N00204.AR.005259
NAS PENSACOLA
5090.3a

# FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION RESPONSE TO TECHNICAL COMMENTS ON DRAFT REMEDIAL INVESTIGATION REPORT ADDENDUM SITE 40 NAS PENSACOLA FL

1/1/2000

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Florida Department of Environmental Protection (FDEP)**
**Response to Technical Comments**
**Draft Remedial Investigation Report Addendum, Site 40**
**NAS Pensacola**

Comment 1:
The document, which presents a site-specific risk assessment for the fish ingestion pathway, outlines a number of uncertainties associated with the estimated risk. These uncertainties could be reduced by actually collecting tissue samples of game fish and measuring the concentrations of chemicals of potential concern.

**Response:**
**The Navy disagrees with the above comment. To illustrate the Navy's position, the red drum is used as a representative game fish species for the Pensacola Bay area. Red drum are dependent on estuaries for at least the first few years of life. Larvae and juveniles are generally found in shallow waters, in areas not greatly affected by tides, with grassy or muddy bottoms and moderate salinities. Adult red drum move out to nearshore ocean waters and only come back to the estuaries to spawn. For the purposes of risk assessment, red drum were assumed to spend all of their life in Bayou Grande, thereby overestimating the risk since adult fish would likely spend the majority of time in nearshore ocean waters and only coming back to Bayou Grande to spawn (i.e., exposure to contaminants in the sediments of Site 40 would only be constant during the first few years of life, with the adult red drum only being exposed during periods of spawning). The model predicting the tissue concentration in the Level 4 fish assumes that the red drum is feeding only on prey within Bayou Grande, when in reality, the adult red drum would be feeding primarily on prey from Pensacola Bay and the Gulf of Mexico. Therefore, it would not be possible to assess the source of contaminants detected in the fish tissue.**

**In addition, many gamefish feed on other food sources besides fish. For example, red drum are major predators in estuaries with prey consisting primarily of crustaceans (crabs and shrimp) and other fish. Fish are generally more prevalent in the diet of red drum during winter and spring months, and crustaceans become increasingly more important during late spring and summer. Therefore, the estimated risk may be overestimated because these other food sources may not bioaccumulate COPCs at the same rate as the trophic Level 3 fish (pinfish and killifish) that were used as the basis for predicting concentrations of COPCs in trophic Level 4 fish. As a result, the amount of contaminant ingested by the Level 4 fish may vary with the season and prey species available.**

**Significant number of red drum would need to be collected from Bayou Grande in order to obtain a realistic estimate of the average tissue concentration of the contaminants in that fish species. Additionally, even if this data were collected, there is limited toxicity information available specifically for the red drum for the compounds of concern for comparison purposes. Given the other conservative assumptions utilized in the model, it is believed that collection of additional fish tissue samples is not warranted at this time.**

**Florida Department of Environmental Protection**
**Response to Technical Comments**
**Final Remedial Investigation Report, Site 40**
**NAS Pensacola**

Comment 1:
Figure 4-2, Bottom Sediment Types Based on USCS Descriptions, Phase I: It is hard to differentiate the sediment types in this figure due to the small size of the symbols.

**Response:**
**Agreed. The figure will be revised to better illustrate the bottom sediment types.**

Comment 2:
Figure 4-4, TOC in Bottom Sediments, Phase II: It is hard to differentiate the four categories of TOC concentrations in bottom sediments due to the small size of the symbols.

**Response:**
**Agreed. The figure will be revised to better illustrate the TOC concentrations.**

Comment 3:
Table 4-1, NAS Pensacola Sites Relative to Assessment Zones in Bayou Grande: Site 15 should be included as a potential source site to Assessment Zone 3.

**Response:**
**Agreed. Site 15 will be added to Table 4-1.**

Comment 4:
Figure 6-1, Bayou Grande Bathymetry: This figure should be revised so that bathymetry is illustrated clearly.

**Response:**
**Agreed. Figure 6-1 will be revised to clearly illustrate bathymetry.**

Comment 5:
Pages 7-10, 7-18, and 7-27: DDD and DDE are known as metabolites of DDT.

**Response:**
**Agreed. The word cogener will be replaced with metabolite.**

Comment 6:
Figures 7-1 through 7-29, Nature and Extent: The unit of measurement ($\mu$g/kg or mg/kg) for the concentration values presented on these figures should be indicated and presented in similar units to the screening value for comparison. Many concentration values "appear" to greatly exceed the screening values because of the manner in which they are presented on the figures.

**Response:**
**Agreed. The figures will be revised to better illustrate contaminant distribution.**

Comment 7:
Page 10-78, Risk Characterization: This section discusses a potential risk to level 4 (predatory) fish species based on dietary exposure from level 3 fish species. This risk may be underestimated of overestimated depending on the model and assumptions utilized to determine trophic transfer coefficient (TTC) values. The report recommends a more focused literature search to produce more realistic TTC values. I recommend that the Navy collect appropriate level 4 fish species and perform laboratory analysis on the tissue to assess the risk at this level.

**Response:**
**The fish model has been revised to incorporate contaminant specific trophic transfer coefficients, and effects levels based on ingestion only. As shown in the text, there is little potential risk to Level 4 fish.**

**The Navy disagrees with the suggestion of collecting Level 4 fish. The number of uncertainties will not be reduced by the collection of upper trophic level fish. In addition to logistical considerations, there are inherent factors which preclude using higher tropic level fish as a true indicator of risk. Specifically, given the absence of a species which spends its entire life within the confines of the Bayou, any contamination which may be detected in a higher tropic level tissue cannot be attributed to Bayou Grande alone. To illustrate the Navy's position, the red drum is used as a representative game fish species for the Pensacola Bay area. Red drum are dependent on estuaries for at least the first few years of life. Larvae and juveniles are generally found in shallow waters, in areas not greatly affected by tides, with grassy or muddy bottoms and moderate salinities. Adult red drum move out to nearshore ocean waters and only come back to the estuaries to spawn. For the purposes of the risk assessment, red drum were assumed to spend all of their life in Bayou Grande, thereby overestimating the risk since adult fish would likely spend the majority of time in nearshore ocean waters and only coming back to Bayou Grande to spawn (i.e., exposure to contaminants in the sediments of Site 40 would only be constant during the first few years of life, with the adult red drum only being exposed during periods of spawning). The model predicting the tissue concentration in the Level 4 fish assumes that the red drum is feeding**

**only on prey within Bayou Grande, when in reality, the adult red drum would be feeding primarily on prey from Pensacola Bay and the Gulf of Mexico. Therefore, it would not be possible to assess the source of contaminants detected in the fish tissue.**

**In addition, many gamefish feed on other food sources besides fish. For example, red drum are major predators in estuaries with prey consisting primarily of crustaceans (crabs and shrimp) and other fish. Fish are generally more prevalent in the diet of red drum during winter and spring months, and crustaceans become increasingly more important during late spring and summer. Therefore, the estimated risk may be overestimated because these other food sources may not bioaccumulate COPCs at the same rate as the trophic Level 3 fish (pinfish and killifish) that were used as the basis for predicting concentrations of COPCs in trophic Level 4 fish. As a result, the amount of contaminant ingested by the Level 4 fish may vary with the season and prey species available.**

**Significant number of red drum would need to be collected from Bayou Grande in order to obtain a realistic estimate of the average tissue concentration of the contaminants in that fish species. Additionally, even if this data were collected, there is limited toxicity information available specifically for the red drum for the compounds of concern for comparison purposes. Given the other conservative assumptions utilized in the model, it is believed that collection of additional fish tissue samples is not warranted at this time.**

Comment 8:
Page 10-100, Fish Consumption: The risk to humans from game fish consumption may be overestimated or underestimated based on the assumptions used in the assessment (Please see Comment 7 above). I recommend that the Navy collect appropriate game fish species and perform laboratory analysis on the tissue to assess the risk at this level.

**Response:**
**Please see response to Comment 7. Given the number of conservative assumptions used in the risk assessment, it is unlikely that risk is underestimated. Based on the risk calculations provided in the Remedial Investigation Report Addendum and the uncertainties associated with them, it is thought that the risks associated with the ingestion of contaminated fish from Site 40 are within acceptable limits. The cumulative HIs for noncarcinogenic effects are all 1 or below (1 is the regulatory threshold level for noncarcinogens), except for mercury for subsistence fishermen (HI = 6). Since subsistence fishing does not occur at or near Site 40, this pathway is not considered to be significant.**

**For carcinogenic risks, the cumulative risks for subsistence fishermen were slightly above the 1E-06 threshold level; however, as stated previously, it has been demonstrated that**

**subsistence fishing does not occur at or near the site; therefore, this scenario is deemed irrelevant to Site 40. Lastly, although the cumulative carcinogenic risks for recreational fishermen slightly exceed the regulatory level of 1E-06, these risks are not thought to be significant due to the likelihood of overestimating risk, specifically, the use of the maximum detected value in trophic Level 3 fish, the use of conservatively estimated TTCs, the relatively high background concentrations of PCBs in Pensacola Bay, and the fact that no allowances were made for the way the fish may be cooked, which may reduce the concentration of COPCs in the fish before consumption.**

N:\WP51\ADENNEN\PCOLA\CTO.036\BAYOU\responses\final\RIFDEP.wpd

**Florida Department of Environmental Protection**
**Response to Comments**
**Final Remedial Investigation Report for Site 40**
**NAS Pensacola**

*Ecological Baseline Risk Assessment (Section 10.2)*

The Ecological BRA prepared by EnSafe is generally consistent with ecological risk assessment guidance from the USEPA. For purposes of the risk assessment, Site 40 was divided into 4 Assessment Zones (AZs). The boundaries of these AZs are artificial but serve to delineate areas that may have been impacted by similar base-related activities. The characterization of Site 40 took place in several phases. In Phase I, sediment at Site 40 was analyzed for grain size and total organic carbon content. These data were used in the Phase IIA sampling in an effort to focus sample collection to those locations which had a greater potential for the accumulation of chemical contaminants. In Phase IIB/III, sediment samples were taken at 10 locations across Site 40. These samples were used to assess sediment quality using a Sediment Quality Triad (SQT) approach which included: 1) determination of the levels of contaminant present, 2) determination of the potential for toxicity and bioaccumulation in the food chain, and 3) an analysis of the benthic community structure. From the risk assessment, EnSafe concluded that while elevated hazard quotients based on the ratio of measured contaminant levels with sediment screening levels (SSLs) indicated some risk to ecological receptors, results of the SQT analysis demonstrated that ecological receptors are not at risk from contaminants located at the site. This conclusion seems reasonable given the data presented in the report. However, we have identified several areas of concern with the ecological BRA:

**Comment 1:**
Section 7 of the RI Report contains detailed sampling data for chemicals at Site 40. Tables 7-1 through 7-3 present the analytes detected at Site 40, the detection frequency, the range of detected values, and a comparison to SSLs. There are a number of contaminants for which no SSL was available. On this basis, it appears that these contaminants were eliminated from further evaluation (i.e., they are not presented or discussed in Section 10). Normally, screening values are used to "screen out," rather than as a basis to include, chemicals as COPCs, and the absence of a screening value would lead to the continued inclusion of a chemical in the risk assessment. In this particular case, omission of these chemicals does not appear to have compromised the risk assessment, as toxicity bioassays and benthic community analyses conducted for Site 40 indicate that the sediment is relatively "healthy."

**Response:**
**Agreed.**

**Comment 2:**
When tissue from fish collected at Site 40 was analyzed for contaminants, neither total mercury or methyl mercury was included as a target analyte. Given the fact that mercury is present at

concentrations that exceed the SSL, the transfer of this contaminant to higher trophic levels in the food chain should be evaluated.

**Response:**
**Agreed. A model was performed which predicts mercury tissue concentration in the red drum (*Sciaenops ocellatus*) based on concentrations of mercury in the sediment of Site 40. This model is based on a mercury bioaccumulation model developed by NOAA (Evans and Engel, 1994) and is presented in Attachment A of the RI Report Addendum.**

**Comment 3:**
Fish tissue samples collected at Site 40 are limited in nature. This affects the conclusions of the risk assessment in a number of ways. Section 5.2 explains that fish were collected over several days at only one location and that composite samples of 2 representative species of foraging fish (pinfish and killifish) were analyzed for contaminant concentrations. Four individual killifish and nine individual pinfish were included in the respective composite samples. Contaminant levels in higher trophic level fish were not measured, but rather were modeled based on the results in the few foraging fish that were analyzed. The ability of this approach to adequately assess contaminant burdens in fish, important both for the stated goal of "protecting fish viability" and for the human health risk assessment is highly questionable. Without additional sampling of fish, including fish at higher trophic levels, this represents a significant weakness in the ecological risk assessment.

**Response:**
**The fish model uses various inputs to conservatively estimate risk to upper trophic level fish (maximum and mean detected concentrations in prey fish, site foraging factors of 1 and 0.32, and lowest and no adverse effects levels from the ERED database (U.S. Army Corp of Engineers, 2000). A Level 4 fish that is important economically is the red drum, and is used in the mercury model and would be representative of the Level 4 species of interest in the fish model. Red drum are dependent on estuaries for at least the first few years of life. Larvae and juveniles are generally found in shallow waters, in areas not greatly affected by tides, with grassy or muddy bottoms and moderate salinities. Adult red drum move out to nearshore ocean waters and only come back to the estuaries to spawn. For the purposes of the risk assessment, red drum were assumed to spend all of their life in Bayou Grande, thereby overestimating the risk since adult fish would likely spend the majority of time in nearshore ocean waters and only coming back to Bayou Grande to spawn (i.e., exposure to contaminants in the sediments of Site 40 would only be constant during the first few years of life, with the adult red drum only being exposed during periods of spawning). The model predicting the tissue concentration in the Level 4 fish assumes that the red drum is feeding only on prey within Bayou Grande, when in reality, the adult red drum would be feeding primarily on prey from Pensacola Bay and the Gulf of Mexico. Therefore, it would be difficult to assess the source of contaminants detected in the fish tissue.**

**In addition, many gamefish feed on other food sources besides fish. For example, red drum are major predators in estuaries with prey consisting primarily of crustaceans (crabs and shrimp) and other fish. Fish are generally more prevalent in the diet of red drum during winter and spring months, and crustaceans become increasingly more important during late spring and summer. Therefore, the estimated risk may be overestimated because these other food sources may not bioaccumulate COPCs at the same rate as the trophic Level 3 fish (pinfish and killifish) that were used as the basis for predicting concentrations of COPCs in trophic Level 4 fish. As a result, the amount of contaminant ingested by the Level 4 fish may vary with the season and prey species available.**

**Significant number of red drum would need to be collected from Bayou Grande in order to obtain a realistic estimate of the average tissue concentration of the contaminants in that fish species. Additionally, even if this data were collected, there is limited toxicity information available specifically for the red drum for the compounds of concern for comparison purposes. Given the other conservative assumptions utilized in the model, it is believed that collection of additional fish tissue samples is not warranted at this time.**

*Human Health Risk Assessment (Section 10.3)*

For the human health portion of the Site 40 BRA, EnSafe evaluated four potential exposure scenarios, an adolescent swimmer, an adult swimmer, an adult commercial worker (lifeguard), and a recreational fisher. Due to the limited nature of human contact with Site 40, these seem to be reasonable scenarios for evaluation. However, because of several shortcomings in data collection and exposure pathway evaluation, we are concerned that characterization of human health risks from Site 40 are inadequate. Specifically:

**Comment 1:**
A portion of Site 40 is apparently used for recreational swimming. It is unclear from the information provided how well contamination in this area has been characterized. Additional description and discussion of contamination assessment in areas currently or likely to be used for recreational activities such as swimming needs to be added to the report. It is possible that soil and near shore sediment contamination levels have not been adequately defined, in which case additional sampling would be warranted.

**Response:**
**Surface soil has been sampled during individual site investigations at NAS Pensacola. Risk assessments were included in each of the site-specific remedial investigation reports. Therefore, additional sampling is not needed.**

**Comment 2:**
On page 10-93, the equation used to calculate the preliminary remediation goals (PRGs) for the adolescent/adult recreational swimmer and the lifeguard is shown. The pathways of exposure to

contaminants at Site 40 by these receptors are limited to surface water ingestion and dermal contact. Dermal contact and ingestion of sediment by these receptors is considered by EnSafe to be insignificant pathways at Site 40. Children playing in the near shore areas *will* come in contact with and probably ingest some sediment. Therefore, this exposure pathway should be evaluated.

**Response:**
**As stated in the response to Comment 1, surface soil has been sampled during individual site investigations at NAS Pensacola. Risk assessments were included in each of the site-specific remedial investigation reports.**

**Comment 3:**
Risk estimates to recreational anglers at Site 40 were calculated using the ratio of the Region III RBCs for fish ingestion and the maximum tissue concentration of contaminants in prey fish (pinfish and killifish). The results of this calculation are displayed in Table 10-37. Cumulative cancer risk is estimated to be 7.4E-05. When modeled tissue concentrations in predatory fish that anglers would actually consume were compared to the Region III RBCs, cumulative risk was estimated to be 5.6E-04. These values are greater than the excess cancer risks generally accepted by FDEP. These values are calculated using a fish ingestion rate of 59 g/day based on a native American subsistence fisher, which may not be applicable at this site. The Exposure Factors Handbook lists a 95$^{th}$ percentile fish ingestion value of 26 g/day for recreational anglers on the Gulf Coast, which should be considered as an alternative, conservative estimate of fish ingestion rate. The greatest uncertainty with these risk estimates, however, lies in the estimates of contaminant levels in fish. This uncertainty could be reduced by actual measurement of contaminant levels in game fish through sampling.

**Response:**
**The Remedial Investigation Report Addendum has provided a more detailed assessment of human health risk from fish ingestion.**

N:\WP51\ADENNEN\PCOLA\CTO.036\BAYOU\responses\final\Florida.wpd