metal are ug/kg and some are mg/kg. Normally, concentration of all metals in soil and sediment samples is given as mg/kg. The same concentration unit for metals should be presented in the tables for review.

Comment 2:

Section 8.3.3.4.1, Page 8-249, Paragraph 2, Sentences 4 and 5.

The text mentions tables but does not reference specifically. The text should specify these tables.

Comment 3:

Section 8.3.4.2.14, Page 8-273, Paragraph 2, Sentence 5.

This section presents the toxicity profile for PCBs and this sentence states that the IRIS search data was in 1995. However, the IRIS information on PCBs was updated in 1997. This section should be revised to reflect the most recent information.

Comment 4:

Table 8.3.3.

This table presents values of skin surface area (SSA) for adult, child, and trespassing adolescent. However, there is no reference to the values of SSA. The table should give the reference accordingly.

Comment 5:

Table 8.3.8.

This table displays the COPC selection for Wetland 3 sediment. However, it is very difficult to see the name of the wetland due to the small print. It is suggested that the wetland name be included in the title. This comment applies to all tables. In addition, the original format of the RAGS Part D tables should not be changed.

Comment 6:

Table 8.3.15.

The table shows a few blanks at the column of site trespasser screening toxicity value. It is unclear whether the blanks mean "Not Established" or "Not Applicable". The table should clarify the blanks accordingly.

Response:

These changes were incorporated.